

Mobile Medicine 2.0: Revising and Creating New Services for Mobile Device Users



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Becker Medical Library serves the Washington University School of Medicine in St. Louis:

- **1,360 students across 7 programs**
- **1,979 fellows, trainees, and house staff**
- **1,983 faculty (most are practicing physicians)**

Affiliated Hospitals

- Becker Library supports Washington University faculty and staff who also work at Barnes Jewish Hospital and St. Louis Children's Hospital
- Most of Becker Library's database and journal subscriptions are restricted to the Washington University campus. The hospitals have their own separate subscriptions

What we know about
medical apps and
mobile device usage...

Mobile Devices

- Smartphones: phones with advanced operating systems, e.g. iPhone, Samsung Galaxy, Windows smartphone, Blackberry, etc.
- Tablets: a mobile computer with a touchscreen, e.g. iPad, Android tablets, etc.
- eReaders: device used primarily for reading eBooks and periodicals, e.g. Kindle Paperwhite, Nook eReader.



Mobile applications

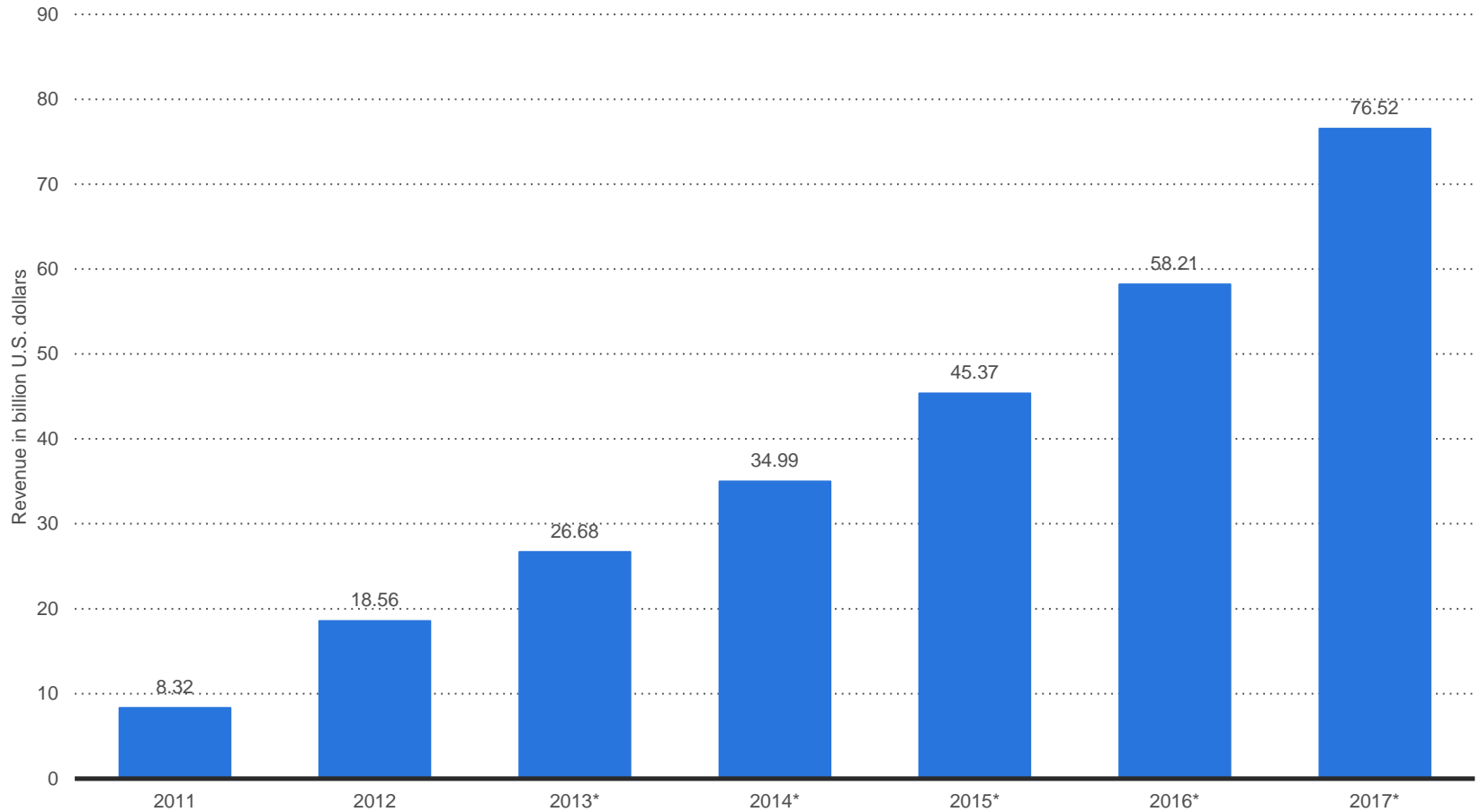


- A mobile application (app) is a computer program designed to run on smartphones, tablets, and other mobile devices
- Apps can generally be used outside of the web browser environment (though some require an internet connection to work)



Growth of the app market

Worldwide mobile app revenues from 2011 to 2017 (in billion U.S. dollars)



Note: Worldwide; 2011 to 2013

Source: Gartner; TechCrunch; [ID 269025](#)

Medical App environment

- **Apple (iTunes) platform:**
 - 30,000+ medical/health apps
 - Apple Health Kit apps

- **Android (Google Play) platform**
 - 15,000+ medical/health apps
 - Google Fit app



Types of Medical Apps

- Apps for healthcare professionals:
 - Clinical summaries/diagnostic tools (UpToDate, Dynamed)
 - Drug information (Epocrates, Micromedex, etc.)
 - Terminology and Anatomy guides
- Apps for consumers:
 - Fitness tracking (e.g. Fitbit)
 - General Health information (e.g. WebMd)
 - Apps connected to electronic health record systems

Most Medical/health apps are not regulated by the FDA or any other oversight body

