Optimizing Personal Digital Assistant Use in Your Pharmacy Practice: A Look at What’s New, What’s Useful and Future Implications.

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www.vhpharmsci.com/PresentationIndex.htm

Outline

- Practice Challenges
  - Documentation
  - Point of need resource material
  - Data confidentiality / security
- Questions

Conflict of Interest Declaration

- No financial conflicts of interests to declare
Conclusion

- Competent PDA use skills are a valuable component of an optimal professional practice information management strategy.

Pharmacy Practice

- Patient Care
- Research
- Teaching

Practice Challenge: Documentation

Context
- Patient care interventions
- Departmental requirements
- Medical record
- Research
  - Q/A
  - DUE
  - Studies

Pharmacist Intervention Documentation: US Survey

- N = 433 Pharmacy Directors
- 62% Mandatory intervention documentation
- 31% Optional but highly encouraged
- 61% Report dissatisfaction
- “PDA could improve documentation efficiency”


Pharmacist Intervention Documentation: VGH

- Collective evolution:
  - Internal patient monitoring records
  - Health record progress note copies
  - Some summary data reflecting processes
- Problems
  - Compliance
  - No outcomes
  - Data not readily analyzable
  - No characterization of Drug Related Problems

Documentation: PDAs

- What’s new?
  - Non technical database development software
    - Pendragon Forms [www.pendragonsoftware.com]
  - Increasing 3rd party services
    - HealthProLink [www.healthprolink.com]
    - PIDS [www.pidsware.com]
    - CliniTrends Mobile [www.ashp.com]
PDA-Based Documentation

- Database: Build it or buy it?
  - Options:
    - Internally developed project
    - Commercially available product

- Considerations
  - Support
  - Needs / expertise
  - Integration with organization IT

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Documentation: Some Site Built PDA-based Systems in the Literature


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PDA-based Data Management

- VGH we built our own infrastructure

- Reasons
  - Unique needs
    - Specific information needs
    - Short term vs. long term data collection
  - Infrastructure & process scalable to upcoming needs
    - DUE / Medication Use Management Initiatives
    - Information "push" – e.g. DUE / Cost update reports
  - User friendly "non technical" development software available
  - Standard office software for analysis
  - In house experience & expertise

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Data Collection: The Challenge

- Seamless with workflow
- Unobtrusive process
- Meaningful
  - Data → Information → knowledge → action
  - Impetus for service improvement
  - Service justification
  - Quality assurance

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Using a personal digital assistant to document pharmacotherapeutic interventions

TIMOTHY J. BOUSKI, LUCY CAMPBELL, AND SUSAN SCHWARTZ


This article describes the construction of a database for a PDA and the use of the application by a pharmacist to document interventions at the point of care.

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Paper vs Electronic Forms

PDA-based Data Management: VGH Evolution

- Service characterization & consult management
  - IVRN Service
  - Outpatient Antibiotic Therapy Program
  - Peripherally Inserted Central Line Program
  - Clinical Pharmacists Interventions
  - DRP tracker database
- Research
- Drug Related Hospitalizations Study
- DUE data collection

Increasing Complexity

PDA-based Data Management

- Levels of complexity
  - 1 user: 1 PDA
    - Local database
  - > 1 user: 1 shared PDA
    - Local database
  - Multiple user: Multiple PDA
    - One shared database
    - Local
    - Networked
    - Merging data

VGH IVRN Consult Management Database

VGH OPAT Program Consult Management

Selected OPAT Outcomes

Bosma L, Balen RM, Davison E, Jewesson P. Point of Care Use of a Personal Digital Assistant for Patient Consult Management: Experience of an Intravenous Resource Nurse team in a Major Canadian Teaching Hospital. CIN 2003; 21 (4): 179-185
Implementation of a Personal Digital Assistant (PDA)-Based Drug Related Problem (DRP) Documentation Tool for Pharmacy Practice

S. Raybardhan BSc (Pharm), R.M. Balen Pharm D., N. Partovi Pharm D. FCSHP, P. Loewen Pharm D. FCSHP, G. Liu Pharm D., P.J. Jewesson PhD. FCSHP

Objective

- Implement and evaluate a multi-site PDA-based documentation tool to collate targeted pharmacist clinical intervention data

