Disclosures

Chairman Committee on Mental Health Information Technology
American Psychiatric Association

Chief Medical Information Officer
PrairieCare

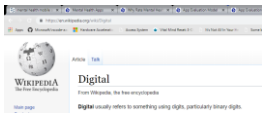
President and Owner
Exponential Innovations

I **do not** have any financial interests in any aids or applications discussed today

Digital Aids and Applications
Objectives

1. Understand the landscape of the medical apps marketplace
2. Describe tools available to evaluate the quality of apps and their use in clinic care
3. Consider the impact of artificial intelligence and deep learning on future offerings and clinical practice

What Is Digital?



- Digital electronics - electronic circuits which operate using digital signals
- Digital camera - which captures and stores digital images
- Digital computer - a computer that handles information represented by discrete values
- Digital data - discrete data, usually represented using binary numbers
- Digital signal (signal processing), sampled analog signals represented as a sequence of digital values

Socioeconomic Phenomena

Digital culture - the anthropological dimension of the digital social changes

Digital divide - a form of economic and social inequality in access to or use of information and communication technologies

Digital economy - an economy based on computing and telecommunications resources

Digital

01001000 01100101 01101100
01101100 01101111 00100000
01010111 01101111 01110010
01101100 01100100 00100001

↕

Hello World!

Digital Computing

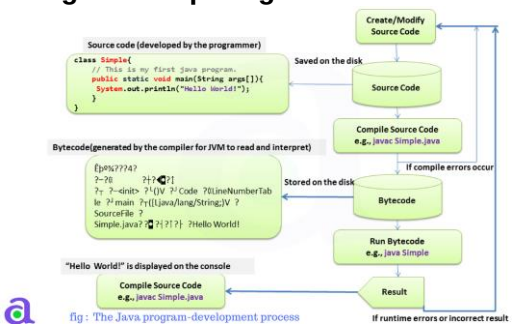


fig : The Java program-development process

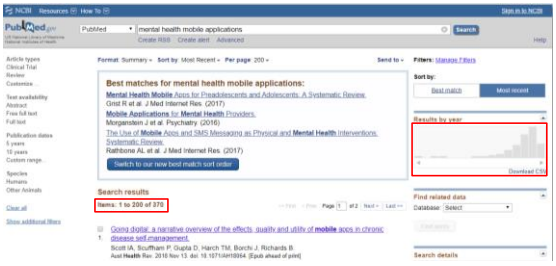
http://www.atnyla.com/tutorial/compilation-and-execution-process/0/10

Future challenges for digital healthcare

Published Wednesday 26 April 2017 By Linda Brookes, M.Sc.

The digital health "revolution" appears to be well under way. According to a recent survey by the American Medical Association, the vast majority of physicians believe that adopting digital health tools will improve their ability to care for their patients.

https://www.medicalnewstoday.com/articles/317022.php



Very few articles given all of the excitement!

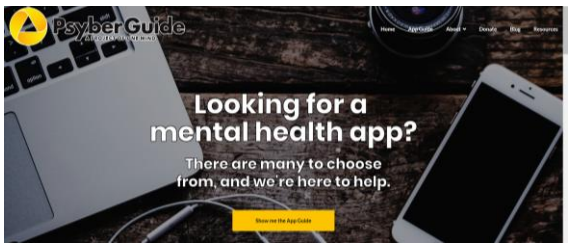
"From ineffective electronic health records, to an explosion of direct-to-consumer digital health products, to apps of mixed quality, [these products are] the digital snake oil of the early 21st century."

James L. Madara, M.D., CEO of the AMA

https://www.ama-assn.org/ama-ceo-outlines-digital-challenges-opportunities-facing-medicine

AMA Digital App Guidelines

- Support the establishment or continuation of a valid patient-physician relationship;
- Have a clinical evidence base to support their use in order to ensure mHealth app safety and effectiveness;
- Follow evidence-based practice guidelines, to the degree they are available, to ensure patient safety, quality of care and positive health outcomes;
- Support care delivery that is patient-centered, promotes care coordination and facilitates team-based communication;
- Support data portability and interoperability in order to promote care coordination through medical home and accountable care models;
- Abide by state licensure laws and state medical practice laws and requirements in the state in which the patient receives services facilitated by the app;
- Require that physicians and other health practitioners delivering services through the app be licensed in the state where the patient receives services, or be providing these services as otherwise authorized by that state's medical board; and
- Ensure that the delivery of any services via the app be consistent with state scope of practice laws.



APA App Evaluation

Grounded in the belief that any decision between a provider and a patient is a personal decision based on many factors, for which there is rarely a binary 'yes' or 'no' answer.

Goal: help providers consider important information that when picking an app

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

APA App Evaluation Areas / Steps

1. General Information
2. Safety / Privacy
3. Evidence (i.e., effectiveness)
4. Ease of Use
5. Interoperability

- Ordered
- Not absolute - No minimum or maximum number of levels necessary for an app to be considered "good" or "useful".
- Patient Centered - There may be cases where an app fills few levels but you and a patient still want to use it

* Of note, while we offer examples of how to use this model, we do not explicitly rate apps. Given that apps are constantly updating and changing, such information would quickly be out of date. Also, determining the inherent usability is very subjective and depends on how both you and the patient experience and feel after examining it.

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

General Information

- What is the business model? Who is the developer? Does it claim to be medical?

- What is the cost? Does it require in-app purchases to unlock certain features? Does it integrate advertising into its usability?

- On which platforms does it work (e.g., iOS, Android)?

- When was it last updated?

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

Risk/Privacy & Security

● Is there a privacy policy? Are cookies placed on your device?

● What data are collected? Are personal data de-identified? Can you opt-out of data collection? Can you delete data?

