

DAVID REBEDEW, MD

Six Mobile Apps to Make Prescribing Easier

These apps can help you more effectively make medication decisions on the go.

Physicians and other clinicians use a wide range of mobile applications in their practices, and prescribing apps are the most common.¹ Most prescribing apps are tied to online pharmaceutical databases, the use of which can decrease mortality and the number and length of hospital stays.² The scope, completeness, accuracy, and ease of use of various databases has been studied extensively.

This article focuses on six commonly used pharmaceutical apps that were reviewed using *FPM*'s "SPPACES" criteria. Key features, including interaction checking, drug monitoring information, dosing information, and pill identification, are summarized in a tabular format (see "Prescribing app comparison," page 13).



MEDSCAPE

The Medscape app is a comprehensive resource for medications, diseases, and medical calculators.

Source: WebMD Health Corp.

Platforms available: Android 4.0.3 or later (<http://bit.ly/2Nhe3ik>); iOS

10.0 or later for iPhone, iPad, and iPod touch (<https://apple.co/2PyVfN2>).

Pertinence to primary care practice: Medscape is listed as one of the most commonly used medical apps in multiple studies.^{1,3} The app provides an extensive resource for clinicians, including data on more than 8,000 medications and 7,600 diseases or conditions as well as step-by-step procedural articles and image collections. It also offers a consult service that allows users to confer with other physicians on diagnoses and treatment options and provides continuing medical education (CME) for some of its activities. The drug interaction checker can compare up to 30 medications, herbals, or foods simultaneously.

Authoritativeness/accuracy/currency of information: The app was developed with the help of physicians, PhDs, and pharmacists and relies on the medication database RxList and pricing database WebMDRx. Studies have rated Medscape as the most comprehensive



ABOUT THE AUTHOR

Dr. Rebedew is a family physician at Monroe Clinic in Albany, Wis., and a faculty member for the University of Illinois Rockford Family Medicine Residency. Author disclosure: no relevant financial affiliations disclosed.

app for geriatrics⁴ and best overall resource for pediatrics.⁵ A 2016 study determined the app had the best interaction checker and dose calculator among the 59 apps reviewed.⁶ An earlier test ranked Medscape as having the most complete and accurate medical calculator.⁷ Medscape has been downloaded more than 10 million times and has won multiple awards. The app was last updated in September 2018 (iOS) and October 2018 (Android).

Cost: Free.

Ease of use: Finding information about dosing, interactions, side effects, warnings, use during pregnancy, formularies, pricing, and administration is quick and easy, and the search function has an autocomplete feature. However, users cannot search for medications and herbals phonetically. The procedures portion of the app is lengthy and not ideal for point-of-care use. There is no search feature in the conditions section, so numerous taps and scrolling are required. Users can bookmark frequently viewed articles. The app is available in English only.

Sponsor: WebMD LLC

Rating: ★★★★★

This is an essential app for identifying pills and is a good overall medical reference.

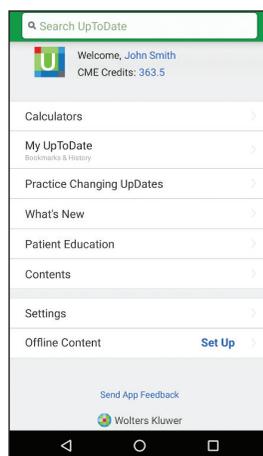


UPTODATE

UpToDate is one of the most widely used clinical decision support resources for medication and disease management.

Source: UpToDate Inc.

Platforms available: Android 4.1 or later (<http://bit.ly/2P4uejq>); iOS 8.0 or later for iPhone, iPad,



APP REVIEW CRITERIA

- S — Source or developer of app
- P — Platforms available
- P — Pertinence to primary care practice
- A — Authoritativeness/accuracy/currency of information
- C — Cost
- E — Ease of use
- S — Sponsor(s)

and iPod touch (<https://apple.co/2woQkFH>).

