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# THE EFFECT OF EMR IMPLEMENTATION ON COMMUNICATION BETWEEN PHARMACISTS AND PRESCRIBERS.

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# Objective

- To determine the effect of a newly implemented EMR system on communication between pharmacists and primary care clinicians.



# Background

- In Canada, preventable drug-related hospitalizations cost the healthcare system an estimated \$2.6 billion per year.<sup>1</sup>
- Computerized decision-making support has been shown to result in fewer cases of inappropriate prescriptions and higher rates of discontinuation of drugs causing harmful interactions.<sup>2</sup>
- EMRs have potential to improve quality of care, but is this occurring?

1. Hohl CM, Nosyk B, Kuramoto L, Zed PJ, Brubacher JR, Abu-Laban RB, Sheps SB, Sobolev B: Outcomes of emergency department patients presenting with adverse drug events. *Ann Emerg Med* 2011, 58(3):270-279.e4.

2. Tamblyn R, Huang A, Perreault R, Jacques A, Roy D, Hanley J, McLeod P, Laprise R: The medical office of the 21st century (MOXXI): effectiveness of computerized decision-making support in reducing inappropriate prescribing in primary care. *J Am Med Inform Assoc* 2011, 18:732-733,734,735,736,737.



# MEDICAL CENTER HOSPITAL

500 - 800 WY 4TH STREET

ODESSA, TEXAS

PH 332 7111

FOR Vazquez, Ramon AGE \_\_\_\_\_

ADDRESS 12141 15th St DATE 6/23/95

- NO REFILLS
- REFILLS \_\_\_\_\_
- LABEL

Zendil 20mg # 120 -  
 20mg P.O. Q6hr  
 Ferrous Sulfate 300mg # 100  
 300mg P.O. TID c meals  
 Humulin N  
 30 units SQ QAM  
 Ramon Vazquez

PRODUCT SELECTION PERMITTED

DISPENSE AS WRITTEN

D.E.A. #

FORM 207 2-90

PH 88-270



EXPLORER INNOVATOR PIONEER ADVENTURER VISIONARY TRAILBLAZER

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SAN DIEGO SPORTS MEDICINE AND ORTHOPAEDIC CENTER  
[REDACTED]  
[REDACTED] CA, U.S.A.

NAME James [REDACTED] AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

**R** JUN 07 1999

*Urology # 7000 [REDACTED] (City)*

Rx 4 TIMES [REDACTED]

DO NOT SUBSTITUTE  [REDACTED]

To assure brand name consistency, check all product labels.

*[Signature]*



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# Methods

- Retrospective chart analysis comparing **faxed** pharmacy communications captured before and after the implementation of an EMR in December 2011 at a family medicine academic teaching unit in Winnipeg.
- Rule of 3's:
  - Pharmacist requests during a 3 month period before EMR implementation and for 3 months, 3 years after EMR implementation.
- EMR used was QHR Accuro®



## Fax Prescription Renewals...



# Methods

- Requests were classified into various categories including:
  - **Medication/Service requests:**
    - refill accepted, refill denied, interaction, supplies request, continued care information, drug insurance/coverage application, new prescription request, substitution, opioid early release request
  - **Potential errors:**
    - clarification, incorrect dose, duplicate fax, confirmation of phone call and “other”





# Results

## ➤ Pre-EMR Implementation (Total of 555 Requests)

- Medication/Service Requests
  - Refill Accepted – 259 (46.7%)
  - New Prescription – 74 (13.3%)
- Potential Errors
  - Clarification – 64 (11.5%)
  - Incorrect Dose – 29 (5.2%)



# Results

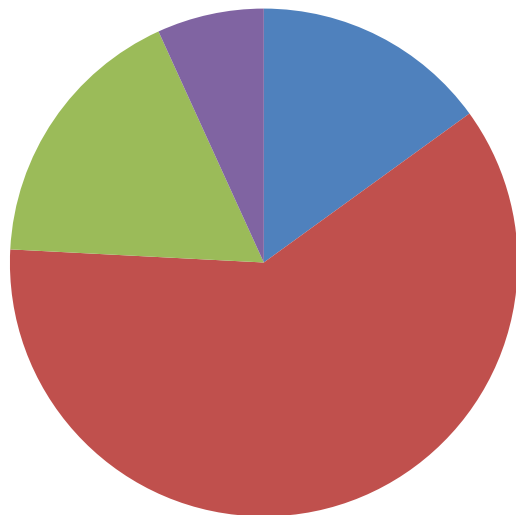
## ➤ Post-EMR Implementation (Total of 857 Requests)

