

Performance of Drug–Drug Interaction Software for Personal Digital Assistants

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BACKGROUND: Personal digital assistants (PDAs) allow healthcare professionals to check for potential drug–drug interactions (DDIs) at the point of care, reducing the need to consult traditional references. However, PDAs can only be as effective as the software programs they use.

OBJECTIVE: To examine the ability of DDI software programs manufactured for Palm OS-compatible PDAs in detecting clinically important DDIs.

METHODS: Eight PDA software programs were assessed for sensitivity, specificity, and positive and negative predictive values for 16 well-documented DDIs contained within 6 simulated patient profiles.

RESULTS: Sensitivity of the software programs ranged from 0.81 to 1.0, specificity ranged from 0.52 to 1.0, positive predictive values ranged from 0.62 to 1.0, and negative predictive values ranged from 0.88 to 1.0. Five programs scored perfect sensitivity scores: DrugI_x, ePocrates Rx, ePocrates Rx Pro, Lexi-Interact, and the Tarascon pocket Pharmacopoeia. Of these, the ePocrates programs scored the highest in specificity (0.9), while Lexi-Interact and the Tarascon pocket Pharmacopoeia scored considerably lower (0.52). MosbyI_x was the only program to score a 1.0 in specificity; however, its sensitivity was just 0.81.

CONCLUSIONS: ePocrates Rx and ePocrates Rx Pro scored greater than or equal to 90% in regard to both sensitivity and specificity, making them the most reliable in detecting the clinically relevant interactions studied without the distraction of detecting those of no clinical significance. In addition, ePocrates Rx is updated regularly and is easily accessible on the Internet at no cost.

KEY WORDS: drug information, drug interactions, personal digital assistants.

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A drug interaction is defined as “the pharmacological or clinical response to the administration of a drug combination different from that anticipated from the known effects of the 2 agents when given alone.”¹ There is potential for a drug–drug interaction (DDI) to occur any time a patient consumes at least 2 drugs. In the US, it is not uncommon for a patient to be treated by several specialists and prescribed multiple medications, leading to a greater possibility of a DDI. A retrospective study of prescriptions in community pharmacies indicated that 4–6% of the prescriptions dispensed could have caused an interaction.^{2,3} The magnitude of this problem is seen in the number of

deaths that occur annually from medication errors. Medication errors, including DDIs, have been estimated to account for 7000 deaths annually.⁴

In the age of technology, personal digital assistants (PDAs) allow healthcare professionals to check for potential DDIs at the point of care, reducing the need to consult traditional reference books or package inserts. However, as convenient as PDAs may be, they can only be as effective as the software programs they use. With an ever-increasing number of healthcare professionals using PDAs as drug reference tools, it is vital that the software be sensitive and specific in providing information relating to potential DDIs.

In a study of the performance of community pharmacy computer software, Hazlet et al.⁵ concluded that one-third of the software assessed was inadequate in detecting clini-

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cally significant DDIs. Twelve community pharmacy software programs were evaluated using 6 fictitious patient profiles developed by the authors. Thirty-seven potential DDIs existed in the patient profiles. Of the potential DDIs, 16 were considered to be clinically significant. The clinically significant interaction pairs were determined by 2 of the authors (Hansten and Horn) to “assess the sensitivity and specificity of software in detecting well-documented, clinically important, contemporary DDIs.” The authors concluded that the overall sensitivity (ability to detect an important interaction) ranged from 0.44 to 0.88, with an average of 0.71, while specificity (the ability to avoid detecting non-interactions) ranged from 0.71 to 1.0, with an average of 0.89.

Another study assessed the ability of PDA software in detecting clinically relevant DDIs.⁶ The following software programs were evaluated between December 2002 and July 2003: Clinical Pharmacology OnHand (v. 2.01), ePocrates Rx (v. 6.0), iFacts (Facts and Comparisons Drug Interactions Facts) (v. 5.3.12/2002.10.25), Lexi-Interact (Lexi-Comp) (v. 20021031), the Medical Letter’s Handbook of Adverse Drug Interactions (v. 5.0.123/2002.9.24), mobileMICROMEDEX (v 2.4.1), the mobilePDR (v. 32), Mosby’s Drug Consult (v. 5.0.116/2002.8.27), and the Tarascon pocket Pharmacopoeia Deluxe (updated May 6, 2003). Sensitivity, specificity, and positive and negative predictive values were determined for these programs using 40 clinically important and 40 clinically unimportant DDIs. The author concluded that iFacts and Lexi-Interact were exceptional programs in regard to accuracy, comprehensiveness, and ease of use.