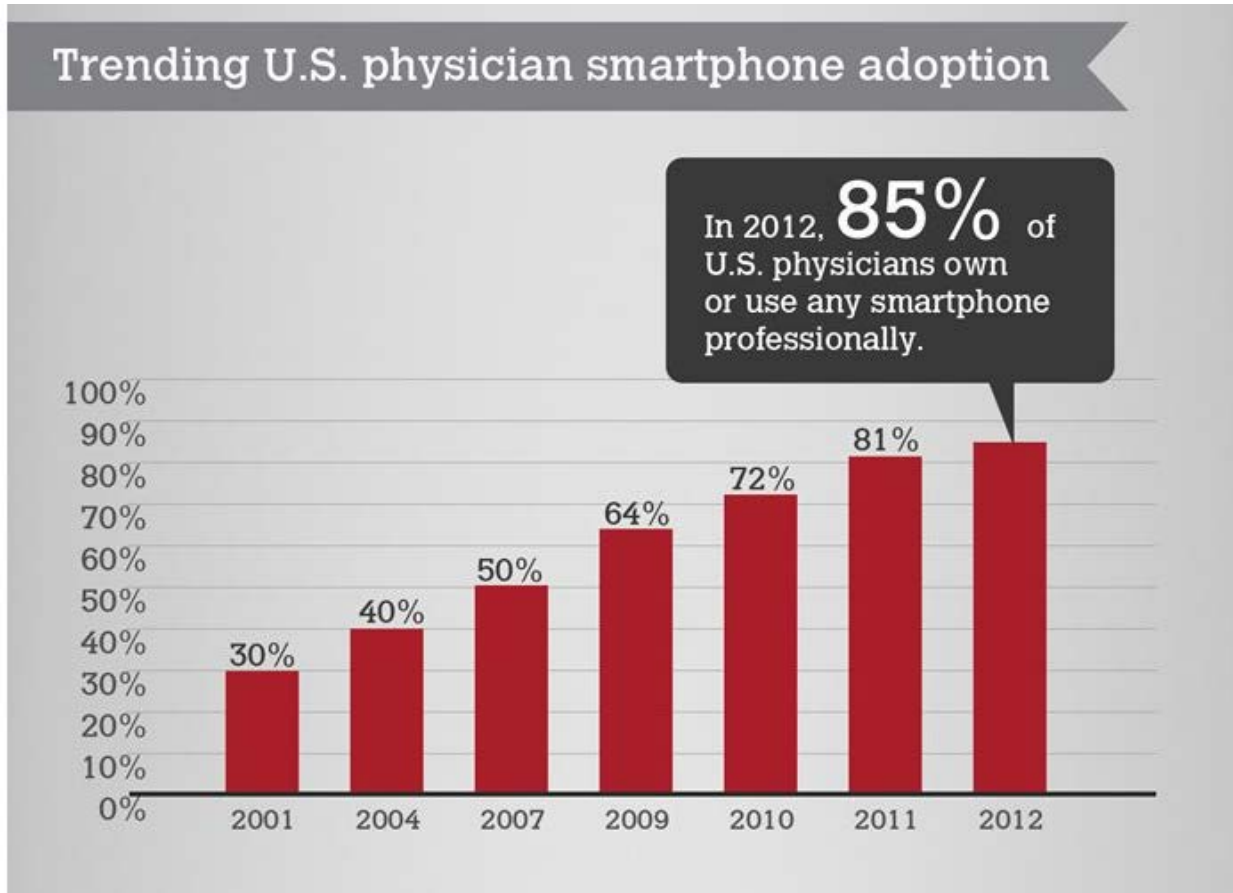
Medical app regulations

- A select few mobile apps are regulated by the FDA. They must meet one of the following criteria:
 - It's intended to be used as an accessory to a regulated medical device
 - Transforms a mobile platform into a regulated medical device
- Some FDA regulated apps: AliveCor, iExaminer, MobiUS, Resolution MD

Source:

<http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ConnectedHealth/MobileMedicalApplications/ucm255978.htm>

Use of smartphones by physicians



Source: Manhattan Research group: <http://manhattanresearch.com/Infographic-Images/data-snapshot-taking-the-pulse-us-image>

Trending U.S. physician tablet adoption

62% of U.S. physicians own a tablet.

Among physicians who own a tablet,

81% have an iPad.



35% **2011**

2012

1/2 of tablet-owning physicians have used their device at the point-of-care.

Recent survey data

- Boruff & Storie research published in the *Journal of the Medical Library Association*:
 - Large, multi-site study
 - Most survey participants reported using mobile devices
 - Most commonly reported uses were finding drug information, performing clinical calculations, and taking notes.

Lingering questions..

- Is mobile device usage on our campus similar to patterns seen in these larger studies?
- What are the specific needs of our patrons?
- How can the library provide services that best fit our patrons' needs for accessing information on mobile devices?

The best way for us to move forward, using an evidence-based approach was to conduct our own survey



**Tell us how
you use
medical apps.**

Take Becker Library's Mobile Medicine Survey and enter to win a gift card.

Survey Design

- Targeted towards faculty, residents, fellows, and students in our various programs (medical, occupational therapy, etc.)
- Survey was conducted online using the Survey Monkey platform
- Using branching and skip logic, survey questions changed depending on whether the participant was a student or faculty/resident/fellow

Survey Question Design

- Mixed model of open and closed questions, designed to allow participants to quickly take the survey, but also provide details and rich data
- General questions about mobile device usage adopted from similar surveys*, but most of the questions were created specifically for this survey project.

*See bibliography at end of presentation for full list of sources

Survey questions

- Demographics
- Mobile device usage
 - Types used and frequency of use
- Type of Apps Used
 - Students: Apps used for studying, prepping for exams, etc.
 - Faculty/Residents: Apps used to inform patient care
- Barriers to using apps
- Potential Becker Library services and resources