Data -> Information -> Action

- What are the DRPs
- Where are they occurring
- What can we change or implement to:
  - Better Prevent DRP
  - Better resolve DRP
  - Most effectively use clinical resources
  - Scaleable database for expanded use

Results: PDA Database User Interface

PDA-Based Data Collection Infrastructure

- Site 1: Multiple PDAs (approx. 28)
  - Personal & corporate
  - Multiple sync stations

- Site 2: Multiple PDAs (4)
  - Corporate only
  - One sync station

- Site 3: One PDA
  - Corporate
  - One sync station

Central Data Repository

LAN-Based Data transmission

Results

- Twenty-eight PDAs deployed (39 Pharmacists)
- Successful cross-network data transmission
- Data Analysis
  - MSAccess / MExcel
- User feedback:
  - Easy to use
  - Easy to learn
  - Documentation time ≤ 30 min/day (85%)
### Report Example: DRP Totals

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Period</th>
<th>VGH</th>
<th>UBCH</th>
<th>GFS</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1-2005</td>
<td>2005-01</td>
<td>151</td>
<td>145</td>
<td>21</td>
<td>168</td>
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<tr>
<td></td>
<td>2005-02</td>
<td>159</td>
<td>116</td>
<td>64</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>2005-03</td>
<td>170</td>
<td>153</td>
<td>82</td>
<td>194</td>
</tr>
<tr>
<td></td>
<td>2005-04</td>
<td>229</td>
<td>179</td>
<td>70</td>
<td>238</td>
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<tr>
<td>Q2-2005</td>
<td>2005-05</td>
<td>159</td>
<td>191</td>
<td>34</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>2005-06</td>
<td>181</td>
<td>140</td>
<td>17</td>
<td>148</td>
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<tr>
<td></td>
<td>2005-07</td>
<td>198</td>
<td>166</td>
<td>60</td>
<td>214</td>
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<tr>
<td>Q3-2005</td>
<td>2005-08</td>
<td>224</td>
<td>197</td>
<td>63</td>
<td>247</td>
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<td></td>
<td>2005-09</td>
<td>203</td>
<td>137</td>
<td>59</td>
<td>205</td>
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<td></td>
<td>2005-10</td>
<td>180</td>
<td>40</td>
<td>16</td>
<td>236</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>1826</td>
<td>1464</td>
<td>558</td>
<td>20285</td>
</tr>
</tbody>
</table>

### Report Example: DRP Types

<table>
<thead>
<tr>
<th>DRP Type</th>
<th>VGH</th>
<th>UBCH</th>
<th>GFS</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>need to add drug</td>
<td>6184</td>
<td>305</td>
<td>65</td>
<td>6554</td>
</tr>
<tr>
<td>unnecessary drug</td>
<td>2907</td>
<td>162</td>
<td>197</td>
<td>3264</td>
</tr>
<tr>
<td>high dose</td>
<td>2234</td>
<td>165</td>
<td>85</td>
<td>2484</td>
</tr>
<tr>
<td>wrong/suboptimal drug</td>
<td>2234</td>
<td>149</td>
<td>64</td>
<td>2247</td>
</tr>
<tr>
<td>low dose</td>
<td>2195</td>
<td>123</td>
<td>30</td>
<td>2348</td>
</tr>
<tr>
<td>compliance</td>
<td>963</td>
<td>355</td>
<td>45</td>
<td>1363</td>
</tr>
<tr>
<td>ADR</td>
<td>920</td>
<td>66</td>
<td>21</td>
<td>1007</td>
</tr>
<tr>
<td>non-formulary drug</td>
<td>279</td>
<td>111</td>
<td>11</td>
<td>341</td>
</tr>
<tr>
<td>Drug interaction</td>
<td>237</td>
<td>33</td>
<td>23</td>
<td>293</td>
</tr>
<tr>
<td>Pt counseling</td>
<td>150</td>
<td>30</td>
<td>17</td>
<td>197</td>
</tr>
<tr>
<td>Grand Total</td>
<td>1826</td>
<td>1464</td>
<td>558</td>
<td>20285</td>
</tr>
</tbody>
</table>

### Report Example: DRP Details

- need to add drug
  - continue current dosing: 45
  - continue for chronic condition: 304
  - IV/po stepdown candidate alt. drug(s): 1
  - low serum levels: 1
  - new medical condition: 761
  - other: 74
  - synergistic effect: 14
  - to optimize therapy: 74
  - need to add drug Total: 1534