- Medication/Service Requests
  - Refill Accepted – 497 (58.0%)
  - New Prescription – 160 (18.7%)
- Potential Errors
  - Clarification – 50 (5.8%)
  - Incorrect Dose – 13 (1.5%)



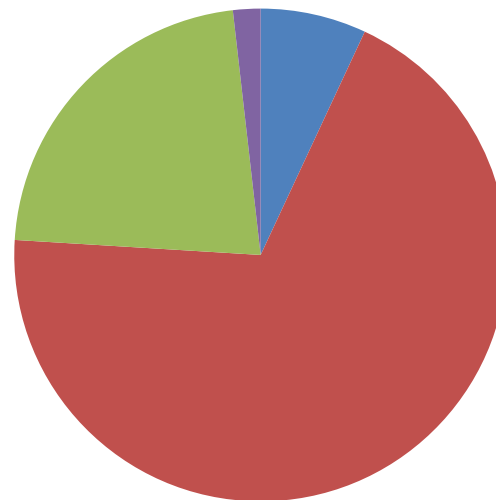
# Results

Pre-EMR Implementation



- Clarification
- Refill
- New Prescription
- Incorrect Dose

Post EMR implementation



# Discussion

- Statistically significant change in types of communication after the implementation of an EMR
  - **Reduced** volume of clarification and incorrect dose requests, with a slight decrease in the number of interaction requests.
  - **Increased** amount of refill requests and duplicate faxes.
- Findings agree with other studies that demonstrated that electronic prescribing significantly reduces risk compared to handwritten prescribing.<sup>3</sup>

3. Ammenwerth E, Schnell-Inderst P, Machan C, Siebert U: The Effect of Electronic Prescribing on Medication Errors and Adverse Drug Events: A Systematic Review. Journal of the American Medical Informatics Association 2008, 15(5):585-600.



# Interaction Requests

- Decreased in number, but very few were reported initially.
  - One possible explanation is that other forms of communication are being used to discuss drug interactions (ie: phone)
  - Another explanation is that decision support systems present in the EMR used in our study are not being monitored carefully enough and findings are being reported infrequently.



# Refill and New Prescription Requests

- Dramatic ***increase*** in volume.
  - Counterintuitive—we expected the EMR to be more efficient than paper records.
    - Provided a suitable amount of time for physicians to gain familiarity with EMR use.
    - Clinic practice sizes remained stable during the study.
    - What caused the increase?



## Possible Explanations for Increases in Refills

1. Ease of use of EMR allows prescribers to prescribe medications more easily, without requiring the patient to book an appointment.
2. Capture Bias
  - Faxes from pre-EMR period may not have been stored in binder, underrepresenting communications from that era.
3. EMR was not integrated with dispensing system (ePrescribing).
  - Workflow really captures a paper process on a computer
  - May represent sub-optimal utilization of the prescribing functionality (med list) in the EMR.



## Possible Explanations continued...

4. Telephone communication between pharmacists and prescribers was missed in both pre and post EMR workflows.
  - Pharmacist often call to speak directly with a doctor over the phone and the interaction therefore not captured as a faxed communication document.
5. Data may reflect a change in pharmacist practice between both time periods.