Survey Question Review

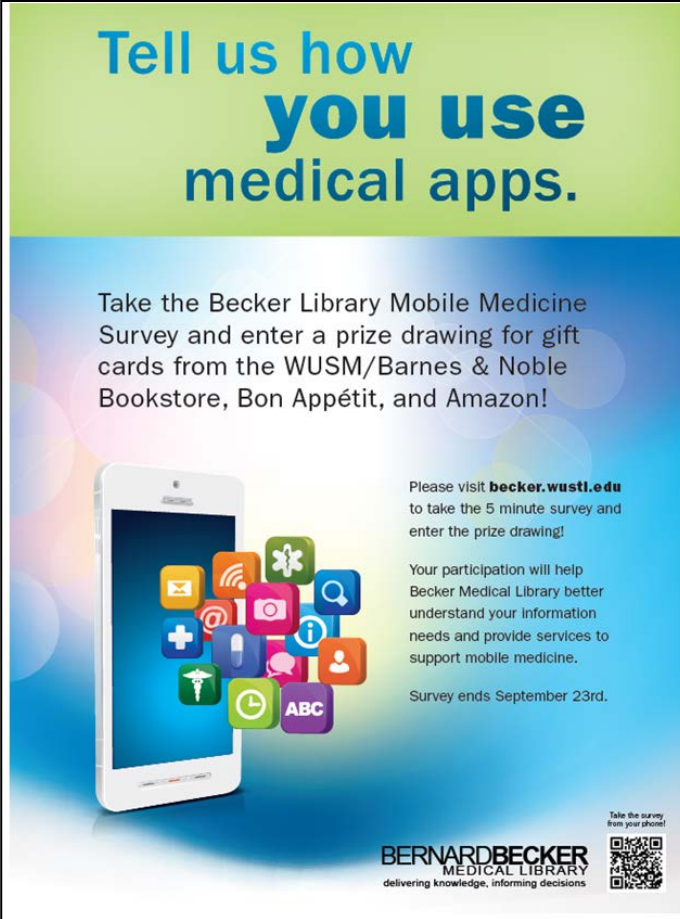
- Survey questions were reviewed in a three stage process:
 - Survey investigators
 - Becker Library staff (all staff)
 - Outside reviewers (3 Faculty members and 3 Students)
- A formal feedback form was used to ensure that all questions were easy to understand, unambiguous, and would elicit **valid** and **reliable** data

Institutional Review Board approval

- The survey project was submitted to our institution's IRB and was approved for IRB exemption
- Process required submitting not just the survey questions, but also advertising materials, recruitment letters, and even email messages that we intended to send to survey participants

Survey marketing

- Posters (had QR codes)
- Email recruitment letters (different departments at the medical school sent out on our behalf)
- Banner on the library's home page
- Survey table near a café/commons area



**Tell us how
you use
medical apps.**

Take the Becker Library Mobile Medicine Survey and enter a prize drawing for gift cards from the WUSM/Barnes & Noble Bookstore, Bon Appétit, and Amazon!


Please visit becker.wustl.edu to take the 5 minute survey and enter the prize drawing!

Your participation will help Becker Medical Library better understand your information needs and provide services to support mobile medicine.

Survey ends September 23rd.

BERNARD BECKER
MEDICAL LIBRARY
delivering knowledge, informing decisions

Take the survey from your phone!



Select Survey Findings

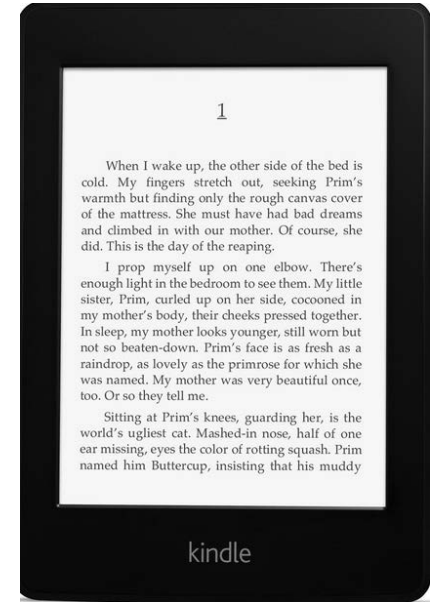
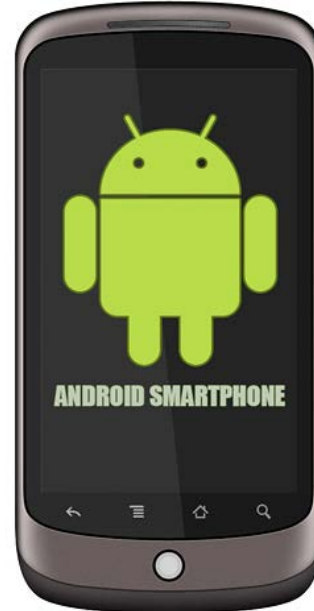
Survey Demographics

