

## "Fact or Fiction" Use of PharmaNet in the Emergency Department of a Community Hospital

Susan Buchkowsky, BSc, BScPharm, ACPR, PharmD  
Clinical Pharmacy Specialist, Emergency Medicine  
Peace Arch Hospital, Fraser Health Authority  
April 19, 2007

## Outline

- Background
- Objectives
- Methods
- Results
- Case studies
- Conclusions
- Implications for Practice

## Background

- Adverse events (AE) are common during hospitalization and an important cause of morbidity and mortality
  - Medications are responsible for 19-24% of these AEs
- Most medication errors occur during the medication ordering process at hospital admission
- The earlier in the medication use process that these errors are identified, the more likely it is that they will be rectified, thus preventing harm to the patient
- Obtaining a complete and accurate medication history at hospital admission is a necessary step in minimizing adverse events during hospital stay

## Background

- Prescription claims databases
  - Provide a record of prescription medications filled in community pharmacies
  - B.C.'s prescription claims database is called PharmaNet
  - Their use as medication histories has been advocated as a means of decreasing medication errors at hospital admission
  - The stand-alone use of these databases as accurate and reliable medication histories has been questioned

## Study Objectives

- To assess the accuracy of using PharmaNet as a medication history tool for patients admitted to a community hospital through the emergency department by
  - Comparing the PharmaNet record to an interview-based medication history
  - Identifying, categorizing and quantifying discrepancies between the PharmaNet record and the interview-based medication history
- To determine the types of medications involved in the discrepancies

## B.C.'s Prescription Claims Database: PharmaNet

- Provides a record of prescription medications filled in community pharmacies in BC
- Provides information regarding
  - Medication name, strength, directions for use, date of dispensing
- Does not record
  - Medications ordered during hospital stay, OTCs, herbal products, anti-retroviral medications
- Available in
  - Community pharmacies, hospital pharmacy and ER depts
- In hospital emergency departments
  - 15-medication PharmaNet record is obtained for admitted pts
  - A 14-month record is also available but is rarely used

## Methods

### Study Design

- A cross-sectional cohort study conducted from April-August 2006

### Inclusion Criteria

- All patients admitted through ED to Peace Arch Hospital on one or more prescription medications prior to admission and had been chosen randomly to have their medication history confirmed by a pharmacist

## Methods

### Exclusion Criteria

- Patients taking no medications prior to admission
- Patients only taking OTCs or herbal products
- Medications excluded from the analysis were
  - OTCs (except KCI listed on PharmaNet), herbal products, anti-retrovirals, creams, ointments, eye drops and medications with directions: take as directed or take as needed

## Methods

### PharmaNet and the Interview-Based Medication History

- 15-medication PharmaNet record accessed for every patient
- This record was compared to an interview-based medication history and discrepancies were identified
- Interview-based medication history was obtained by
  - Speaking directly with patient, caregiver, community pharmacy, family physician
  - Reviewing patient's medication list or vials
- Information was collected and evaluated regarding
  - Patient medications prior to admission
  - Patient demographic and clinical characteristics

## Outcome Measures and Definitions

- The discrepancies between PharmaNet and the interview-based medication history were classified as follows:
  - Medication Omissions
    - Discrepancy resulting in omission of a regularly used medication
  - Dose Discrepancies
    - Discrepancy resulting in the increase or decrease in dose or change in frequency of administration of a regularly used medication
  - Medication Additions
    - Discrepancy resulting in the addition of a medication to the patient's regimen that the patient was not taking

## Outcome Measures and Definitions

- Medication omissions were further classified as:
  - Medication Sample
    - Patient received sample from physician
  - Medication not listed on PharmaNet
    - Medication is not on PharmaNet and the patient did not receive a sample but the patient is taking the medication
  - Medication appears inactive on PharmaNet
    - It appears from PharmaNet that due to the days supply, the patient should no longer be taking the medication, but the patient is taking the medication

## Outcome Measures and Definitions

- Dose discrepancies were further classified as:
  - Strength Discrepancy
    - Where the patient is taking a different strength from what was listed on PharmaNet
  - Directions Discrepancy
    - Where the patient is taking a medication according to different directions (aside from strength) than what appeared on PharmaNet

## Outcome Measures and Definitions

■ Medication additions were further classified as:

■ Intentional Stop

■ Where the medication was intentionally stopped by the physician or patient and this change was not reflected on PharmaNet

■ Patient not taking an active medication

■ Where the medication appears as active on PharmaNet (due to days supply), but the patient is not taking the medication for an unknown reason

**Table 1: Demographic and Clinical Characteristics of Patients Admitted to Hospital through Emergency Department**

Characteristic	N (%) or Mean $\pm$ SD
Number of Patients	100
Age, mean years $\pm$ SD	76.6 $\pm$ 14.2
Male:Female	35:65
Reason for Admission	
Central Nervous System	14 (14%)
Cardiovascular	26 (26%)
Respiratory	16 (16%)
Gastrointestinal	24 (24%)
General Deterioration	9 (9%)
Musculoskeletal	8 (8%)
Genitourinary	5 (5%)
Hematologic	4 (4%)
Fluid/Electrolyte	4 (4%)
Psychiatric	2 (2%)
Other	5 (5%)

