

WHITE PAPER

# Mobile Apps & the Pediatric Subspecialist

Using Calculators, Test and Diagnostic Differentials,  
and Medical Illustrations at the Point of Care

July 2014



# Table of Contents

Executive Summary .....2

The Survey..... 3

Pediatric Subspecialists Are Hooked.....4

Current Trends..... 5

Topping the App List.....7

The Wish List for Apps.....7

Survey Summary .....8

Regulatory Environment.....9

Future State ..... 10

Apps Popular with Pediatric Subspecialists..... 11

# Executive Summary

Mobile health represents a revolution of the application of technology to the diagnoses and management of care. According to active physician users of mobile health apps in the pediatric field, apps help remove barriers to practicing safe, efficient medicine and allow better decision-making at the point of care with patient edification and involvement.

According to iTunes, the online shop for music, movies and apps, more than half the physicians in the country have downloaded apps on their smart devices. Prices range from free to several hundred dollars for a year's subscription for a single app. While half of physicians have downloaded apps, fewer regularly use apps in their practices. According to a 2014 national survey of pediatric subspecialists conducted by Dobies Healthcare Group and sponsored by Children's Mercy Kansas City, 27 percent of pediatric subspecialists regularly use medical apps in daily clinical practice.

**"I can't even pretend to keep up with the literature anymore. Therefore, I need to have access to answers to my specific questions at the moment."**

*Endocrinologist, in practice 30 years*

Of 365 physicians who participated in the online survey, those who use medical apps on a daily basis reported the apps make a difference in how they practice medicine. For example, active users who participated in follow-up telephone interviews said medical apps provide more bedside functionality, more patient education applicability, and more breadth in readily available diagnostic capability. Those who never used mobile applications (18 percent) told interviewers they were unaware of the applicability of mobile apps to their specialties.

**"Typically, I'm using apps in the patient room as I'm talking to the patient."**

*Endocrinologist, in practice 13 years*

This white paper provides a review of the functionality of the apps most frequently used by pediatric subspecialists. Unlike most industry articles and surveys that focus only on the use of apps by physicians at large – for which Epocrates, Medscape and Micromedex usually top the list – this study explores the infusion of medical apps into the pediatric subspecialty practice of medicine. From dosing calculators and evidence-based guidelines to remote access to the EMR, results show pediatric subspecialists are embracing new functionalities brought about by mobile apps and want more apps to enhance their practices.

# The Survey

In early 2014, Dobies Healthcare Group, a Kansas City-based healthcare marketing strategy firm, conducted a quantitative and qualitative analysis with pediatric subspecialists across the United States. The work, sponsored by Children's Mercy, focused on physician communication patterns, their access to information and use of mobile apps, and their perceived reputations of children's hospitals.

Follow-up email invitations to participate in an online survey were sent to 6,318 physicians distributed across 10 pediatric subspecialties. Of those, 365 completed the survey, and 22 also participated in in-depth follow-up telephone interviews.

In appreciation for taking the online survey, pediatric subspecialists were offered the opportunity to receive a summary of select key findings from the surveys.

Results presented here are compared to 2010 survey results (n=336) and to national trends on physician use of mobile devices.

# Pediatric Subspecialists Are Hooked

Overall, survey results suggest that once pediatric subspecialists begin using apps, they likely continue to use on a regular basis and begin using multiple apps for multiple purposes.

No hard evidence is available yet on true efficiencies gained or quality outcomes achieved with the use of apps in the field of pediatric subspecialty care. However, the hope and promise of technology is that apps can provide a new orderliness to medicine. Brief commentary from participating doctors is provided throughout this paper to complement the discussion.

**“With respect to apps, quality and technology go hand in hand. So, my concern is, how do I leverage all the technology? We have to make things leaner and better quality.”**

*Neonatologist, in practice 6 years*

The app trend seems to be growing, along with thought processes for how to incorporate these apps to attain benefits for the provision of care. Hospitals and health systems promoting the broad use of new technologies in the workplace likely see the use of apps by both younger and older generation physicians.