536 respondents (~10% of the potential sample pool)

- 321 Students (Medical, OT/PT)
- 173 Residents/Faculty/Fellows
- 42 Classified as “Other”

96% of students and 98% of faculty/residents reported using or owning a mobile device

Most Commonly Used Devices



iPhone:

Students:

67%

Residents:

69%

iPad:

Students:

32%

Residents:

55%

Android Smartphone:

Students:

27%

Residents:

30%

Kindle

Paperwhite:

Students: 9%

Residents:

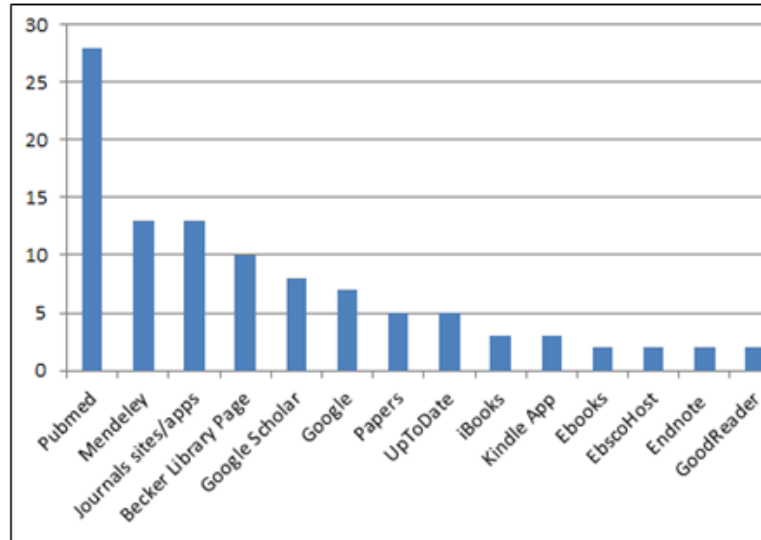
10%

Specific app-related question example

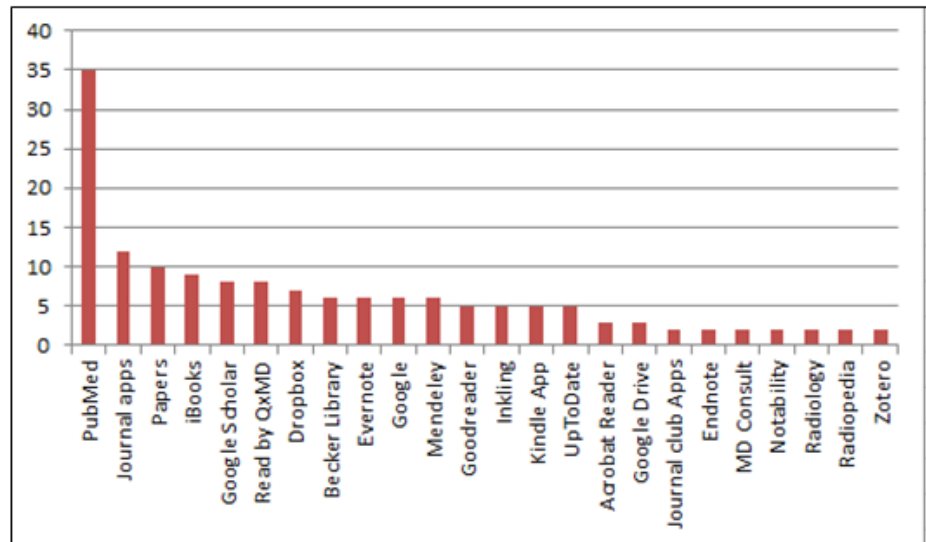
- Both the faculty/resident and student groups were asked if they ever used apps or mobile websites to find, access, or organize journal articles or eBooks
- 46% students and 65% of residents/faculty reported using apps or mobile sites for these purposes.