**Table 2: Interview Based Medication History**

Characteristic	N (%) or Mean $\pm$ SD
Prescription Medications per Interview Based Medication History	
Mean number $\pm$ SD	6.1 $\pm$ 2.9
Range	1-15
Sources of Interview Based Medication History	
Patient	94 (94%)
Caregiver	19 (19%)
Medication List	17 (17%)
Review of Medication Vials	11 (11%)
Community Pharmacist	9 (9%)
Family Physician	4 (4%)
Other	3 (3%)

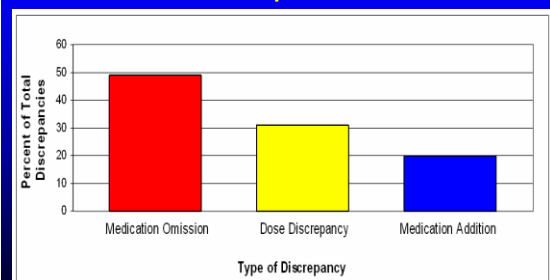
**Table 3: The Number of Discrepancies between the Interview-Based Medication History and the PharmaNet Record**

Parameter	N (%) or Mean $\pm$ SD
Medication Discrepancies	
Mean number $\pm$ SD	1.7 $\pm$ 1.8
Range	0-9
Discrepancies Per Patient	
0	30 (30%)
1	24 (24%)
2	23 (23%)
3	8 (8%)
>3	15 (15%)

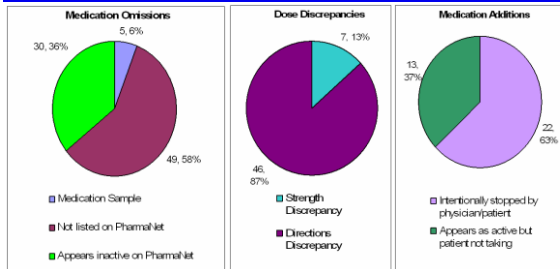
**Table 4: Comparison of Patients with No Medication Discrepancies to Patients with Medication Discrepancies**

Parameter	Patients with no Discrepancies	Patients with Discrepancies	P-value
Age Mean years	76.9	75.9	0.38
Medications Mean Number	5.2	6.6	0.008

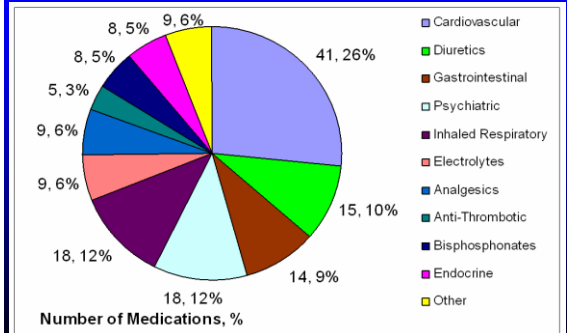
**Figure 1: Classification of Discrepancies**



**Figure 2: Further Classification of Discrepancies**



**Figure 3: Classification of Medications Involved in the Discrepancies**



**Case Study #1**

ID: 88 year old female  
 CC: Chest pain, SOB, productive cough  
 Diagnosis: CHF +/- pneumonia  
 Med History: CAD, CHF, HTN, GERD, glaucoma  
 Triage Med Hx: see medication list with patient

**Case Study #1**

- PharmaNet (Last 15 prescriptions filled)
- Furosemide 40mg po bid
  - Pilocarpine 5mg po bid prn
  - Amlodipine 10mg po daily
  - Omeprazole 20mg po bid
  - Latanoprost 0.005% 1 drop each eye QPM
  - Brimonidine 0.2% 1 drop each eye BID
  - Nitropatch 0.8mg/h daily (2 entries)
  - Didrocal 1 tab po daily
  - Clarithromycin 500mg po daily x 10 days
  - Metoprolol 50mg po bid
  - Fluticasone Nasal Spray
  - Digoxin 62.5mcg po daily
  - Nitrospray prn

**Case Study #1**

- ER physician orders:
- Furosemide 40 mg po bid
  - Pilocarpine 5mg po bid as needed
  - Amlodipine 10mg po daily
  - Omeprazole 20mg po daily
  - Latanoprost 0.005% 1 drop each eye daily
  - Brimonidine 0.2% 1 drop each eye BID
- GP orders same day:
- Furosemide 80mg IV
  - Levofloxacin 500mg IV x 1 then 500mg po daily
  - Slow K 2 tabs bid x 5 days
  - Cozaar 50mg po daily
  - Spironolactone 25mg po daily