**“One thing that I would not have thought of that actually affects our practice is the ability to securely message my partners. The technology provides an effective method for getting non-urgent but important information from one person to another.”**

*Hematology/Oncology, in practice 27 years*

Because interviewees report higher quality and productivity with the use of apps, more in-depth study is warranted to understand the extent of benefits to the patient, the physician and the organization in terms of providing more safe, efficient and effective care.

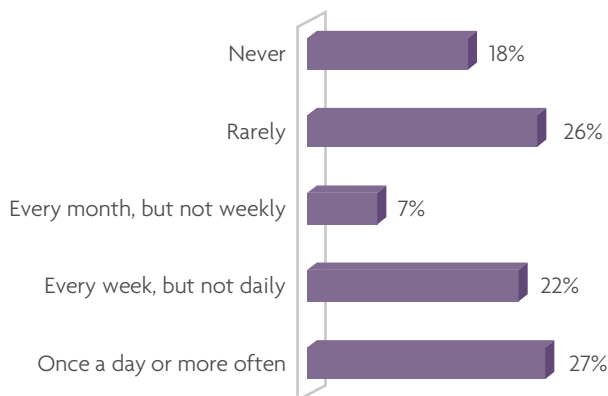
**“I use an app to check on medications that a patient is using that I’m not familiar with – ones that I don’t prescribe on a regular basis.”**

*Pulmonologist, in practice 23 years*

# Current Trends

Mobile healthcare technologies for a physician's practice hold the immediate promise of more efficient diagnosis, more rapid acquisition of knowledge and easier access to drug information. However, it appears some physicians are hesitant to make the leap without understanding the payoff. No formal review body exists to provide guidance to pediatric subspecialists on issues such as safety, the use of data and interoperability. Notwithstanding the novelty of the technology, 27 percent of the pediatric subspecialists surveyed now use apps daily in their clinical practices.

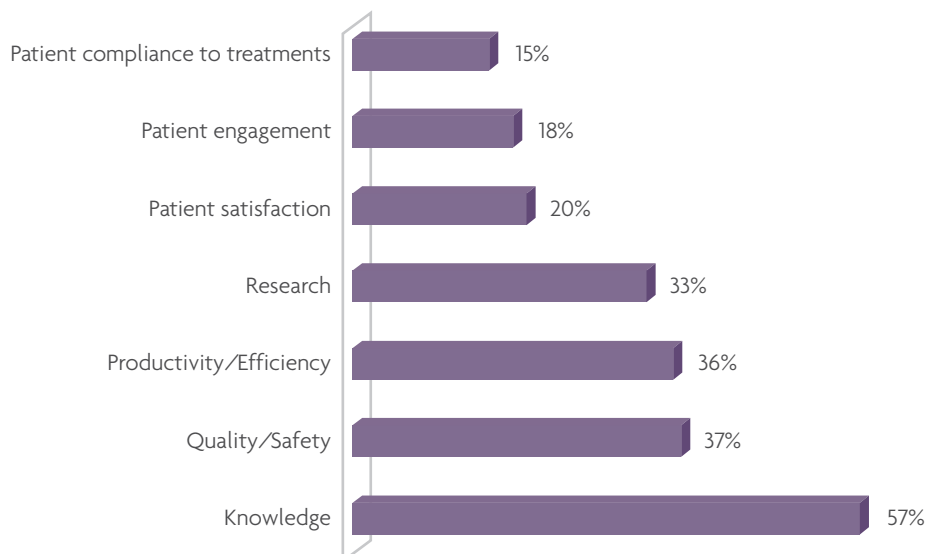
How frequently do you use mobile healthcare applications in your clinical practice?



## Desire for New Knowledge

Those surveyed indicate that apps primarily provide access to information about their profession, and apps that provide faster access and expedited decision-making are most valuable. Pediatric subspecialists use mobile apps primarily to quickly answer questions at the point of care.

To what extent do you agree that mobile applications help you and/or your practice improve the following?



