

The Role of Personal Digital Assistants in Pharmacosurveillance: A Canadian Experience Evaluating Drug-Related Hospital Visits

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Conflict of Interest Disclosure

- No financial interest (stocks/shares) in the sale of any drugs
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Drug-Related Morbidity

Arch Intern Med 1995;155:1949-56; J Am Pharm Assoc 2001;41:192-9.

- Annually in the US drug-related morbidity account for:
 - Costs: \$76 billion (1995) → \$177 billion (2000)
 - Hospital Costs: 62% (1995) → 70% (2000)
 - 17 million emergency department (ED) visits
 - 8.7 million hospital admissions
- Majority of literature focus on drug-related hospitalizations specifically related to adverse drug reactions (ADRs)
- Most studies use retrospective review or administrative databases to determine rate of drug-related morbidity

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The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada

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See related article page 1688

CMAJ 2004;170(11):1678-86

Abstract

Background: Research into adverse events (AEs) has highlighted the need to improve patient safety. AEs are unintended injuries or complications resulting in death, disability or prolonged hospital stay that arise from health care management. We estimated the incidence of AEs among patients in Canadian acute care hospitals.

Methods: We randomly selected 1 teaching, 1 large community and 2 small community hospitals in each of 5 provinces (British Columbia, Alberta, Ontario, Quebec and Nova Scotia).

Canadian Patient Safety Institute, and many health care organizations have initiated efforts to improve patient safety.

One important indicator of patient safety is the rate of AEs among hospital patients. AEs are unintended injuries or complications that are caused by health care management, rather than by the patient's underlying disease, and that lead to death, disability at the time of discharge or prolonged hospital stays.^{1,2} Some AEs are the unavoidable consequences of health care, such as an unanticipated allergic reaction to an antibiotic. However, 37%–51% of AEs have

Drug-Related Hospitalizations in a Tertiary Care Internal Medicine Service of a Canadian Hospital: A Prospective Study

(Pharmacotherapy 2006;26(11):1578–1586)

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Study Objectives. To determine the frequency, severity, preventability, and classification of adverse drug events resulting in hospitalization, and to identify any patient, prescriber, drug, and system factors associated with these events.

during a 12-week period.

Measurements and Main Results. A patient's hospitalization was defined as drug related if it was directly related to one of eight predefined classifications; severity and preventability of the hospitalization were also assessed. Multivariate logistic regression analysis was used to evaluate patient, prescriber, drug, and system factors associated with drug-related hospitalizations. The frequency of drug-related hospitalization was 24.1% (95% confidence interval [CI] 20.6–27.8%), of which 72.1% (95% CI 63.7–79.4%) were deemed preventable. Severity was classified as mild, moderate, severe, and fatal in 8.1% (95% CI 4.1–14.0%), 83.8% (95% CI



Personal Digital Assistant (PDA)



PDA-Based Data Collection

- Practice-based research typically involves a paper-based data collection process
- Paper-based data collection requires subsequent time consuming data entry into computer software for analysis
- PDA database development software can replicate paper forms to enables point of care data input, storage and retrieval
- Electronic forms based data collection can improve research data handling efficiency and render data in analyzable format

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Software Requirements

- Windows® and Palm® Operating System compatibility
- Non-technical development platform
- Sufficient data field capacity
- Selection list data entry options
- Ability to synchronize data across networks
- Ability to share data across multiple PDAs
- Ability for manage data with Microsoft Access®
- Security capabilities

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Software Selection

- Pendragon Forms® (Pendragon Software Corp., Libertyville, IL)
 - Multi-user scope
 - Cross-network data synchronization
 - Central database administration
 - Native data integration with Microsoft Access®



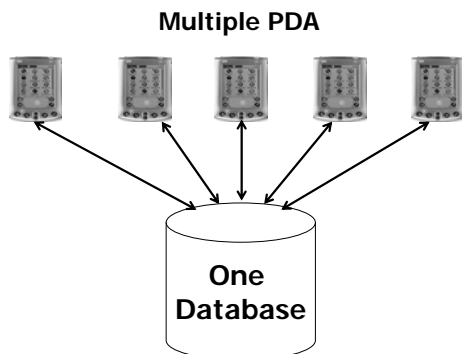
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Data Security and Synchronization