Apps used to find, access, or organize journal articles or eBooks

Student Responses



Residents/Faculty Responses

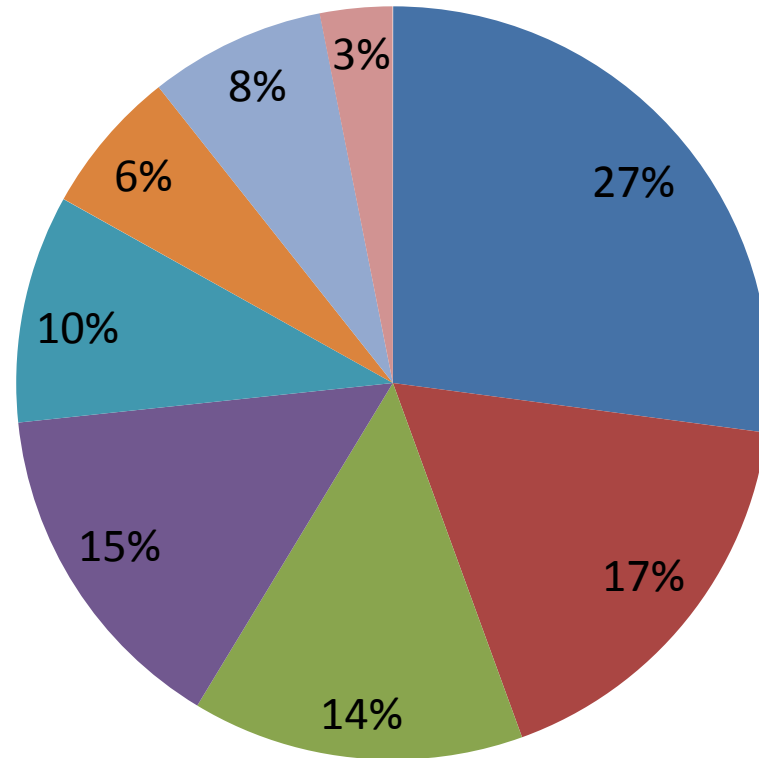


Barriers to using apps and mobile devices

- Both survey groups were provided a list of potential barriers they may encounter when using apps or mobile devices
- Survey participants were also given the option of writing additional barriers they have experienced

Barriers

- Not sure which apps to utilize
- Poor wireless internet connection
- Not able to find quality medical apps
- Not able to access library resources
- Technical issues with mobile devices
- Don't trust the content of apps
- Mobile device restrictions at the hospital/school
- Other



Barriers: Write-in responses

- Both groups listed “Cost” as a major barrier
- Some students noted work culture issues:
 - “Attendings are leery of medical students typing into their phones during rounds”
 - “Looks weird to be on the phone all the time”
- Faculty/Residents cited more technology problems:
 - “Poor display/aesthetics of information on mobile device”

Potential Services

- Survey participants were presented with a list of 12 services Becker Library could potentially offer to support mobile medicine and were asked to select those they were interested in.

Top Student Responses

Online List of
Recommended Apps
(87%)

Online List of FDA-
approved apps (61%)

Access to devices with
apps loaded with
medical apps to try out
(34%)

Tablets available for
checkout (21%)

Training Sessions
about mobile
devices (11%)

- “I'm techy. Give me a list of suggestions and I'll try them out. I imagine that the less digitally inclined students would benefit from some training, but I have absolutely no interest in attending. Tech literacy is so variable that people are forced to teach to the tech-illiterate as I fall asleep in the back row.”
- “I would need to know that these apps have been tested and "proven" (at least in some capacity) to be beneficial. They should be endorsed by some medical faculty before I would consider spending time with them.”

