

Children's Research Center CRC

The hospital of the Eleonore Foundation

Kinderspital Zürich – Eleonorenstiftung Steinwiesstrasse 75 CH-8032 Zürich

www.kispi.uzh.ch

Abstract Number: DI-008

Apps for paediatric dosing – an evaluation

Elisabeth V. Giger¹, <u>Priska Vonbach¹</u>

¹Division of Pharmacy, University Children's Hospital Zurich, Zurich, Switzerland

Objectives

Thousands of medical apps can be found in the apple app store and google play. This huge amount makes it difficult to find an appropriate app and to ensure quality and accuracy of an app.

Since we are interested to see whether the available apps are safe to use and to identify areas for possible improvement, we evaluated their quality and content. This evaluation was done in accordance with the European Statements of Hospital Pharmacy to be involved in eHealth/mHealth procedures and to decrease the risk of medication errors (statements 1.7, 5.5).¹

Our website www.kinderdosierungen.ch provides paediatric dosages in two languages, German and French (the English version will be published soon). To increase usability, we aim to develop a mobile version whereby the results of our evaluation might be useful.

Conclusion

- Several high quality paediatric dosage apps are available.
- The apps Epocrates, Lexicomp and Safe Dose reached the highest scores in our evaluation, followed by AGN Emergency Booklet and **EMRA** Peds Meds.
- The calculator is the feature that could be improved in all five top apps.
- It is important to keep in mind that the appropriate medical app depends on the contents and features that are relevant for the individual user.
- We recommend that prior to using an app, a short evaluation is performed.

Methods

Search for paediatric dosing apps

- Keywords such as paediatric, medical, app, dosing (in English or German)
- Perform a google search and search the apple app store and google play
- Search between April and June 2015

Inclusion criteria

Evaluation

- Six main catego containing a tot criteria were ch (Table 1)
- Category weight

Table 1: In-depth evaluation of selected paediatric dosage apps

gories	Category (weight)	Criteria (examples out of 73 criteria)				
otal of 73 hosen	Quality/Content (35%)	Updates, maximum dose, different dosages for different indications, accuracy of dosage, references				
abto obooo	Quantity (10%)	Number of active ingredients and preparation different routes of administration				
ghts chosen mportance	Calculator (20%)	 Integration, plausibility check weight/age, preterm calculations Add bookmarks, calculation of volumes (liquid forms) or tablets (solid forms), different therapeutic categories Data presentation, efficiency Adverse events, drug-drug interactions, compatibility 				
ealthcare (Table 1)	Features (15%)					
eights	Usability (15%)					
o experts	Additional professional information (5%)					

- Part I: Selection of apps in either English or German containing structured paediatric dosages (preselection)
- Part II: Selection of apps with a dosage calculator and either more than 70 active ingredients or a calculator specific for preterm infants (in-depth) evaluation)

according to im for usage by he professionals (

- Criteria and we defined by two

Results & Discussion



Figure 1: Paediatric dosing app selected for in-depth evaluation²

Preselection: 43 paediatric dosage

apps

- Eighteen apps fulfilled criteria for indepth evaluation
- Top five apps: Epocrates, Lexicomp, Safe Dose, AGN Emergency Booklet, EMRA Peds Meds
- Table 2: Ranking of top five apps within the 18 included apps for each of the six categories
- Table 3: Summery of different details together with strengths and weaknesses of the top five apps

Suggestions for improvements

- Calculators, especially regarding integration of preterm infant calculations
- Data presentation: Large amount of information to be presented

Important to know

- No danger to use any of the 18 evaluated apps
- Quality of the dosages of seven randomly chosen active ingredients from different drug groups (e.g. amoxicillin, furosemide, paracetamol) were evaluated and displayed correct dosage ranges

Limitation of the evaluation

- Evaluation is based on criteria/weights that two experts defined
- End result could be different depending on criteria/weights chosen

Table 2: Ranking within categories for the top five paediatric dosing apps Table 3: Details of the top five paediatric dosing apps

Арр	Quality/ Content			S	~	Additional professional information			Languages	Operation system	Price (CHF)	Calculator	Strengths	Weaknesses
		Quantity	or					Epocrates	English	Android iOS	free	integrated manual calculation	differentiation* usability	calculator
			Calculato	Feature	Usability		Rank	Lexicomp	English German further languages	Android iOS	75	not integrated	quality quantity	calculator
Epocrates	3	3	15	3	3	3	1	Safe Dose	English German further languages	Android iOS	free (limited number of medications) 100 (all medications)	integrated automatic calculation	features usability	missing galenic forms
Lexicomp	1	1	18	2	17	1	1							
Safe Dose	2	5	9	1	5	2	1	AGN Emergency Booklet	German	Android	24	integrated automatic calculation hard to find	administrative features (FAQ, informations)	additional professional information
AGN Emergency Booklet	6	6	8	4	7	13	4	EMRA Peds Meds	English	iOS	3	integrated automatic calculation	calculator	additional professional information differentiation*
EMRA Peds Meds	10	7	1	5	7	13	5							

*Differentiation: several indications, different dosages for different age groups

References: 1. The European Statements of Hospital Pharmacy. Eur J Hosp Pharm 2014 21: 256-258. 2. Ralf Müller (2016), AGN Emergency Booklet (Version 11.6.4); David Alden (2014), Critical Peds (Version 1.3); EMRA (2015), EMRA Peds Meds (Version 1.1.0); Epocrates (2016), Epocrates (Version 15.12.1); logicmantra (2013), Kids Drug Dosage Calc - Paed Rx (Version 1.0); Dr. Steve-Oliver Mueller (2015), Kinderanästhesie XS (Version 1.1.1); Lexi-Comp (2015), Lexicomp (Version 2.3.3); ITDCS Ltd (2015), Neonatology (Version 1.4); Guy's and St Thomas' NHS Foundation Trust (2015), NICU (Version 2.3); Caduceus Digital Systems (2014), PedDrugDose (Version 1.1.2); Vargo Anesthesia (2016), Pedi Anesthesia (Version 2.6); Deep Pocket Series LCC (2010), PediMeds (Version 1.2); QxMD Medical Software (2015), Pedi STAT (Version 3.3); UBQO Limited (2011), Paediatric Emergency Drugs (Version 3.1); theinviter (2014), Pediatric IV Dosage (Version 2.7); ChildrensEmergency.com (2013), Pediatric Quick Reference (Version 2.0.1); eBroselow LLC (2015), Safe Dose (Version 4.5); Skyscape Medpresso Inc (2015), Skyscape Medical Library (Version 2.4.5)