- unnecessary drug
  - excessive treatment duration: 199
  - no valid indication: 360
  - nondrug therapy preferred: 21
  - not most cost effective: 1
  - other: 39
  - substance abuse: 2
  - meeting avoidable ADR: 3
  - unnecessary multi drug regimen: 165
  - unnecessary drug Total: 747

### PDA DRP Database: Conclusions

- Successful infrastructure / implementation
- Successful cross-network transmission
- Documentation tool easy to learn and use
- Efficient data analysis

**PDA DRP Database Demo**

### Drug-Related Hospitalization to Internal Medicine: Prospective, Observational Study

**Principal Investigator**
- Peter J. Zed, B.Sc., B.Sc.(Pharm), Pharm.D.

**Pharmacy Resident**
- Leslie Samoy, B.Sc.(Pharm)

**Co-Investigators**
- Kerry Wilbur, B.Sc.(Pharm), Pharm.D.
- Robert M. Balen, B.Sc.(Pharm), Pharm.D.
- Mark Roberts, M.D.
- Riyad B. Abu-Laban, M.D., M.H.Sc., FRCPC
**DRH Study: Objective**

To determine:
- Incidence
- Classification
- Severity
- Preventability
- Economic impact
- Risk factors
- Of drug-related hospitalization to internal med

**DRH Study Data Algorithm**

- Patients Admitted to Internal Medicine Service
  - Included
  - Excluded
  - Patient Work-Up
    - Not Drug Related
    - Drug Related Hospitalization
  - DRP Details
    - Severity
    - Preventability
    - Preventable DRP
  - Discharge

**DRH Study PDA Database**

- Census info imported via file extract from PCIS
- PDA-based Documentation
  - Turn-key solutions
    - Healthprolink
    - Pedisware
    - Clinitrend mobile

**DRH Study Data Fields All Patients**

**DRH Study Data Fields: DRH Positive**
TWO-WAY DATA EXCHANGE

Cost Savings Per Intervention Type

http://www.pidsware.com/index.html

www.ashp.com
PDA-Based Documentation Infrastructure

- Should you do it yourself?
- Benefits
  - Very customizable
  - Target to specific needs
  - Facilitate research
  - DUE
- Cautions
  - Hidden costs
  - Lacking formal IS support?
  - Takes time and skills to develop
  - What if the “expert” leaves?

PDA-Based Patient Tracking

Commercially Available Patient Tracking Software

- Patient Tracker
  - www.handheldmed.com
- Patient Keeper
  - http://www.patientkeeper.com/
- E-patient
  - http://www.iatrosoft.com/

Commercially Available Patient Tracking Software

Patient Tracker

www.handheldmed.com

http://www.patientkeeper.com/

http://www.iatrosoft.com/
PDA Patient Tracking

- Issues:
  - Data backup
  - Confidentiality / security
  - Varying practice approaches
  - Corporate strategy / support lacking
    - Recreating medical record
  - Lack of integration with hospital IT systems
    - Redundant data entry
  - Commercial databases aimed at MD approach

Practice Challenge:
Point of Need Access To Resources

What's New: PDA Hardware

- Sony CLI
  - Dell Axim™ X50v Handheld
    - VGA display
    - Accelerated Graphics
    - Integrated 802.11b and Bluetooth

- Palm Tungsten T5
  - 256 MB memory
  - Flash memory
  - Large screen
  - Bluetooth

- Wrist PDA FX2008
  - Palm OS
  - Personalised 'dial' when not in PDA mode
  - A stylus is integrated into the buckle

What's New: Resource Software

- More titles
- More frequent updates
- Practice guidelines
- Better office software integration
Clinical References: More Titles

- Major Vendors:
  - Lexi-comp (www.lexi.com)
  - Skyscape (www.skyscape.com)

PDA-Based Clinical Guidelines

PDA Clinical Resources: Guidelines

- Mobile Medica – Apprisor
  - www.apprisor.com
- Skyscape
  - www.skyscape.com

Decision Support: Guidelines on PDA

- www.apprisor.com

PDA Guides: Clinical Trials Database

Overview of Algorithms for Management of Patients with AF
(See Figures 2, 3, 4, and 5)
Management of patients with AF requires knowledge of its pattern of presentation (paroxysmal, persistent, or permanent) and decisions about restoration and maintenance of sinus rhythm, control of the ventricular rate.
PDA Guides: Clinical Trials Database