# Current Trends

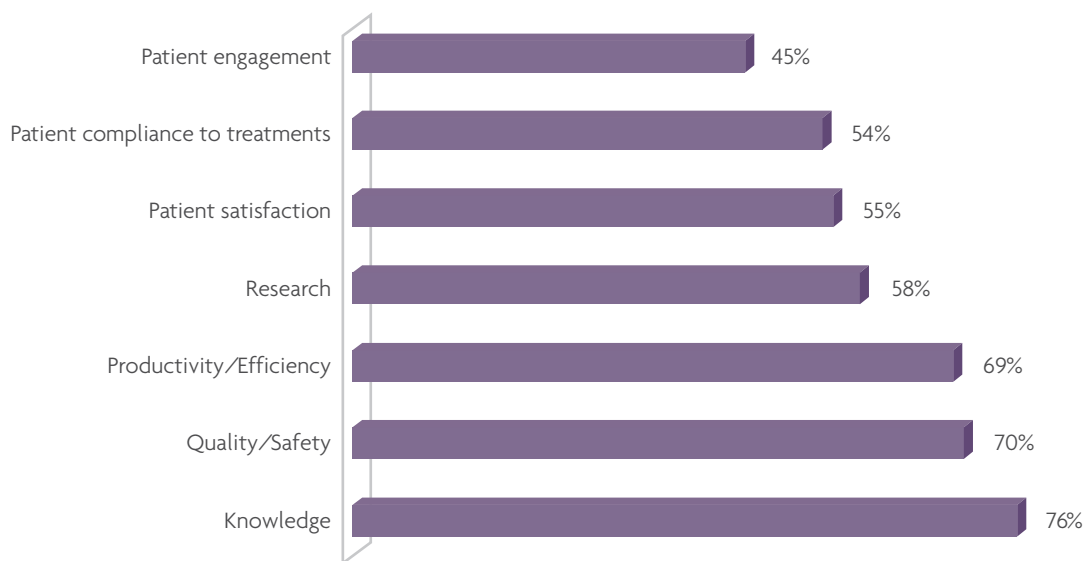
## Desire for Efficiency, Safety and Research

Physicians are more likely to use mobile medical apps in the future, provided the apps help them increase their knowledge and improve quality, safety and productivity.

*“I’m seeing one of these complicated patients in the ICU. We are looking at the labs. Someone is asking about the form of acidosis. I’ll pull out my app and put in the numbers, and it graphs the results.”*

*Nephrologist, in practice 15 years*

How likely are you to use mobile healthcare applications in the future if they can improve your:



While none of the survey respondents indicated current use of a research app, over half of pediatric subspecialists are interested in apps if they can improve their research.

# Topping the App List

The pediatric nephrologist has Acid Plus to interpret panel results. The pediatric endocrinologist has the Johns Hopkins Diabetes Guide. The neonatologist uses LactMed to enable viewing of drug level effects on lactation. Doctors tend to use these apps as a just-in-time tool at the bedside or in the clinic at the point of care.

Apps for drug interaction and dosing information top the list of most mentioned apps in this survey. Pediatric subspecialists also frequently discussed their tendency to use apps with broad functionality, such as Epocrates, Medscape and Skyscape. AAP's Pediatric Care Online and the Washington Manual Pediatric Survival Guide are the most frequently cited pediatric-specific apps.

*"I think younger people coming out of medical school right now are more inclined to say there's just way too much information. And they need to know how to get something really quickly. So they use an app."*

*Pulmonologist, in practice 21 years*

## The Wish List for Apps

The wish list is long for new apps, with more than 30 applications mentioned by survey respondents. This represents an opportunity for organizations to begin assessing the potential return on the use of apps in terms of quality and efficiency, and foster appropriate use through guidance on the practicalities and legalities. It also suggests an opportunity for additional sharing of subspecialty-specific capabilities among physicians as new apps become available. In addition, clinicians and researchers in academic medicine are well positioned to help develop subspecialty-specific apps based on their needs. The question is how to create a structure that allows this to come about.