The purpose of this study was to further evaluate the ability of DDI software programs for Palm OS-compatible PDAs to detect clinically important DDIs.

Methods

A prospective evaluation of the ability of 8 software programs for PDAs to detect clinically important DDIs was conducted in the spring of 2004. The software selected for this study included DrugIx (Medical Letter’s Handbook of Adverse Drug Interactions) (v. 6.0.156), ePocrates Rx (v. 6.0), ePocrates Rx Pro (v. 6.0), iFacts (Facts and Comparisons Drug Interaction Facts v. 6.5.2), Lexi-Interact (Lexi-Comp v. 20040109), mobileMICROMEDEX (v. 4.0.100.1190), MosbyIx (Mosby’s Drug Consult 2003 v. 5.0.139), and the Tarascon pocket Pharmacopoeia deluxe edition (v.7.1.100.1248/1_46_R2). The most current demo versions of the palm software were downloaded from the manufacturers’ Web sites. Despite using demo versions, all software programs allowed the evaluation of DDIs. The software was assessed by one of the authors (Perkins) on a Palm OS-compatible PDA between December 2003 and January 2004. Software not compatible with Palm OS and/or without the ability to check for DDIs was excluded from this study. Although some excluded programs provide drug monographs with a section dedicated to drug interactions, they do not provide the ability to enter drug pairs. Only English versions were evaluated.

Specificity, sensitivity, and positive and negative predictive values in the detection of clinically relevant DDIs and avoidance of irrelevant DDIs were

measured. This was accomplished by using a slightly varied version of the 6 simulated patient profiles and 37 drug pairs of Hazlet et al. (Table 1).⁵

In the years since publication of the Hazlet study, cisapride has been taken off the market. Because of this, the patient profiles were modified. A group of 3 pharmacy faculty members and 3 PharmD students met to assign medications to replace cisapride. In the first profile, ergotamine tartrate with caffeine 1 mg was used. In the second instance, pimoziide 1 mg tablets replaced cisapride. These substitutions were justified because the cisapride–erythromycin interactions are in the same drug interaction class (substrate of CYP3A) as the ergotamine–erythromycin and pimoziide–erythromycin interactions. Unlike the Hazlet study of computer software, patient information such as age, sex, and disease state was not entered into the programs due to the inability of the PDA programs to hold such data.

Table 1. Drug–Drug Pairs: Clinically Important and Unimportant Interactions

Pair	Profile 1	Importance
1	ergotamine and erythromycin tablets	I
2	erythromycin tablets and sildenafil	I
3	ergotamine and sildenafil	NI
Profile 2		
4	pimoziide and erythromycin liquid	I
5	pimoziide and fluconazole	I
6	erythromycin liquid and tacrolimus	I
7	fluconazole and tacrolimus	I
8	pimoziide and tacrolimus	NI
9	erythromycin liquid and fluconazole	NI
Profile 3		
10	ketoconazole and omeprazole	I
11	ketoconazole and simvastatin	I
12	ketoconazole and tacrolimus	I
13	omeprazole and simvastatin	NI
14	omeprazole and tacrolimus	NI
15	simvastatin and tacrolimus	NI
Profile 4		
16	atenolol and digoxin	I
17	fluvoxamine and theophylline	I
18	atenolol and azithromycin	NI
19	atenolol and fluvoxamine	NI
20	atenolol and theophylline	NI
21	azithromycin and digoxin	NI
22	azithromycin and fluvoxamine	NI
23	azithromycin and theophylline	NI
24	digoxin and fluvoxamine	NI
25	digoxin and theophylline	NI
Profile 5		
26	carbamazepine and verapamil	I
27	rifampin and verapamil	I
28	azithromycin and carbamazepine	NI
29	azithromycin and rifampin	NI
30	azithromycin and verapamil	NI
31	carbamazepine and rifampin	NI
Profile 6		
32	clomipramine and phenelzine	I
33	guaifenesin and dextromethorphan and phenelzine	I
34	meperidine and phenelzine	I
35	clomipramine and guaifenesin and dextromethorphan	NI
36	clomipramine and meperidine	NI
37	guaifenesin and dextromethorphan and meperidine	NI

I = clinically important; NI = not clinically important.