Top Resident/Faculty responses

Online list of recommended apps (80%)

Online list of FDA-approved apps (47%)

Access to devices with apps loaded with medical apps to try out (28%)

Training Sessions about using mobile devices (18%)

Tablets available for checkout (13%)

- “Someone available to help get appropriate apps up and running on phones.”
- “I'm really interested in seminars/lectures about app development and design. This needs to happen. :)”

Survey Summary

- We found that a large proportion of our patron population frequently utilize mobile technology to access information resources
- There is demand for the library to provide more services and resources to support mobile medicine initiatives
- We need to move forward keeping in mind the varying levels of technology expertise among our patrons

So what now??



Mobile Medicine 2.0 Plan

Phase 1

- Improve Access to Resources

Phase 2

- Provide education and training

Phase 3

- Forum for mHealth and app creation

Phase I: Improve Access to Resources

- Make Library website more easy to navigate on mobile devices
- Guide patrons towards apps connected to Becker Library resources
 - Becker Library already has a Libguide/resource guide that provides a list of recommended mobile apps, but we need to revise it and make it easier for our patrons to find and utilize

Mobile Medicine Resource Guide:

<https://beckerguides.wustl.edu/mobileresources>

Mobile Medicine Resources Tags: android, apps, ipad, iphone, mobile medicine, pda, smartphones, tablets

Last Updated: Dec 29, 2014 | URL: <http://beckerguides.wustl.edu/mobileresources> | [Print Guide](#) | [RSS Updates](#)

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Becker Resources

These apps are provided for members of the Washington University School of Medicine community by Becker Library subscriptions. **You do not need to purchase these apps**, but for most of them you will need to create an account while on the internet network at the Washington University School of Medicine (WUSM network).


Clinical Pharmacology

 Clinical Pharmacology offers a mobile version of their site that is easier to utilize on smartphones and tablets. To access the mobile site you will need to submit a short [request form](#) and receive an activation code. Once you have an account established you can utilize this link to access the mobile site: <https://cpmobile.mobi/>.

The activation code will give you access the mobile site for one year. You will need to request a new activation code each year.

Device Availability: All devices with a mobile web browser

Ebsco Host Mobile




The Ebsco Host app allows you to search for articles in Ebsco databases including CINAHL and PsycInfo.

Instructions:

- Download the Ebsco Host app from iTunes (Apple devices), or Google Play (Android devices)
- Open CINAHL or PsycInfo (must be on the WUSM network to access)

UpToDate Anywhere



UpToDate Anywhere gives you off-campus access to UpToDate on your mobile device or from you home computer. Here are basic instructions for getting started with UpToDate Anywhere (detailed instructions found in a PDF document at the bottom of the section)


Here is Video that takes you through the process step-by-step: <https://vimeo.com/77631768>

1. Make sure your computer or mobile device is connected to the WUSM, BJH, or SLCH network.
2. Go to the [Becker Library Website](#)
2. Click on UpToDate (it is listed under Popular Resources on the front page)
3. Click on Log-in/Register and create an UpToDate account.
4. A confirmation email will be sent to you with your chosen username and a link to recover your password.
5. Install the free UpToDate app on your mobile device (available in iTunes, Google Play, and Windows App store)

Once installed, log-in using the username and password selected during the registration process

Note: In order to maintain access to UpToDate Anywhere you need to verify your affiliation with Washington University, Barnes Jewish Hospital, or St. Louis Children's Hospital **at least once every 30 days**. Simply login to UpToDate once every 30 days from the WashU, BJH, or SLCH internet network to maintain your account and access.

Device Availability: iPhone/iPad, Android devices, Windows 8 devices

 [UpToDate Mobile App Instructions](#)

Web of Science Anywhere

WEB OF SCIENCE™

Phase 2: Provide Education and Training

- Create a series of courses to instruct patrons how to find and utilize mobile apps, and how to incorporate mobile resources into a typical workflow. Courses will be available online and in-person

Getting to Know Devices and Apps:

This will be an interactive, “sandbox” type session where participants will get the chance to try out our various devices along with a selection of medical apps. During this time we can also help answer questions about installing Becker subscription apps.

Length of Session: 30-60 minutes (can also be structured as a drop-in event)

Location: Either inside or outside of the library (might actually work best outside of the library)

Medical App Essentials

What apps should you have installed on your device? Which ones are the most helpful and trustworthy? During this session we will provide information about top medical apps, including apps that are available via Becker Library subscriptions.