- Data Security Requirements
 - Data encryption
 - Password access control
- Data Synchronization Procedures
 - Cross-network or local PDA to PC synchronization capability
 - Multiple PDAs to one central database

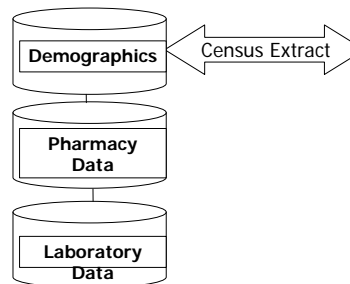
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Multiple PDA to Single Database

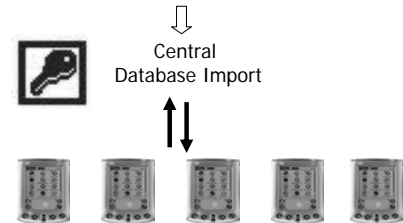


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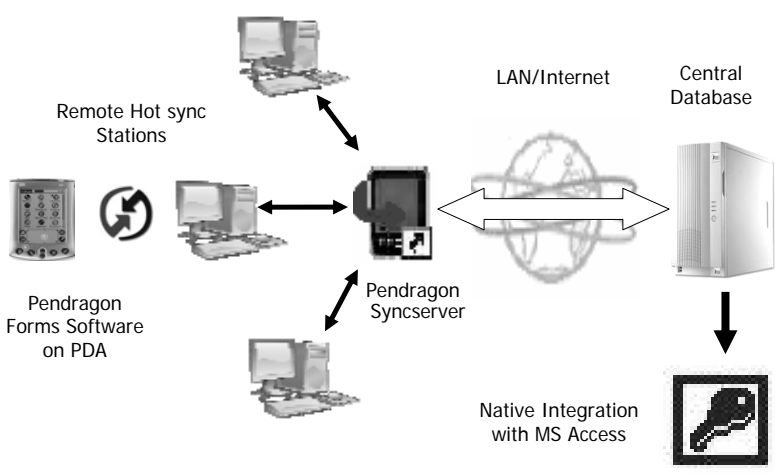
Patient Care Information System



UnitBed	LtName	FName	MRN	Sex	Age	AdmDate	AttendingMD
4E720-3	Pt 1	Name1	158315	M	35	1-Apr-05	MD1
4E740-1	Pt 2	Name2	116146	F	68	1-Apr-05	MD1
EMRG-04	Pt 3	Name3	32937	F	85	1-Apr-05	MD1
EMRG-10	Pt 4	Name4	34001	M	78	1-Apr-05	MD1
EMRG-13	Pt 5	Name5	33296	M	77	1-Apr-05	MD1
EMRG-02	Pt 6	Name6	30638	M	73	1-Apr-05	MD2
EMRG-07	Pt 7	Name7	258	F	84	1-Apr-05	MD2
4S320-3	Pt 8	Name8	13337	F	52	1-Apr-05	MD2
EMRG-03	Pt 9	Name9	15633	M	25	1-Apr-05	MD2
4B610-1	Pt 10	Name10	24537	M	63	1-Apr-05	MD2
4S320-1	Pt 11	Name11	4564	M	70	1-Apr-05	MD2
EMRG-30	Pt 12	Name12	174	F	82	1-Apr-05	MD2
11A320-2	Pt 13	Name13	15911	F	85	1-Apr-05	MD2
EMRG-23	Pt 14	Name14	655	F	72	1-Apr-05	MD2
EMRG-28	Pt 15	Name15	12150	M	75	1-Apr-05	MD2
4E710-1	Pt 16	Name16	33671	F	44	1-Apr-05	MD2



PDA Data Collection - Electronic Forms
Two-way Data Synchronization



Documenting drug-related problems with personal digital assistants in a multisite health system