In the profiles, 37 potential DDIs existed. Of these, 16 were considered clinically important and 21 clinically unimportant. All software analyzed allowed each of the drug pairs from each of the patient profiles to be entered and checked for DDIs. One of the authors (Perkins) entered each profile in the same order into each program evaluated. The number of true positives, false negatives, false positives, and true negatives were recorded on a data collection form.

Sensitivity, specificity, and negative and positive predictive values were determined for each software program. A true positive occurred when a clinically important DDI was identified. A false negative occurred when a clinically significant interaction was not identified but should have been. A true negative occurred when a clinically unimportant DDI was not identified, and a false positive occurred when a DDI was identified but was not considered clinically significant.

Sensitivity was determined by calculating the proportion of clinically important DDIs correctly identified: [number of true positives/(number of true positives + number of false negatives)]. A sensitivity of 1.0 indicated that all clinically important DDIs were identified. Specificity was determined by calculating the proportion of clinically unimportant interaction pairs ignored: [number of true negatives/(number of true negatives + number of false positives)]. A specificity of 1.0 indicated that the program ignored the interaction pairs deemed of no clinical importance.

The positive predictive value (PPV), the probability that the drug interaction identified was considered clinically important, was calculated by summing the number of true positives and false positives and entering them into the following equation: [number of true positives/(number of true positives + number of false positives)]. The negative predictive value (NPV), the probability that software ignored an interaction defined as clinically unimportant, was computed by adding the number of true negatives and false negatives and entering them into the following equation: [number of true negatives/(number of true negatives + number of false negatives)].

Results

Table 2 provides the results for sensitivity, specificity, and positive and negative predictive values. The average sensitivity and specificity of the 8 programs were 0.95 and 0.78, respectively. The overall PPVs and NPVs were 0.80 and 0.97, respectively. Five of the programs scored perfectly on sensitivity. The ePocrates programs scored highest in specificity, while Lexi-Interact and the Tarascon pocket Pharmacopoeia scored considerably lower. The only pro-

gram that scored perfectly in specificity was MosbyIx; however, it received the lowest score in regard to sensitivity. The only programs that scored 90% or greater on both sensitivity and specificity were the ePocrates programs. NPV was generally high for all the programs (>0.88), while PPV varied considerably (0.62–1.0).

Of the 37 drug pairs analyzed, only one program was unable to analyze all of the drug pairs. This was due to an omission of ergotamine or a brand equivalent in the mobileMICROMEDEX database. This omission prevented it from achieving a sensitivity of 1.0.

Six false negatives and 34 false positives were identified (Table 3). All 8 programs correctly identified 18 of the pairs as being important or unimportant. Discrepancies occurred for 19 pairs.

Discussion

To provide high quality health care, all healthcare providers who prescribe and/or dispense medications must catch prescribing errors prior to the patient receiving the medication. Detecting DDIs is an integral part of this responsibility. Many studies have assessed pharmacists' ability to detect DDIs and respond to DDI alerts. For example, Weideman et al.⁷ found that only 66% of pharmacists who did not have computer assistance detected all of a group of DDIs presented to them. Cavuto et al.⁸ found that, when presented with 2 prescriptions resulting in a potentially fatal DDI, only 68% of computer-assisted pharmacists intervened by not allowing the prescriptions to be filled. This study prompted hypotheses as to why a pharmacist with a computerized screening program would not take action to prevent a potentially serious DDI. One suggestion was that outdated software and the plethora of false positives produced rendered screening program warnings easy to ignore.⁹

Since some clinically important DDIs were not detected by one-third of the computer programs evaluated in the Hazlet et al.⁵ study, inadequately performing software may

Table 2. Results by Program

Program	TP	FP	TN	FN	Sensitivity	Specificity	PPV	NPV
DrugIx (Handbook of Adverse Drug Reactions)	16	5	16	0	1.0	0.76	0.76	1.0
ePocrates Rx	16	2	19	0	1.0	0.9	0.89	1.0
ePocrates Rx Pro	16	2	19	0	1.0	0.9	0.89	1.0
iFacts (Facts and Comparisons Drug interactions)	14	1	20	2	0.88	0.95	0.93	0.91
Lexi-Interact (Lexi-Comp)	16	10	11	0	1.0	0.52	0.62	1.0
mobileMICROMEDEX	15	6	15	1	0.94	0.71	0.71	0.94
MosbyIx (Mosby's Drug Consult)	13	0	21	3	0.81	1.0	1.0	0.88
Tarascon pocket Pharmacopoeia (deluxe ed.)	16	10	11	0	1.0	0.52	0.62	1.0
Mean (SD)					0.95 (0.07)	0.78 (0.19)	0.80 (0.15)	0.97 (0.05)
Range					0.81–1	0.52–1	0.62–1	0.88–1

FN = false negative; FP = false positive; NPV = negative predictive value; PPV = positive predictive value; TN = true negative; TP = true positive.

partly explain why pharmacists ignored a potentially life-threatening DDI in the Cavuto et al.⁸ report.