Here's a snapshot of the pediatric subspecialists wish list:

- Just get me access to my EMR from my mobile device.
- Let me show my patients and families appropriate medical illustrations and information.
- I need an app so I can put in symptoms and labs and create a realistic differential.
- Give me evidence-based references, protocols, easy search and read – and make it quick.
- Let me check on patient compliance and give patients reminders.
- Please help me with dictation, coding and billing.
- Mobile calculators! Give me more.

*"The goal is artificial intelligence with real-time feedback."*

*Cardiologist*



# Survey Summary

Survey results from the 365 pediatric subspecialists across the country revealed:

- Daily use of apps by 27 percent of the respondents focused on accessing information and providing care at the bedside through multiple apps with multiple functionalities. A range of pediatric subspecialists across medicine and surgery were represented in this 27 percent.
- The primary content within the most highly utilized apps is drug information, guidelines and protocols, calculators, and treatment options.
- The more immediate future opportunity lies in patient communication and compliance.

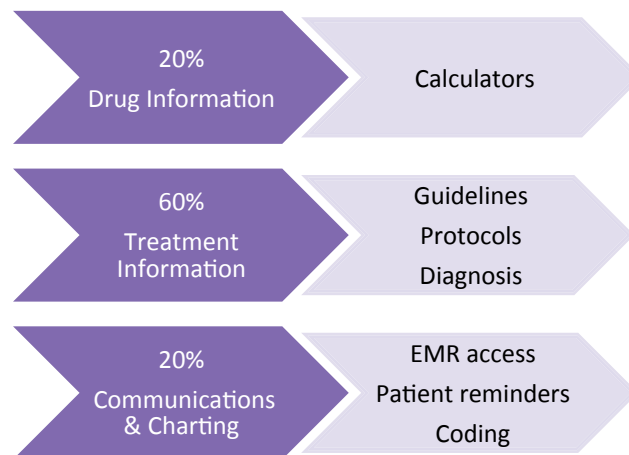
Interview results with 22 pediatric subspecialists revealed what's important to doctors in the use of apps:

- Keeping up with new protocols, capabilities and trends
- Impacting patient care
- Improving quality
- Applying to specific patient population
- Accessing specific expertise

One pediatric academic faculty member summed up this view on embracing the growing use of medical apps for the clinical practice:

*“The use of apps is an expectation of my students. Other students come here and are overwhelmed when they see what my kids can do. Still today, however, your brain is more important than anything else clinically. So, you never sell that short.”*

Describe a mobile application that you would like to use in your physician practice.



# Regulatory Environment

Only one of the physicians who participated in the interviews reported widespread promotion of the use of mobile apps by his organization. Some organizations may hesitate to incorporate technologies due to HIPAA regulations. However, it is likely medical organizations will develop procedures and guidelines for use of mobile technologies that align with regulations.

The Department of Health and Human Services provides guidance on HIPAA compliance for mobile technologies: [www.hhs.gov/ocr/privacy/hipaa/administrative/securityrule/techsafeguards.pdf](http://www.hhs.gov/ocr/privacy/hipaa/administrative/securityrule/techsafeguards.pdf)

The FDA and other regulatory bodies also continue to comment on the use of mobile devices, most recently citing the following:

*“In September, the agency (FDA) issued final rules on mobile medical apps, saying it would only regulate apps that transform smartphones into devices that the agency currently regulates.”*

*April 22, 2014, reuters.com*

The regulatory environment will continually evolve as more data is integrated and more provider-to-patient communications ensue.

# Future State

Pediatric subspecialists in the U.S. are now beginning to realize the transformative potential of apps. The future involves an emphasis on big data application and much more provider-to-patient and provider-to-provider information sharing. Europe is further along than the U.S. on big data applications with the European Commission's March 2014 "Green Paper on Mobile Health" that addressed mobile health safety, the use of data and interoperability. The Commission hopes to clear the way for further appropriate adoptions of the technology for potential gains in patient-focused healthcare, safety and efficiency. It also seeks to address additional barriers, including reimbursement. The Commission pointed toward Germany's reimbursement for the use of an app in the pediatric subspecialty space.