PDA Drug Info Software

Lexi-Drugs

Lexi-Drugs Categories of Information

Drug Information: ePocrates qRx

http://www.epocrates.com/
The Best Drug Information Software

- Many may meet your needs
  - Lightweight quick look up vs. comprehensive database
- Few objective comparisons
- Lexi-Drugs one of the most comprehensive
  - Anecdotal experience

PDA Software: Disease Info

<table>
<thead>
<tr>
<th>Software/ Publisher</th>
<th>Vendor Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classics</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
<tr>
<td>Griffiths' 5 Minute Clinical Consult / Lippincott Williams &amp; Wilkins</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
<tr>
<td>Washington Manual Wash Mnl™/Lippincott Williams &amp; Wilkins/ W. B. Saunders</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
<tr>
<td>New</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
<tr>
<td>Handbook of Applied Therapeutics, 7/e / Lippincott Williams &amp; Wilkins</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
</tbody>
</table>

PDA Software: Drug Interaction Analysis

<table>
<thead>
<tr>
<th>Software/ Publisher</th>
<th>Vendor Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facts™ (Drug Interaction Facts) / Facts &amp; Comparisons</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
<tr>
<td>Lexi-Interact™ / Lexi-Comp, Inc.</td>
<td><a href="http://www.uptodate.com">www.uptodate.com</a></td>
</tr>
<tr>
<td>MosbyRx™ (2002)/ Mosby, Inc.</td>
<td><a href="http://www.skyscape.com">www.skyscape.com</a></td>
</tr>
<tr>
<td>ePocrates Rx™ / ePocrates, Inc.</td>
<td><a href="http://www.epocrates.com">www.epocrates.com</a></td>
</tr>
</tbody>
</table>

5-Minute Clinical Consult: Categories of Information

- Categorization
  - wholesale
  - transportation
  - consumer
  - industrial
  - government

Handbook of Applied Therapeutics

- Categories
  - General Principles
  - 5 General Gaw
  - 1. General Principles
  - 2. Cardiac and Vascular Disorders
  - 3. Pulmonary Disorders
  - 4. Gastrointestinal Disorders
  - 5. Endocrine/ Metabolics
  - 6. Nephrology

PDA Software: Disease Info

- www.skyscape.com
- www.lexi.com
- www.skyscape.com
- www.skyscape.com
iFacts Drug Interaction Analysis
Categories of Information

<table>
<thead>
<tr>
<th>iFacts</th>
<th>FAQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Selection</td>
<td>Intake Network</td>
</tr>
<tr>
<td>Antimicrobial</td>
<td>Indications/Management</td>
</tr>
<tr>
<td>NSAID</td>
<td>Thromboprophylaxis</td>
</tr>
<tr>
<td>Captopril</td>
<td>Streptokinase</td>
</tr>
<tr>
<td>Mendel</td>
<td>Thrombolysis</td>
</tr>
<tr>
<td>Zetacap</td>
<td>Carbenoxolone</td>
</tr>
<tr>
<td>Cardiac</td>
<td>Erezal</td>
</tr>
</tbody>
</table>

ePocrates qRx: Drug Interaction Analysis
Multi drug interaction check available

http://www.epocrates.com

PDA Software: Infectious Diseases

Table 1: Overview of Characteristics of Infectious Diseases Personal Digital Assistant Applications

<table>
<thead>
<tr>
<th>Feature</th>
<th>ePocrates</th>
<th>PDA Infectious Diseases</th>
<th>Sanford Guide</th>
<th>Antibiotics Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Windows CE</td>
<td>Palm OS</td>
<td>Palm OS</td>
<td>Windows CE</td>
</tr>
<tr>
<td>Memory</td>
<td>128 MB</td>
<td>64 MB</td>
<td>64 MB</td>
<td>128 MB</td>
</tr>
<tr>
<td>Battery</td>
<td>10 hours</td>
<td>8 hours</td>
<td>8 hours</td>
<td>10 hours</td>
</tr>
<tr>
<td>Size</td>
<td>4 MB</td>
<td>3 MB</td>
<td>3 MB</td>
<td>4 MB</td>
</tr>
</tbody>
</table>

Miller SM, Beattie MM, Butt AA. Personal Digital Assistant Infectious Diseases Applications for Health Care Professionals. CID 2003; 36:1018-29