## Significance of our Findings and Our Limitations

- Demonstrated a significant change in prescribing patterns and improved safety after EMR implementation.
  - Our data implies that prescribing with a computer is safer than handwritten prescriptions
  - Adds a further mechanism for why this may be true
- Showed increases in the number of certain types of requests (refill requests, new prescription requests, and duplications)
  - Much room for improvement



# Limitations

- Lack of direct interface between prescribers and pharmacists.
  - Instead we relied on fax communications as a surrogate of the typical interaction beyond the usual piece of paper
- Single EMR, single clinic, one province, may not be generalizable.
  - Still indicates an interesting pattern

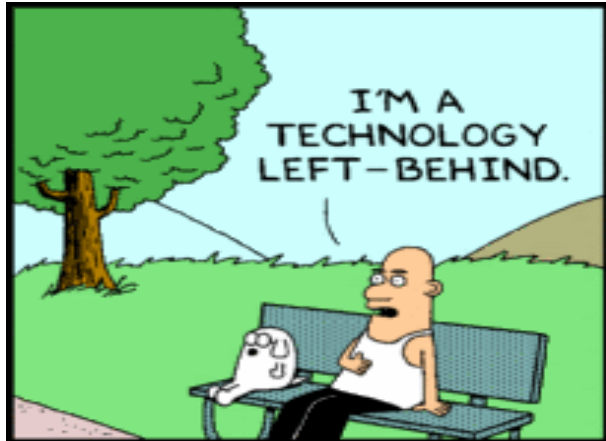


# Conclusions

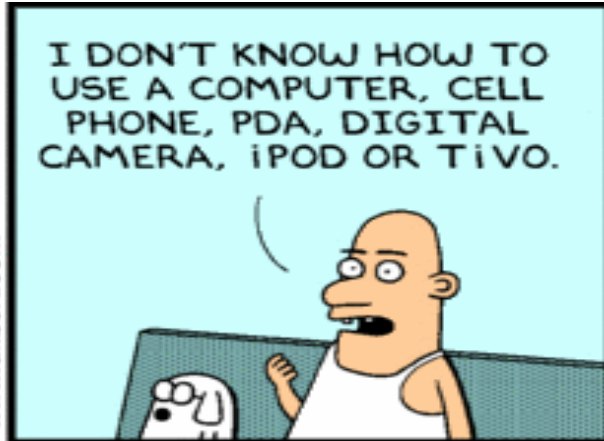
- EMR implementation in an academic family medicine clinic changed the volume of communication between pharmacists and prescribers in significant ways.
  - Clarifications and incorrect dosing communications decreased.
  - Refill requests and new prescription requests increased, suggesting that EMRs may result in improved capture and changes in prescription patterns.



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## Concluding Thoughts

- EMRs have a beneficial impact on patient safety and efficiency related to faxed communications
- Further improvements needed in prescribing technology to make full use of the benefits of digitization in primary care.



# QUESTIONS?



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# Results – Table 2

Table 2 Table listing request categories and their definitions

Request Categories	Definitions
Refill Accepted	Approved refill request.
Refill Denied	Rejected refill request.
Clarification	Requests requiring physician intervention to interpret. Ex: prescription illegible.
Incorrect Dose	Dosage prescribed by prescriber did not match what pharmacists had on record.
Exception Drug Status Request	Application for drug insurance or coverage.
New Rx Request	Request for prescription not on file for that patient.
Supplies Request	Request for non-drug equipment. Ex: diabetic equipment such as touch strips.
Continued Care Information	Requests for refills or new prescriptions relating specifically to individuals in continuing care communities.
Duplicate Fax	Copies of the same fax passed through the system more than once.
Substitution	Request for an alternate medication to replace a current one.
Fill Over Phone	Request that was completed in a phone interaction between pharmacist and prescriber.
Opioid Early Release Request	Application for release of opioid drugs to patient ahead of their intended time. Ex: patient is going away and would like to fill their hydrocodone prescription early.
Other	See Appendix 2.





# Results – Table 3

Table 3. Description of categories counted as “other,” EMR era in which they appeared, and number of each.

Other Categories	Pre or Post EMR	Total Number of Each	
Discontinued prescription	Pre	3	
Update clinical records		1	
Compliance packaging		2	
Request unclear		1	
Early refill for non-opioid		7	
Blisterpack request		3	
Patient allergy		1	
Clinical error		1	
Missing prescriber signature		4	
Patient no longer seen		1	
Error by pharmacy		1	
Follow up request from doctor		Post	1
Patient requests dose change			5
Notification of pharmacist authorized prescription			3
Home care program	9		
Missing signature	3		
Flu shot	1		
Individual not a patient	1		
Limited use request form	1		
Physician initiated communication	1		