Pertinence to primary care practice:

Users can earn and track free CME credit by searching topics in UpToDate. They can also print from the app, email topics or graphics to patients or colleagues, and bookmark commonly viewed topics. The interaction checker can compare more than 50 medications simultaneously. UpToDate sets itself apart by providing overdose treatment, symptoms, and toxidromes for both medications and household products. It also offers

monitoring parameters, a feature matched only by Epocrates.

Authoritativeness/accuracy/currency of information:

The app, which uses pharmaceutical information from the databases of Lexicomp, Medi-Span, and Facts & Comparisons, claims that more than 1.3 million clinicians worldwide use UpToDate. Use of the UpToDate database has been associated with reduced length of stay and lower mortality.² Ninety-six percent of the recommenda-

tions in UpToDate are concordant with the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) framework.⁸ It was the top-ranked resource for pediatric hospitalists in 2015.⁹ More than 6,500 physicians are involved in the process of creating, editing, and updating the app's information, according to UpToDate. The app was last updated in September 2018 (Android) and October 2018 (iOS).

Cost: Downloading the app is free, but using it requires a subscription to UpToDate Online, which also provides access via

KEY POINTS

- Prescribing apps are the most common mobile apps used by physicians and other clinicians.
- Physicians can use prescribing apps to choose the best medication for specific patient conditions based on efficacy, side effects, interactions, and other factors.
- Some prescribing apps also provide easy access to medical calculators, pill identifiers, alternative medicine information, or education materials to share with patients.

PRESCRIBING APP COMPARISON

	Medscape	UpToDate	Drugs.com	Epocrates	Clinical Pharmacology	Tarascon Pharmacopoeia
Antibiotic resources	X	X	X	X	X	X
Calculators	X	X		X		X
Dialyzability information	X	X	X			
Drug interactions	X	X	X	X	X	X
Formulary information	X			X		
Guidelines	X	X	X	X		X
Herbal interactions	X		X	X		X
Inactive ingredients list					X	
Missed dose guidance	X		X		X	
Monitoring parameters		X		X		X
Overdose treatment guidance		X	X			
Pharmacogenomics information	X	X	X	X		X
Pill identifier	X		X	X	X	
Pricing information	X	X		X		X
Rx images	X			X	X	

computer and costs \$519 for one year, \$929 for two years, or \$1,229 for three years.

Ease of use: The app shares the same categories of information as the full website, but it requires quite a bit of scrolling. The medical calculators are complete and optimized for smartphones. The app is available in English and several other languages.

Sponsor: Wolters Kluwer Health

Rating: ★★★★★

This is an ideal resource for pharmacogenomics information and drug interactions, especially among oncology medications.



CLINICAL PHARMACOLOGY

Clinical Pharmacology is an extensive medication database for use by clinicians and pharmacists.

Source: Elsevier Inc.

Platforms available: Android 4.0.3 or later (<http://bit.ly/2NgdcOH>); iOS 8.0 or later for iPhone, iPad, and iPod touch (<https://apple.co/2NgjRIA>).

Pertinence to primary care practice:

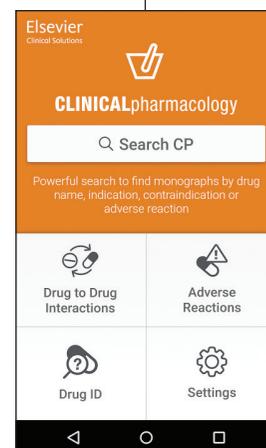
Many local pharmacists use this resource for answering pharmaceutical questions.

The app sets itself apart by listing inactive ingredients and is one of only three apps that describe what to do if a patient misses a dose. It provides pictures of various medications and specifies how to tailor doses based on gender, weight, and ethnicity.

Authoritativeness/accuracy/currency of information: This app, whose Gold Standard database is run by pharmacists, is used in more than 2,000 hospitals and 35,000 retail pharmacies. It was a top performer in the 2018 Best in KLAS report for clinical decision support¹⁰ and was rated in one study as the best database for clinical decision support.¹¹ The app was last updated in December 2017.

Cost: Downloading the app is free, but using it requires an institutional subscription to Clinical Pharmacology.