● Who are data shared with / What data are shared? Are data maintained on the device or the web (i.e., "the cloud")? Both?

● What security measures are in place? Are data encrypted on the device and server? Does it purport HIPAA compliance? / Does it need to be HIPAA-compliant?

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

Evidence

● What does it claim to do vs. what does it actually do?

● Is there peer-reviewed, published evidence about tool or science behind it?

● Is there any feedback from users to support claims (App store, website, review sites, etc.)?

● Does the content appear of at least reasonable value?

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

Ease of Use

● Is it easy to access for the patient at hand (i.e., based on patient diagnosis or other factors)? Would it be easy to use on a long-term basis?

●Is the app or are features of the app customizable?

●Does it need an active connection to the Internet to work? What platforms does it work on?

●Is it accessible for those with impaired vision or other disabilities?Is it culturally relevant?

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

Interoperability

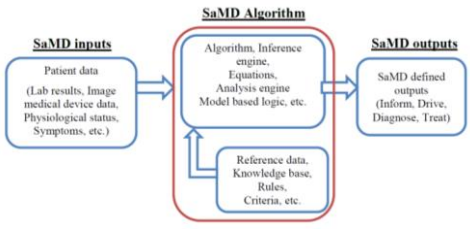
- Who “owns” the data (i.e., patient, provider, developer)?
- Can it share data with the EHR?
- Can you print out your data?
- Can you export/download your data?
- Can it share data with other user data tools (eg, Apple HealthKit, FitBit)?

https://www.psychiatry.org/psychiatrists/practice/mental-health-apps

Regulatory Implications / Guidance?

FDA Regulations

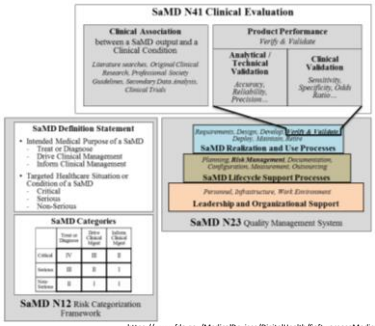
Software as a Medical Device (SAMD): Clinical Evaluation



https://www.fda.gov/MedicalDevices/DigitalHealth/SoftwareasaMedicalDevice/ucm587925.htm

FDA Regulations

Software as a Medical Device (SAMD): Clinical Evaluation



https://www.fda.gov/MedicalDevices/DigitalHealth/SoftwareasaMedicalDevice/ucm587925.htm

Current regulation of mobile mental health applications.

In recent years, the availability of software that is targeted toward the general public and designed to assist in the diagnosis and treatment of mental illness or to promote general mental health has expanded greatly.

Regulation of more traditional health care providers and health care-associated devices is well established by statute, regulatory guidelines, and common law precedents.

Applications (apps), in contrast, pose a novel regulatory challenge.

Current regulation of mobile mental health applications.
Armontrout JA, Torous J, Cohen M, McNiel DE, Binder R J Am Acad Psychiatry Law. 2018 Jun; 46(2) 204-211

Mental health mobile apps for preadolescents and adolescents: A systematic review.

Overall, there is currently insufficient research evidence to support the effectiveness of apps for children, preadolescents, and adolescents with mental health problems.

Mental health mobile apps for preadolescents and adolescents: A systematic review.
Grist R, Porter J, Stallard P, J Med Internet Res. 2017 May 25; 19(5) e176

Review of use and integration of mobile apps into psychiatric treatments.

Mobile apps are versatile. Integrating apps into psychiatric treatment requires addressing both patient and clinical workflows, design and usability principles, accessibility, social concerns, and digital health literacy.

Review of use and integration of mobile apps into psychiatric treatments.
Chan S, Godwin H, Gonzalez A, Yellowlees PM, Hilty DM, Curr Psychiatry Rep. 2017 Oct 30; 19(12) 96

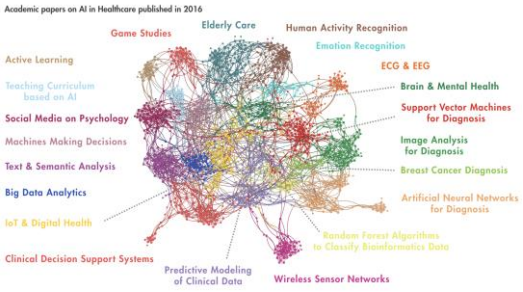
Which App Do I Choose?

Maybe we need AI!?

http://www.bbc.com/culture/story/20150706-terminator-genisys-an-ai-experts-view

- Half of hospitals plan to adopt AI within 5 years and 35% within two years
- AI can save 20% of RN time through avoided unnecessary visits
- Medical imaging & diagnosis will witness more than 40% growth with expectations to surpass USD 2.5 billion by 2024
- In a 2016 study by Frost & Sullivan, the market for AI in healthcare is projected to reach $6.6 billion by 2021, a 40% growth rate
- GE partnering w/ Harvard teaching hospitals to develop AI tools to help w/ medical imaging

https://www.navedas.com/real-world-examples-of-ai-and-healthcare-in-action/



https://quid.com/feed/paging-dr-robot-how-ai-will-transform-healthcare

What's all this tech speak?

- Big Data or Little Data
- "The Cloud"
- AI
  - Heuristics
    - Queries
  - Data Mining
    - Correlation Analysis
  - Machine Learning
    - Clustering / Classification
  - Deep Learning
    - Neural Networks
- Others?

Even with big advancements of AI application in healthcare over the recent years, it is unlikely that technology will replace the diagnostic role of physicians- at least in the near future. AI, however, is now sophisticated enough to take over the tedious repetitive tasks that used take up the productive hours of a physician.

https://www.intelegain.com/ai-in-healthcare/

PrairieCare PrairieCare medical group

Thank you!