John Hopkins ABX Guide

Search by diagnosis
Search by pathogen
Search by antibiotic

http://hopkins-abxguide.org/

John Hopkins Antibiotic Guide

Search by diagnosis (HEP C)
- Click on the Diagnosis tab on right
- Select GI from the pull out menu
- Click diagnosis tab on right
- Select GI

Infectious Diseases: Sanford Guide

Electronic may not always be better
PDA Software: Natural Medicines

**Classic**
- Natural Medicines Comprehensive Database
  - [www.naturaldatabase.com/skyinfo.asp](http://www.naturaldatabase.com/skyinfo.asp)

**New**
- Natural Standard the Authority on Integrative Medicine
  - [www.naturalstandard.com](http://www.naturalstandard.com)

**King's Guide to Parenteral Aseptic Practice**

**Clinical Pharmacology OnHand IV Alert**
- IV compatibility report tool for checking the compatibility of two or more intravenous products and/or solutions when mixed in solution or a syringe, or via a Y-site administration

**IV Compatibility Software: King Guide**
- Select 1st Drug: ACE-TERAPAMIDE SODIUM
  - Incompatibility: OMEPRAZOLEhydrochloride

**Clinical Pharmacology OnHand**
- [www.cponhand.garn.com/](http://www.cponhand.garn.com/)
Creating Your Own Resource Material
Office Software Integration

Office Software Integration
- Word Processing / Spreadsheet / Presentation
- Documents to Go  [www.dataviz.com]
- Word Processing / Spreadsheet
  - Quick Office  [www.cesinc.com/quickoffice/]
  - Word Processing Only
    - Wordsmith  [www.bluenomad.com/]
- Adobe Acrobat files
  - Adobe reader for Palm OS  [www.adobe.com/products/acrobat/readerforpalm.html]

Documents To Go
New Version Available!
Word, Excel & PowerPoint® Files On Your Palm® Handheld. Instantly.

www.dataviz.com

QuickOffice
The first fully functional suite for opening and editing popular Microsoft Word, Excel and PowerPoint files directly on your Palm® or iPAQ® mobile device. Learn more about QuickOffice's suite of applications available for your mobile device

http://www.quickoffice.com/
Clinical References: The “VGH Package”

- Clinical resources
  - Lexi-drugs, Lexi-interact, SMCC
- Calculators
  - Scientific
  - Medical
  - Kinetics spreadsheet
- Documentation & Research Databases
  - Pendragon Forms
- Relevant practice guidelines - coming soon

Data Security / Pt Confidentiality

- Requirements
  - HIPPA (USA)
  - PIPEDA (CAN)
  - For commercial transactions
- Goals
  - Access control
  - Audit control
- Strategies
  - Password protection
  - Data encryption
  - Hardware security

Data confidentiality: Options

- Database software features
- Password protection
- Palm OS features
  - Password protection
  - Data encryption on some
- Commercial security software
  - PDA Defense Pro
PDA Defense Pro

- PDA Defense Pro
  - Password protection
  - Bombing features
  - Erases data
  - Data encryption

http://www.pdadefense.com/

Some PDA Defense Options

- **PDA Defense Options**
  - Activation:
    - Lock on power-off
    - Smart
    - If off more than ~ 3 min
  - Bombs:
    - Attempts limit ~ 8
    - If non-sync 49 days ~ 0 hours
  - Owner:
    - Show owner information
    - Stealth mode

Future Implications

- Bunny or a duck? Depends how you look at it

Future Implications

- ↑ PDA presence in clinical information environment
- Easier access to data
- Increased “client” expectations
- Technology To Facilitate Practice Goals
  - Covenant with patients
  - Meet medication therapy needs
  - Prevent and solve drug related problems
- New essential skills for pharmacists
Conclusion: This study suggests that SMS collection of asthma diary data is feasible, and that SMS may be a tool for supporting the self-management of asthma (and possibly other chronic diseases)…
Patient Monitoring: Wireless

PDA & PCIS Interface: Mercury MD

Patient data is captured from the MData application and transferred to the new Forms record.

Summary

- Practice Challenges
  - Documentation
  - Point of need resource material
  - Data confidentiality / security

Conclusion

- Competent PDA use skills are a valuable component of an optimal professional practice information management strategy.
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...Questions?

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