**"In Germany, physicians are allowed to prescribe a smartphone app which will be reimbursed by a statutory health insurance fund (Barmer-GEK) for the first time since March 2014 in regard to a therapy for children with functional amblyopia. The children shall practice their weaker eye in a playful way via a mobile app."**

*The European Commission, May 2014,*

[www.taylorwessing.com/synapse/ti\\_mobile\\_med\\_apps.html](http://www.taylorwessing.com/synapse/ti_mobile_med_apps.html)

The Deloitte Center for Health Solutions emphasizes data sharing in their vision for the future state of app use. The Center anticipates apps for providers moving from diagnostic tools and bedside tools to a future state consisting of:

- Big data smart dashboards
- Data integrity and error reduction via centralized digital records
- Digitized information for exchange between providers
- Population health management

*Deloitte and Touch Center for Health Solutions, 2012 mHealth in an mWorld*

**Editor's note:** *The authors of this white paper believe ample opportunity exists to fill much needed gaps in the creation of pediatric subspecialty-specific apps to enhance physician practice and treatment. Doctors currently report the tendency to use apps as an efficient accessory to the power of the brain. However, few apps exist that target the relatively small population of practicing physicians within a specific subspecialty. We look forward to further exploring the opportunity for new apps to develop new potential in the pediatric subspecialty space.*

# The Apps

The following pages provide an overview of most frequently mentioned medical apps used by pediatric subspecialists on their smart devices. Either the iTunes or Google Play websites or the app developer itself, provided the information. Actual prices and features may vary according to the level of service, the version or date posted. Many apps provide a free introductory version.



# Epocrates

**PRICE:** basic is free, subscriptions start at \$159.99

**SOURCE:**

[www.epocrates.com](http://www.epocrates.com)

**DETAILS:**

- **Drug Information:** Review drug prescribing and safety information in the moment of care for thousands of brand, generic and OTC
- **Interaction Check:** Check for potentially harmful drug-drug interactions between up to 30 drugs at a time
- **Pill ID:** Identify a pill based on its imprint code and/or physical characteristics

*"I use Epocrates hundreds of times a day."*

*Pediatric Hematology/Oncologist*



# Medscape

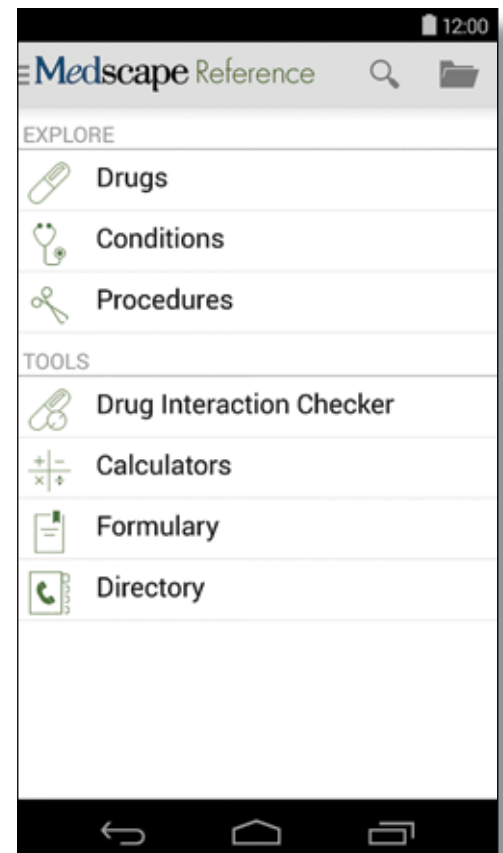
**PRICE:** free

**SOURCE:**

[www.medscape.com/mobileapp](http://www.medscape.com/mobileapp)

**DETAILS:**

- **Drug Information and Tools:** Look up adult and pediatric drug dosing information in seconds, check drug interactions, access medical calculators, and get health plan formulary information to support you with patient care. Access 129 medical calculators covering formulas, scales, and classifications directly through the calculator feature. Plus, 600+ drugs in the drug reference have integrated dosing calculators.
- **Disease & Condition Information:** Prep for patients by reviewing clinical presentation, workup, and treatment information for 4,400+ diseases and conditions. Authored and reviewed by expert physicians.
- **Continuing Medical Education Courses:** Complete accredited CME/CE courses for professional development and to fulfill licensure requirements. Courses available in 1,000+ topics across 30+ specialties.