Ease of use: The app is initially difficult to navigate but gets easier with familiarity. Compared with other apps, it requires more



taps but less scrolling to view indications.

Sponsor: Elsevier Inc.

Rating: ★★★★★

The app's nuanced information is primarily of interest to pharmacists, but this is still a great app for clinicians.



DRUGS.COM

Drugs.com has a multitude of information on diseases and medications as well as a symptom checker.

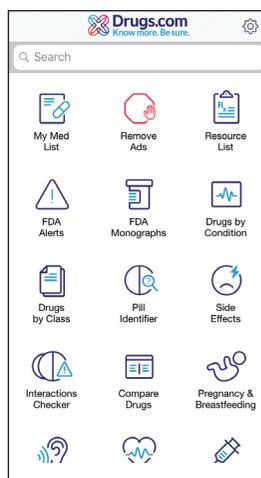
Source: Drugs.com

Platforms available:

Android 4.4 or later (<http://bit.ly/2P4j9im>); iOS 9.0 or later for iPhone, iPad, and iPod touch (<https://apple.co/2P1kt5m>).

Pertinence to primary care practice: Drugs.com is the app version of a website that has more than 25 million U.S. visitors per month and frequently is the first website that appears in searches for certain medications. With the app, patients

can use a symptom checker, record their medications in My Med List, and perform phonetic searches for medications. The interaction checker can track more than 50 medications and foods at once. Other unique features include its list of top 40 drug searches, drug popularity rankings, user ratings and commentaries, pregnancy safety warnings, alcohol effects and warnings, recent alerts from the U.S. Food and Drug Administration (FDA), and a drug comparison tool. The drug comparison



on more than 24,000 prescription medications, over-the-counter medications, and natural products compiled from multiple sources, including Wolters Kluwer Health, Cerner Multum, Micromedex from Truven Health, the American Society of Health-System Pharmacists, and the Physicians' Desk Reference. Micromedex has been rated highly for clinical decision support,¹¹ pharmacogenomics data,¹² antibiotic completeness,¹³ and medication interaction tracking.^{14,15} Drugs.com provides monographs from the FDA and the American Hospital Formulary Service Drug Information as well as articles from the Mayo Clinic. A.D.A.M. Inc. supplies the app's health encyclopedia, which was developed by physicians and is reviewed by a content review board of physician specialists. The symptom checker was created by Harvard Health

Decision Guides, which draws on the expertise of 9,000 faculty physicians at Harvard Medical School. Many of the app's underlying databases are updated at least quarterly. The app itself was last updated in May 2018 (Android) and September 2018 (iOS).

Cost: Free; removing ads costs \$1.99 for three months or \$4.99 for a full year.

Ease of use: Finding information requires a lot of scrolling because the data is compiled and not synthesized. This is compounded by ads placed within the text. Looking for medications by condition or class is a very useful feature. The app is available in English only.

Sponsors: The app is produced by Drugsite Trust, which is privately held and administered by two New Zealand pharmacists. The app is not affiliated with pharmaceutical companies, but it does feature pharmaceutical advertising.

Rating: ★★★★★

This is a free, unbiased resource for patients and institutions with limited resources to view medication information and check interactions as well as compare medications head-to-head with both objective and subjective data.

Prescribing apps are the most common mobile apps physicians and other clinicians use.

tool considers price, half-life, number of medication interactions, and disease interactions. Drugs.com is also one of only two databases with overdose treatment (UpToDate being the other database with this information).

Authoritativeness/accuracy/currency of information: The app has information



EPOCRATES

Epocrates is an exhaustive reference for medications, pricing, medical calculators, disease information, and herbal supplements.

Source: Epocrates Inc.

Platforms available: Android 4.0 or later (<http://bit.ly/2wx5yse>); iOS 9.0 or later for iPhone, iPad, and iPod touch (<https://apple.co/2C2YlpM>).