SUMIT RAYBARDHAN, ROBERT M. BALEN, NILUFAR PARTOVI, PETER LOEWEN, GWEN LIU, AND PETER J. JEWESSON

The identification, prevention, and resolution of drug-related problems (DRPs) are fundamental to optimizing patient outcomes in pharmacy practice.¹ Internal documentation of these activities by pharmacists is an essential activity of any hospital pharmacy department for clinical program evaluation and justification of services. Some of the characteristics and current challenges pertaining to documentation of pharmacist interventions were reported in a survey of 1895 randomly selected U.S. hospital pharmacy directors in 2003.² Sixty-two percent of surveyed hospitals had mandatory pharmacist-intervention documentation systems, and 31% defined such documentation as "optional but highly encouraged." A majority of pharmacists documented

Purpose. A scalable, multiuser, personal digital assistant (PDA)-based documentation tool for pharmacist collection of data on drug-related problems (DRPs) is described.

Summary. A PDA-based tool for documenting DRPs and pharmacist interventions was developed with database software. Data fields were based on the pharmaceutical care model. PDA synchronization stations were configured to transmit encrypted data from three hospital sites to a central server. Pharmacists in a multisite health care organization were trained to use the documentation tool. Data were analyzed with commercially available software. Users' opinions about the tool were solicited in a survey. Twenty-eight PDAs containing a 15-field database were issued to 39 pharmacists in 31 service areas. Data were successfully transmitted from all hospital sites over the existing cor-

porate local area network. During a two-month period, 5084 DRPs were documented; 90% of them were resolved at the time of data entry. The most frequent types of DRPs were the need to add a drug (31%) and the ordering of an unnecessary drug (15%). Most pharmacists reported that the tool was easy to use, was well integrated with the workflow, and required less than 30 minutes per day for documenting DRPs.

Conclusion. A PDA-based documentation tool was successfully used in a multisite health care organization to collect data on DRPs and document pharmacist interventions.

Index terms: Computers; Documentation; Interventions; Pharmaceutical care; Pharmaceutical services; Pharmacists; Hospital; Pharmacy, institutional, hospital; Technology; Toxicity

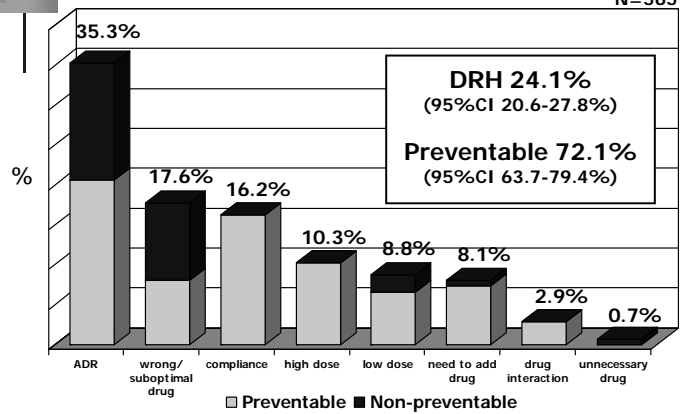
Am J Health-Syst Pharm. 2005; 62:1782-7

test		Test		ADR compliance Drug interaction high dose low dose need to add drug ↓
Lname	Test	Lname	Test	
MRN	1234567890	MRN	1234567890	
Unit	ICU	Date	5/4/04	
Add/Review-DRP	<input checked="" type="checkbox"/>	Service	ICU	
Inactivate (D/C) Pt	<input type="checkbox"/>	DRP Type	
Optional-Fields	DRP Details	
Flag For F/U	<input type="checkbox"/>	Drug	
		Drug2	If applicable	
		Recommendation	
		Anticipated Impact	
		DRP-Outcome	
		End		Recommendation Add drug Change dosing interval Change dosing times Change drug Change formulation Change to IV/SC Change to PO Change to prn dosing Change to regular dosing Continue treatment regimen ↓