**Case Study #1**

- Obtained current medication list and history from grandson/patient
  - No longer taking pilocarpine as it aggravates her glaucoma
  - Omitted regular meds – ASA, metoprolol, nitropatch, citalopram, digoxin, clonidine, Didrocal, fluticasone nasal spray, vitalux
  - Omeprazole twice daily instead of once daily
- Contacted GP – medications ordered, omeprazole increased to bid, pilocarpine discontinued

## Case Study #2

ID: AM 78 year old female

CC: SOB

Diagnosis: CHF

Med History: CAD, CHF, DM, asthma/COPD, OP

Triage Med List: with patient

## Case Study #2

PharmaNet (Recent fills)

- Furosemide 40mg po daily (+ 1 previous fill)
- KCl 8meq po bid
- Metoclopramide 10mg po QID prn (+ 1 previous fill)
- Ferrous Sulfate 300mg po daily
- Didrocal as directed
- Atorvastatin 20mg po daily
- Gabapentin 100mg po QHS
- Azithromycin 500mg po x 1 then 250mg po daily (+ prior course)
- Nitropatch 0.4mg/hr daily
- Rabeprazole 20mg po daily
- Lorazepam 1 mg QHS for sleep
- Metformin 1g po bid

## Case Study #2

ER physician orders:

- Furosemide 40mg IV then 80mg po bid
- Metoclopramide 10mg po QID
- ASA 81mg po daily
- Tylenol prn
- Ferrous sulfate, Didrocal, Atorvastatin, Gabapentin, Nitropatch, Rabeprazole, Ativan, Metformin (dosing same as PharmaNet)

GP (orphan) orders:

- No changes to medications
- ? Why no ACEI or spironolactone

## Case Study #2

- Obtained longer history PharmaNet and history from patient's wife
  - Omitted regular meds – risperidone, digoxin, spironolactone, fluticasone nasal spray, clopidogrel, Advair, valsartan, celecoxib, compounded ointment
- GP orders medications except celecoxib, digoxin (held due to high level) and compounded ointment next day

## Case Study #3

ID: CH 65 year old female

CC: sudden onset headache

Diagnosis: gastroenteritis

Med History: chronic pain, depression, HTN, asthma

Triage Med List: Ventolin/Flovent

## Case Study #3

PharmaNet (Recent fills)

- Paroxetine 10mg po daily
- Lorazepam 1mg po QID
- Morphine 120mg po TID (prior fills and diff strengths)
- Ramipril 10mg po bid
- Diltiazem 240mg po daily
- Salbutamol 2 puffs QID prn (+ prior fill)
- Nortriptyline 60mg po QHS (prior fills and different strengths)
- Trimipramine 75mg po QHS

### Case Study #3

ER physician orders:

- Paroxetine 10mg po daily
- Nortriptyline 10mg po QHS
- Trimipramine 75mg po QHS
- Morphine 110mg po tid
- Ativan 1mg po QHS
- Ramipril 10mg po daily
- Diltiazem 240mg po daily

### Case Study #3

■ Patient interview

- No longer taking trimipramine – not working
- No longer taking nortriptyline as she said she had a bad reaction (GI effects)
- She has filled the paroxetine prescription but is not yet taking it as she wishes to try going off medications (in consultation with psychiatrist)
- Contacted GP – medications held until confirmation with psychiatrist
- Psychiatrist confirmed patient not currently taking meds

### Case Study #4

- Patient admitted to surgery floor from long term resident (Weatherby) pavilion due to hip fracture
- Medication reconciliation form was made out by using the PharmaNet record which was outdated by about 5 months
- The plan for surgery was delayed because the medication reconciliation form stated that the patient was on clopidogrel

### Case Study #4

- By looking at the Weatherby MAR, the ward pharmacist determined that the patient had not received clopidogrel since admission to Weatherby 3 months prior
- Due to the discovery of this discrepancy, the patient ended up having surgery without delay.

### Case Study #5

- A patient was admitted to the emergency department with acute on chronic renal failure
- Medication orders did not include the nitro patch 0.8mg/hr that the patient was applying daily as it did not appear on the 15 medication PharmaNet
- The patient did not receive nitro patch for about 18 hours.

### Case Study #5

- While the pharmacist was confirming the medication history, the patient complained of chest pain
- Nitro patch were then reordered and the patient's chest pain was resolved.

## Conclusions

- When used in isolation, the PharmaNet record is not an accurate means of obtaining a complete medication history
- Discrepancies between the interview-based medication history and the PharmaNet record are common
- Discrepancies leading to possible omissions of regular medications occurred most frequently

## Conclusions

- Cardiovascular medications are the most common type of medication involved in a discrepancy
- Patients with no discrepancies appear to be associated with taking a fewer number of medications compared to those patients with discrepancies

## Implications for Practice

- PharmaNet is a useful tool when taking a medication history
- However, it is not completely accurate and reliable
- It must be used in conjunction with talking directly with the patient or caregiver when obtaining a medication history

## Implications for Practice

- The current PharmaNet system will be enhanced as part of B.C.'s eHealth initiative which is expected to be implemented in 2008
- These improvements in PharmaNet are designed to
  - Improve patient safety
  - Enhance decision-making