# Micromedex

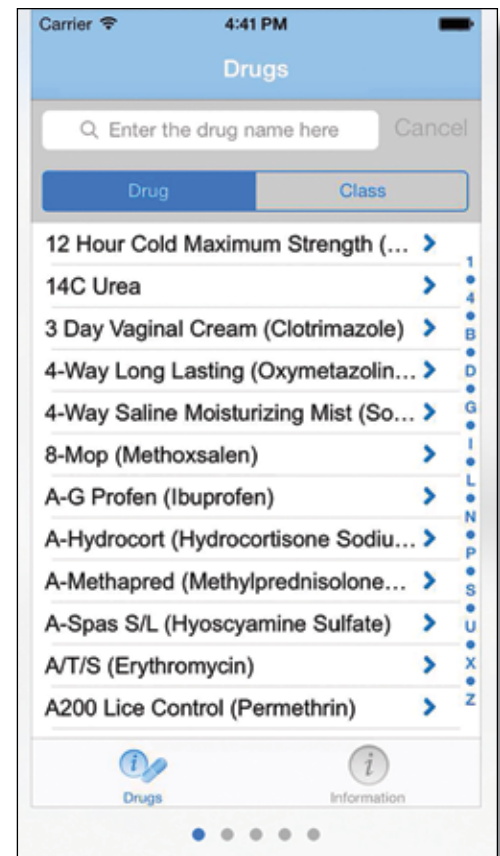
**PRICE:** \$2.99/year

**SOURCE:**

[www.micromedex.com/mobile](http://www.micromedex.com/mobile)

**DETAILS:**

- Drug reference, drug interactions, IV compatibility
- The app delivers actionable recommendations to take users beyond the drug package insert to find off-label indications, dosing recommendations, therapeutic class, administration, monitoring, toxicology, clinical teaching, and more, giving customers access to the highest quality evidence available. With this release, the Drug Information app is now available outside the U.S. and Canada to current Micromedex subscribers at no charge.



# Calculate by QxMD

**PRICE:** freely available to the medical community

**SOURCE:**

[www.qxmd.com/apps/calculate-by-qxmd](http://www.qxmd.com/apps/calculate-by-qxmd)

**DETAILS:**

- A clinical calculator and decision support tool
- More than 150 unique calculators and decision support tools
- Unique "Question Flow" technology gets you answers, fast



# Pediatric Care Online (PCO)

**PRICE:** free with paid subscription to Pediatric Care Online

**SOURCE:**

[www.pediatriccareonline.org](http://www.pediatriccareonline.org)

**DETAILS:**

- From the American Academy of Pediatrics, Pediatric Care Online provides up-to-date clinical resources and tools that can be used at the point of care, as well as personalization features, such as bookmarking pages, downloading content to a mobile device, and logging in remotely.



# Natural Medicine

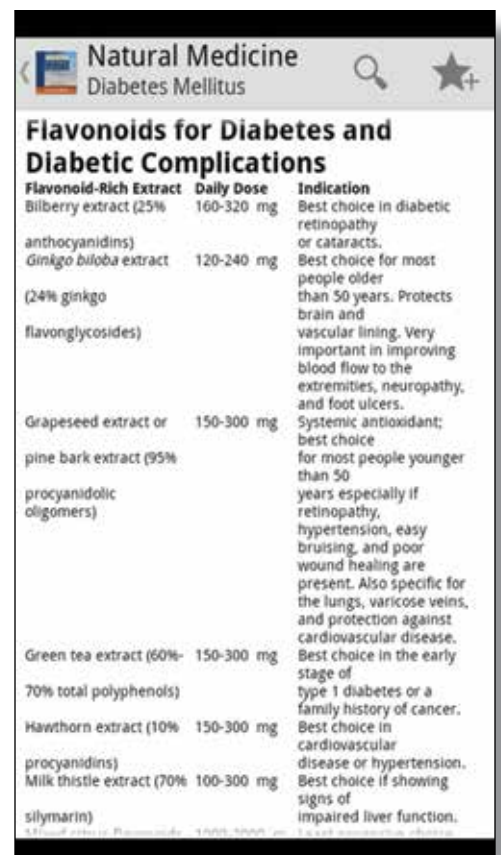
**PRICE:** \$64.99 on iTunes (Clinician's Handbook of Natural Medicine)