A retrospective analysis was conducted of pharmacists' actions after receiving drug utilization review alerts, approximately 10% of which were DDI alerts.¹⁰ The authors found that, in 43% of the cases, pharmacists responded to the DDI alert by using their own references, an indication that the alerts were not providing sufficient or high-quality information about the DDI.

Segments of the healthcare community have increasingly embraced PDAs because of their compactness and ability to provide quick access to vital information at the point of care. Health professionals are increasingly relying on PDAs, which can be updated frequently, for accessing drug information, performing calculations, tracking patients, e-prescribing, and organizing general information.

Traditionally, pharmacists have used computers and drug compendia as reference tools. With the advent of PDAs, more pharmacists are turning to this pocket-sized device that provides information on DDIs, particularly outside of community pharmacy settings where computer access is generally easy. It is important that these tools be dependable and accurate. Each of the PDA programs that we evaluated had a differing scope of information and number of drugs in their databases. Although this might impact the utility of the programs for other uses, it was not the purpose of this study to determine such utility.

PDAs are often used for general drug information, and the value of the information in decision support likely affects actual use. Approximately 3000 physicians and medi-

cal students were surveyed regarding their experience with ePocrates software.¹¹ Of the 29% who responded, 60% used the software more than 2 times per day, 92% reported that it reduced their use of other drug references, and 50% reported avoiding dispensing drugs that could produce serious adverse reactions on one or more occasion per week through use of the software.

As more drugs appear on the market, the potential for DDIs increases. Although it is unlikely that all potential DDIs will lead to patient harm, it is imperative that software identify clinically important interactions. With one in 5 physicians using PDAs as of 2004 and a higher percentage of use expected in the future, it is crucial that the software programs be reliable.¹²

Enders et al.¹³ compared the breadth of coverage and clinical dependability of 9 drug information PDA software programs: Lexi-Drugs Platinum, Tarascon ePharmacopoeia, Mosby's, ePocrates Rx, Davis's Drug Guide for Physicians (DrDrugs), PDR 2001, Physicians Drug Handbook, A to Z Drugs, and mobileMICROMEDEX. Fifty-six questions were developed to assess each program, 4 of which related to DDIs. LexiComp Platinum provided the greatest breadth of information (75%). It was also considered 100% clinically dependable compared with a minimum of 2 drug resources. MobileMICROMEDEX provided the least breadth (32.1%) and was the least clinically dependable (66.7%).

Of the 8 programs evaluated in our study, 2 were available at no cost. ePocrates Rx was available for download at no charge to anyone with a PDA, while mobileMI-

Table 3. Drug–Drug Pairs: Discrepancies Between Programs^a

Drug Pair	Druglx	ePocrates	iFacts	Lexi-Interact	Micromedex	Mosbylx	Tarascon	Totals
1	TP	TP	TP	TP	FN	TP	TP	1 FN
5	TP	TP	FN	TP	TP	FN	TP	2 FN
9	FP	TN	TN	FP	FP	TN	FP	4 FP
11	TP	TP	TP	TP	TP	FN	TP	1 FN
13	TN	TN	TN	FP	TN	TN	TN	1 FP
14	TN	TN	TN	FP	FP	TN	TN	2 FP
15	TN	TN	TN	FP	TN	TN	FP	2FP
16	TP	TP	FN	TP	TP	FN	TP	2 FN
18	TN	TN	TN	TN	TN	TN	FP	1 FP
20	FP	TN	TN	FP	FP	TN	FP	4 FP
21	TN	FP	TN	FP	FP	TN	FP	4 FP
23	TN	TN	FP	TN	TN	TN	FP	2 FP
28	FP	TN	TN	TN	FP	TN	FP	3 FP
29	TN	TN	TN	TN	TN	TN	FP	1 FP
30	FP	TN	TN	TN	TN	TN	FP	2 FP
31	FP	TN	TN	FP	FP	TN	FP	4 FP
35	TN	TN	TN	FP	TN	TN	TN	1 FP
36	TN	FP	TN	FP	TN	TN	TN	2 FP
37	TN	TN	TN	FP	TN	TN	TN	1 FP

FN = false negative; FP = false positive; TN = true negative; TP = true positive.
^aAll other pairs were identified correctly by each program.