Drug-Related Hospitalizations in Canada

Samoy et al. *Pharmacotherapy* 2006; 26:1578-86

N=565



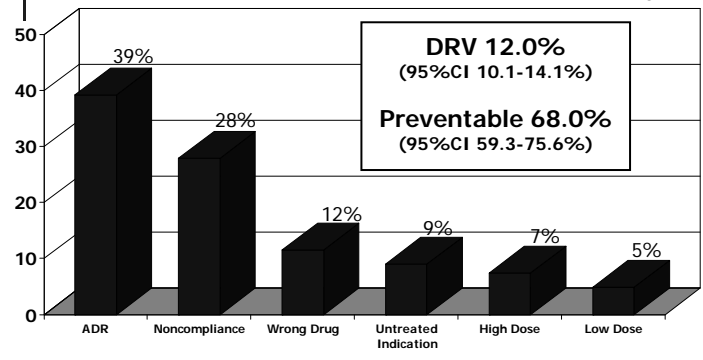
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Drug Related ED Visits in Canada

Zed et al. *Can J Emerg Med* 2007; 9:194-5 (Abstract)

N=1017



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Conclusions

- PDA software is available to electronically replicate paper forms for research data collection at the point of care
- Electronic data collection increases the efficiency of the data collection process, eliminates the redundancy of subsequent data transcription and renders data in analyzable format
- Data can be stored, shared and transmitted from multiple PDAs to a central database for analysis securely and automatically
- PDA-based data collection is attractive for performing prospective research necessary in pharmacosurveillance

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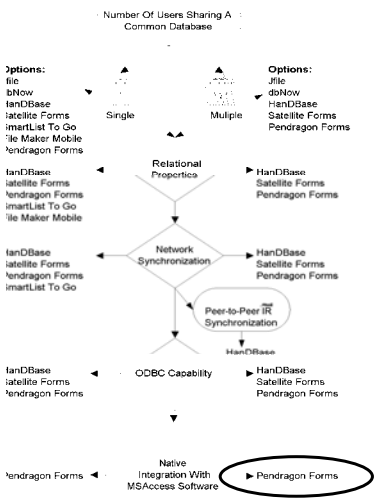
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PDA Database Software Selection Algorithm

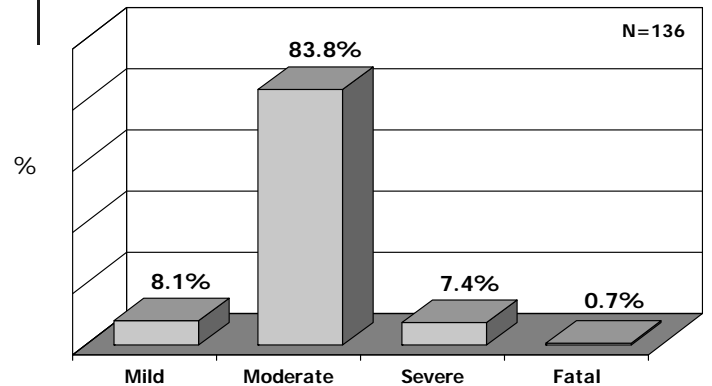
Cecillon DL, Balen RM. A comparison of Personal Digital Assistant (PDA) database software: a guide to choosing an application for professional practice data management. Canadian Society of Hospital Pharmacists (CSHP) 34th Professional Practice Conference, Toronto, ON, February 3, 2003. Can J Hosp Pharm 2003;56 Suppl 1:S53.



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Severity

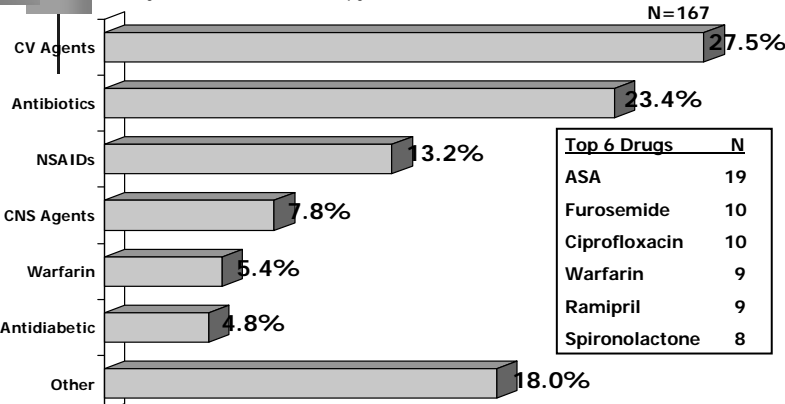
Samoy et al. Pharmacotherapy 2006;26:1578-86



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Medications

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