**SOURCE:**

Available at iTunes

**DETAILS:**

- Written by leading authorities in complementary and integrative medicine, this convenient, quick-reference handbook provides clear and rational directives on diagnosing and treating specific diseases and disorders with natural medicine. You'll get concise summaries of diagnostic procedures, general considerations, therapeutic considerations, and therapeutic approaches for 84 of the most commonly seen conditions, 12 of which are new to this edition, plus naturopathic treatment methods and easy-to-follow condition flowcharts.





# Skyscape

**PRICE:** free

**SOURCE:**

[www.skyscape.com/sml](http://www.skyscape.com/sml)

**DETAILS:**

- Custom medical library
- Pick and choose from more than 600 mobile medical resources in partnership with medical publishers
- Content you know and trust, all on your mobile device
- Resources covering 35 specialties
- Advanced search function lets you find the right answers, right away



## Pediatrics Survival Guide

**PRICE:** \$49.99 (Washington Manual Pediatrics Survival Guide)

**SOURCE:**

Available through Skyscape, Product Id 993

**DETAILS:**

- Prepared by Washington University house staff and faculty, this electronic survival guide encapsulates the critical knowledge essential for a successful pediatric residency. Content includes algorithms, useful formulas, patient notes, top ten work-ups, common calls and complaints, key points on most common problems, essentials of what not to miss and when to refer/call for help, and tricks of the trade.
- This easy-to-navigate PDA reference includes guidelines on floor survival, writing prescriptions, and calculating IV fluids and feeds, as well as laboratory reference values and formulary information. It also covers adolescent medicine topics such as STDs, eating disorders and suicide.





# Johns Hopkins ABX Guide

**PRICE:** \$29.99 (Also available: Diabetes and HIV Guides)

**SOURCE:**

[www.hopkinsguides.com/hopkins/ub/learn#abx](http://www.hopkinsguides.com/hopkins/ub/learn#abx)

**DETAILS:**

- The Johns Hopkins ABX Guide features up-to-date, authoritative, evidenced-based information on the treatment of infectious diseases to help you make decisions at the point of care.
- Choose the correct drug and dosage, then review the risk of potential adverse reactions or interactions.
- Discover or confirm a diagnosis with details on pathogens and clinical considerations.
- Access the most up-to-date content, medical news feeds, and journal citations and abstracts.



# Acid Plus

**PRICE:** iTunes \$3.99, \$2.99 Android (Acid Plus – The ABG Calculator)

**SOURCE:**

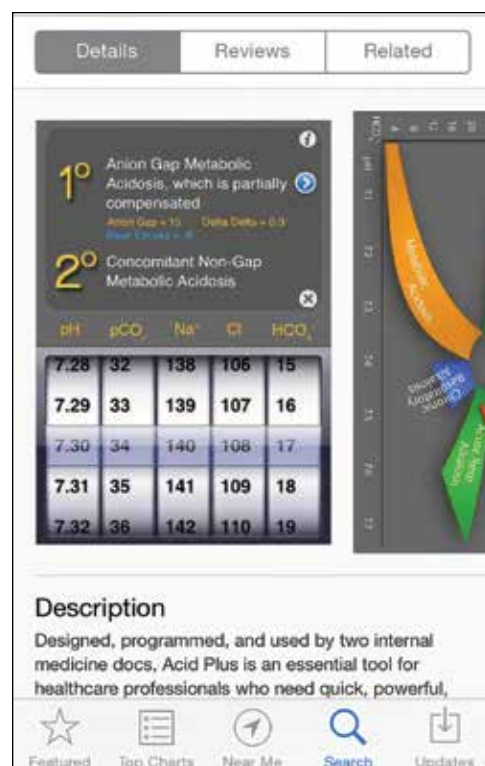
Available at iTunes or Google Play

**DETAILS:**

- Designed, programmed, and used by two internal medicine physicians, Acid Plus is an essential tool for healthcare professionals who need quick, powerful, and easy-to-interpret acid-base results from ABGs and metabolic panels.