CROMEDEX was available for download to all healthcare professionals associated with an institutional subscription. The remaining programs ranged from \$27 to \$75 per year at the time of the study. Cost was primarily related to the availability of color on the screen and was not a factor in the programs' ability to detect clinically relevant DDIs. The free programs were the only ones without color.

Of the programs evaluated, several were general drug databases with the added ability to check for drug interactions (ePocrates Rx, ePocrates Rx Pro, mobileMICROMEDEX). The remaining programs were developed solely for the purpose of checking for drug interactions (DrugIx, iFacts, Lexi-Interact, the Tarascon pocket Pharmacopoeia, MosbyIx). Of the programs that accurately detected all 16 clinically relevant DDIs, 3 were general databases (ePocrates Rx, ePocrates Rx Pro, the Tarascon pocket Pharmacopoeia), while 2 were exclusively for the assessment of DDIs (iFact and Lexi-Interact).

In addition to identifying DDIs, each program furnished a mechanism for the interaction and a management strategy. Half provided information on the severity and onset of the interaction (iFacts, Lexi-Interact, mobileMICROMEDEX MosbyIx). While 3 programs (iFacts, Lexi-Interact, mobileMICROMEDEX) supplied a level of evidence, only iFacts and Lexi-Interact provided and discussed the references given. The maximum number of medications that could be entered into the programs ranged from 16 (iFacts) to no limit as long as adequate memory was available (Lexi-Interact, the Tarascon pocket Pharmacopoeia).

When Barrons⁶ evaluated the ability of 9 drug–drug interaction software programs for PDAs to correctly identify 80 DDI pairs, he concluded that iFacts and Lexi-Interact excelled when taking into account ease-of-use, comprehensiveness, and accuracy. After omitting the ease-of-use and comprehensiveness scores and focusing on accuracy, the highest accuracy scores, defined as the sum of values obtained for sensitivity, specificity, PPV, and NPV multiplied by 100, were computed for iFacts and mobileMICROMEDEX. The limitation of this accuracy score is in the assumption that sensitivity is as important as specificity or the PPV and NPV. While important, a program's specificity may not lead to harm as readily as missing an important interaction and thus should perhaps not be weighted equally to sensitivity. In the case of detecting DDIs, being overly cautious is preferred. Barrons found Clinical Pharmacology OnHand to be the most sensitive (1.0), followed by iFacts and Lexi-Interact (0.98), and then mobileMICROMEDEX (0.95). The specificity of the programs ranged from 1.0 (mobileMICROMEDEX) to 0.75 (Clinical Pharmacology OnHand).

If Barrons' accuracy score was assigned to the 8 programs that we analyzed, the ePocrates programs would rank highest (379), followed by MosbyIx (369) and iFacts

(367). Barrons found iFacts, mobileMICROMEDEX, and Lexi-Interact to have the highest accuracy scores, perhaps because they were the Palm OS versions of the references used (eFacts and Micromedex DRUG-REAX) to formulate the DDI pairs in the study. There were many differences in the included drug pairs used to assess the programs between Barrons' and our study.

Limitations

We assumed that the substitutions for cisapride were justifiable because the cisapride–erythromycin interactions are in the same interaction class (CYP3A substrates) as the ergotamine–erythromycin and pimoziide–erythromycin interactions. Because the methodology in the Hazlet et al.⁵ study was used as a template, comparing our results with theirs is hampered, although the most important difference is that Hazlet compared computer systems while we evaluated PDA software. Companies producing software for computers and PDAs usually update the programs fairly frequently. Thus, these results represent a snapshot in time. Not all possible PDA programs were evaluated, so there may be others that outperform the 8 evaluated in this study. Other programs and new versions of the ones that we analyzed should be periodically evaluated to determine their utility for the assessment of DDIs.