Length of session: 20-30 minutes

Location: Inside/Outside of Library (probably FLTC 602 for practical reasons)

Accessing eBooks and journals on your mobile device

Would you like to access and read journal articles or eBooks on your mobile device, but don't know where to start? This session will discuss the best ways to access articles and eBooks via Becker Library subscriptions. We will also discuss using journal aggregator apps like Docphin and Read by QXMd

Length of Session: 30-45 minutes

Location: Probably FLTC 602, potentially other classrooms in the FLTC

Searching for articles using PubMed Mobile and other mobile-based databases

Using PubMed and other databases on your mobile device (especially smartphones) can be a challenging experience. During this session participants will be introduced to PubMed Mobile and other mobile-optimized databases. We will also discuss strategies for putting together an effective search in these “miniaturized” environments.

Length of Session: 45 minutes – 60 minutes

Location: Probably FLTC 602

Phase 3: Forum for mHealth and app creation

- Provide a space (online and in-person) for patrons to discuss mobile health issues and trends
- Organize a lecture series or forum about app creation

Challenges

- How to provide services to patrons with varying levels of technical expertise
- Successfully marketing programs across our large medical campus
- Keeping up with constantly evolving technology
- Knowing when the “latest thing” will have enduring value...not just a flash in the pan

Take Home Points

- You may find it beneficial to survey your library patrons about their use of mobile technology and apps before revising current services or starting new ones.
- By providing library services via mobile devices we have the opportunity to assist our patrons with their information needs in new and exciting ways.

More Information

- Becker Library Mobile Medicine Resource Guide:
<http://beckerguides.wustl.edu/mobileresources>
- If you are interested in reading our complete survey report, please contact me at: hardia@wustl.edu

Acknowledgements

***All from Becker Library**

- Kim Lipsey (survey co-investigator)
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 - Debbie Thomas (Becker Library Associate Director of Health Information Resources)
 - Paul Schoening (Becker Library Director)

Sources

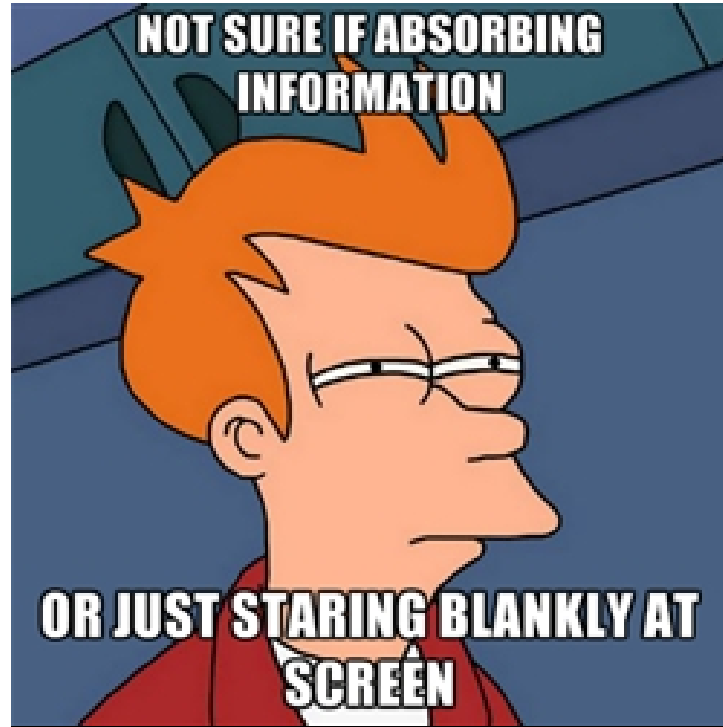
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- Singh, A., Taneja, A. & Mangalaraj, G. (2009). Creating online surveys: Some wisdom from the trenches. *IEEE Transactions on Professional Communication*, 52 (2), 197-212
- There are lots of useful resources also available from the Duke University Initiative on Survey Methodology site: http://dism.ssri.duke.edu/question_design.php

**Thank you for your time
and attention!**



Any Questions?