Pertinence to primary care

practice: Epocrates is one of the most commonly used apps by both clinicians and medical students.¹⁶ Users can view national and regional health insurance formularies, coordinate care with HIPAA-compliant text messaging, and find specialists for consults or referrals in the provider directory. The app is one of the few to include safety and monitoring parameters. Unfortunately, it does not list the frequency of side effects by percentage for each medication. It does list off-label or prescription-strength uses and includes dosing recommendations found in generic monographs. Beyond medications, Epocrates also provides numerous guidelines that list key points organized by specialty. It also includes numerous calculators such as unit and dose converters, medical equations, clinical criteria, and decision trees. Note, however, that these resources are not searchable. Lastly, Epocrates offers picture quizzes and numerous tables featuring content based on Advanced Cardiac Life Support, Pediatric Advanced Life Support, Glasgow Coma Scale, Beers List, Rapid Sequence Intubation, and other resources.

Authoritativeness/accuracy/currency of information: Epocrates uses a number of sources for its information, including GoodRx for pricing, MedCalc 2000 for calculators, and Therapeutic Research Center's Natural Medicines Inc. for dietary supplements and natural medicines. The company claims its app is used by more than 1 million health care professionals worldwide and half of physicians in the United States. In studies, Epocrates

was determined to have the best medication interaction accuracy.^{14,17} For depth and accuracy of antibiotic treatment recommendations, Epocrates was equal to Sanford Guide while outperforming Johns Hopkins Antibiotic Guide, 5 Minute Clinical Consult, and 5 Minute Infectious Diseases Consult.¹⁸ The disease references are created by the British Medical Journal group. Medications in the underlying databases are updated quarterly with herbals updated annually. New medications are not added until they become commercially available. The app itself was last updated in October 2018.

Cost: The basic app is free; Epocrates Plus, which allows users to search by disease, view ICD-10 and CPT codes, review herbal medications, and gain insight into lab values, costs \$174.99 a year.

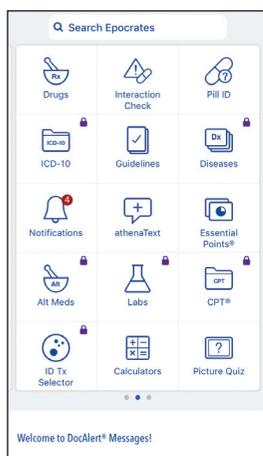
Ease of use: The interface is easy, and users can save favorites and write notes. The drug interaction checker can

track 30 medications and herbals at once but is slower than other apps when adding medications. The app is available in English only.

Sponsors: Epocrates Inc. and AthenaHealth Service

Rating: ★★★★★

This is the best overall reference app, especially for looking up medication information and drug interactions and reviewing guidelines.



TARASCON PHARMACOPOEIA

Tarascon is primarily for viewing pharmaceutical dosing and indications.

Source: Atmosphere Apps Inc.

Platforms available: Android 4.4 or later (<http://bit.ly/2NyjPw3>); iOS 9.0 or later for iPhone, iPad, or iPod touch (<https://apple.co/2NyjTfh>).

Pertinence to primary care practice:

In its printed versions, Tarascon is already a trusted resource for medication dosing information. The app includes data for more than 4,500 medications as well as some useful drug reference tables, a few calculators, and information from Consumer Reports'



“Best Buy Drugs.”

Authoritativeness/accuracy/currency of information:

The use of Tarascon was primarily studied in personal digital assistants and rated as one of the top performers for sensitivity in drug interaction.^{19,20} The data is reviewed by multiple pharmacists, physicians, and PhDs as well as a peer-review panel of 50 clinicians of multiple specialties. It has no affiliation with any pharmaceutical companies. The underlying database is updated weekly, but the app itself was last updated in September 2018.

Cost: Free for 30 days; a one-year subscription costs \$39.99.

Ease of use: The app features succinct descriptions, which significantly reduces scrolling. For each medication, the app lists



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The scope, completeness, accuracy, and ease of use of various online pharmaceutical databases has been studied extensively.

information on cost, metabolism and excretion, and safety in pregnancy and lactation. The app is available in English only.

Sponsors: Jones & Bartlett Learning

Rating: ★★★★★

This is a great app for quickly finding FDA-approved and off-label use and dosing information for medications. **FPM**

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