Conclusions

Examination of the ability of 8 DDI software programs available for PDAs showed that ePocrates Rx and ePocrates Rx Pro performed the best in sensitivity and specificity. Although highly sensitive, it is likely that no program will catch every potential DDI and it would behoove healthcare professionals to be aware of programs that consistently perform best. In addition to ePocrates Rx, Lexi-Interact should be considered for its concise discussion of the available references.

Because evaluation of any program is a point-in-time determination and vendors are constantly striving to update and improve their products, programs should be periodically evaluated in head-to-head comparisons.

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EXTRACTO

ANTECEDENTES: Los asistentes personales digitales (PDA, por sus siglas en inglés) permiten a los profesionales sanitarios verificar las interacciones potenciales medicamento con medicamento DDI, por sus siglas en inglés) en el lugar de atención, lo que reduce la necesidad de consultar las referencias tradicionales. Sin embargo la eficacia de los PDA depende solamente del programa que se utilice.

OBJETIVO: Examinar la capacidad de los programas de DDI diseñados para PDA del tipo Palm OS para detectar interacciones de importancia clínica.

MÉTODOS: Se evaluaron 8 programas de DDI para PDA en términos de sensibilidad, especificidad, y valores de predicción positivos o negativos para 16 DDI bien documentadas incluidas en 6 casos clínicos simulados.

RESULTADOS: La sensibilidad de los programas fluctuaba entre 0.81 y 1.0; la especificidad, entre 0.52 y 1.0; los valores de predicción positivos, entre 0.62 y 1.0; y los valores de predicción negativos, entre 0.88 y 1.0. Cinco programas obtuvieron una puntuación de sensibilidad perfecta: DrugIx, ePocrates Rx, ePocrates Rx Pro, Lexi-Interact, y the Tarascon Pocket Pharmacopoeia. De estos programas, ePocrates obtuvo la puntuación más alta en especificidad (0.9), mientras que Lexi-Interact y the Tarascon Pocket Pharmacopoeia obtuvieron la puntuación más baja (0.52). MosbyIx fue el único programa con una puntuación de 1.0 en especificidad, pero su sensibilidad fue de 0.81.

CONCLUSIONES: ePocrates Rx y ePocrates Rx Pro obtuvieron una puntuación igual o superior al 90% con respecto a la sensibilidad y especificidad; esto los hace los más fiables para detectar interacciones clínicas relevantes, discerniendo las que no son clínicamente significativas. Además, ePocrates Rx se actualiza regularmente y es accesible desde Internet sin costo alguno.

Wilma M Guzmán-Santos

RÉSUMÉ

MISE EN CONTEXTE: Les assistants numériques de poche (ANP) permettent aux professionnels de la santé de vérifier les interactions médicamenteuses (IM) aux points de service, diminuant ainsi le besoin de consulter les références traditionnelles. Cependant, ces interventions ne peuvent être qu'aussi pertinentes que les logiciels sur lesquels elles sont basées.

OBJECTIF: Tester l'habileté des logiciels d'IM conçus pour le système d'exploitation Palm compatible avec les ANP à détecter les IM cliniquement significatives.

MÉTHODES: Huit logiciels ont été évalués quant à leur sensibilité, spécificité, et valeurs prédictives positive et négative pour 16 IM bien documentées et simulées dans 6 profils de patients.

RÉSULTATS: La sensibilité des logiciels a varié de 0.81 à 1.0, alors que la spécificité variait de 0.52 à 1.0, les valeurs prédictives positives de 0.62 à 1.0, et négatives de 0.88 à 1.0. Cinq logiciels ont obtenu des scores parfaits de sensibilité: DrugIx, ePocrates Rx, ePocrates Rx Pro, Lexi-Interact, et the Tarascon Pocket Pharmacopoeia. De ces derniers, le logiciel ePocrates a démontré la plus grande spécificité, alors que Lexi-Interact et the Tarascon Pocket Pharmacopoeia ont obtenu les scores moins élevés (0.52). MosbyIx a été le seul logiciel à obtenir un score de spécificité de 1.0 mais seulement de 0.81 pour sa sensibilité.

CONCLUSIONS: ePocrates Rx et ePocrates Rx Pro ont obtenu des scores supérieurs ou égaux pour la sensibilité et la spécificité faisant de ces 2 logiciels les plus fiables dans la détection des IM cliniquement significatives tout en évitant la détection d'IM non significatives. De plus, ePocrates Rx est mis à jour régulièrement et est disponible sur Internet gratuitement.

Nicolas Paquette-Lamontagne