*“In nephrology, we have to deal a lot with evaluating patients who have acid-based disorders. They are either acidotic or alkaloidic where they have all these different things going on with their electrolytes. I’ve found Acid Plus to be a very useful app to help me sort out the acid-based issues in patient.”*

*Pediatric nephrologist*



# UpToDate

**PRICE:** \$500.00/year

**SOURCE:**

[www.uptodate.com/home/uptodate-mobile-access](http://www.uptodate.com/home/uptodate-mobile-access)

**DETAILS:**

- UpToDate presents a comprehensive synthesis of the evidence, followed by recommendations that can be acted on at the point of care. It combines an advanced publishing platform with the rigor of a sophisticated editorial process managed by a faculty of accomplished physician authors and editors, renowned leaders in their specialties.



# NeoFax Essentials

**PRICE:** \$29.99 (NeoFax Essentials, a Micromedex product)

**SOURCE:**

Available at iTunes

**DETAILS:**

- NeoFax Essentials is a reliable resource for affordable, on-the-go access to evidence-based, neonatal-specific clinical drug information, to efficiently and safely manage drug therapy for neonatal patients.
  - Evidence-based, fully referenced neonatal-specific drug information enabling clinicians to make informed treatment decisions
  - A comprehensive enteral formulas component providing nutritional information for approximately 60 different neonatal and infant formulas, and human milk fortifiers

Nutrient	Per 100 Cal	Per Liter
Energy, Cal	100	739
Volume, mL	135	1000
Protein, g	2.7	19.6
% of total calories†	11	11
Fat, g	5.9	43.9
% of total calories††	54	54
Linoleic acid, mg	594	4391
Carbohydrate, g	9.3	68.4
% of total calories‡	37	37
Water, g	119	879
Minerals		
Calcium, mg (mEq)	94 (4.7)	698 (34.8)
Phosphorus, mg (mEq)	51	378
Magnesium, mg	5	36
Iron, mg	1.14*	8.41*
Zinc, mg	0.95	7.02
Manganese, mcg	8	56
Copper, mcg	117	864
Molybdenum, mcg	--	--
Iodine, mcg	--	--
Selenium, mcg	--	--
Sodium, mg (mEq)	44 (1.9)	328 (14.3)
Potassium, mg (mEq)	97 (2.5)	715 (18.3)
Chloride, mg (mEq)	83 (2.3)	615 (17.3)
Vitamins		

# LactMed

**PRICE:** free

**SOURCE:**

[www.toxnet.nlm.nih.gov/help/lactmedapp.htm](http://www.toxnet.nlm.nih.gov/help/lactmedapp.htm)

**DETAILS:**

- LactMed offers information about drugs/supplements and breastfeeding. Find information about maternal and infant drug levels, possible effects on lactation and on breastfed infants, and alternative drugs to consider.
- LactMed, part of the National Library of Medicine's (NLM) Toxicology Data Network (TOXNET®), is a database of drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant. Suggested therapeutic alternatives are provided to those drugs where appropriate. All data are derived from the scientific literature and fully referenced. Data are organized into substance-specific records, which provide a summary of the pertinent reported information.





#### **ABOUT DOBIES HEALTHCARE GROUP**

The research presented in this document was conducted by Dobies Healthcare Group, a privately owned, Kansas City-based strategic healthcare marketing firm. Since 1992, the Dobies team has helped hundreds of healthcare organizations elevate brands, drive new volume and increase market share. From research and strategic planning to creative execution, Dobies provides comprehensive marketing services from experts who understand hospitals and healthcare. For more information, visit [www.dobies.com](http://www.dobies.com).