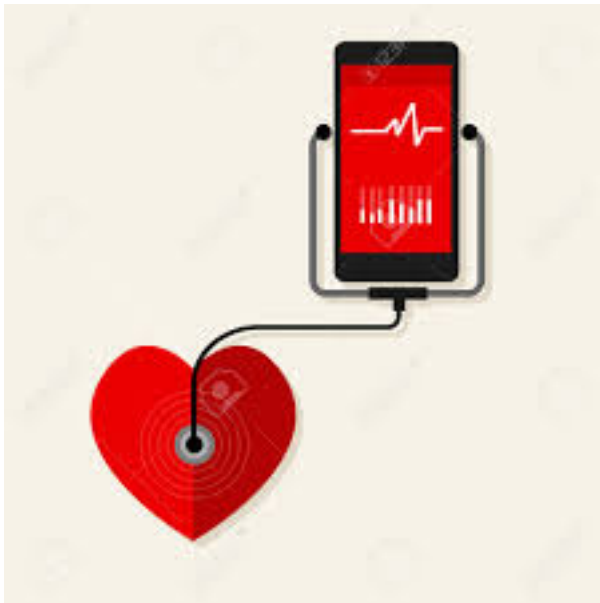


Wearable Devices & Mobile Health for AYA Preventive Care



Charlene Wong, MD MSHP
SAHM Annual Meeting
March 8, 2017

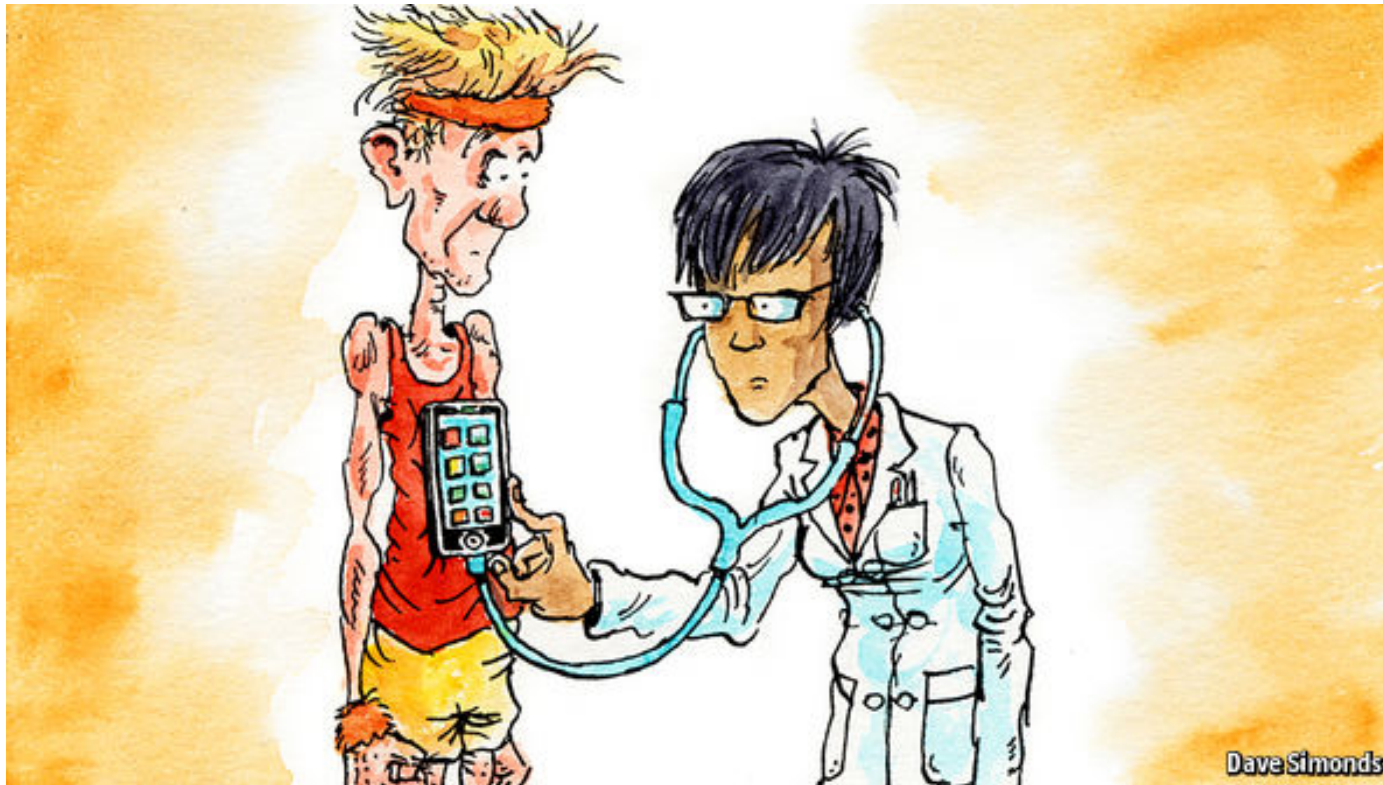
Conflict of Interest Statement

- I have no commercial relationships to disclose
- I will not be discussing any unapproved uses of pharmaceuticals or devices

Outline

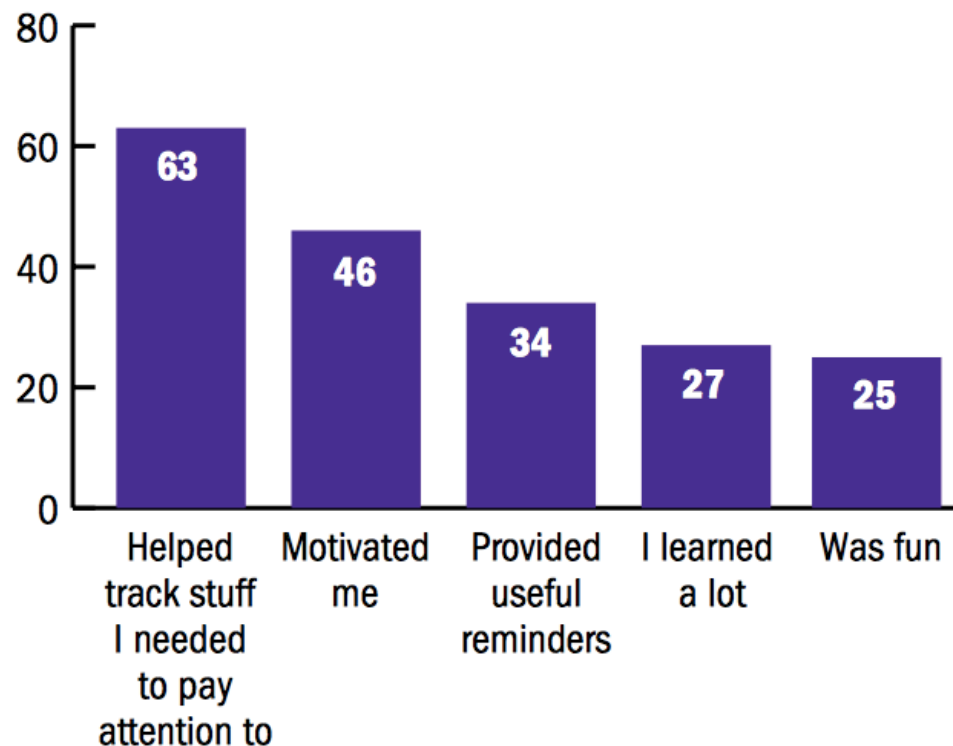
- **Mobile Health Apps for CPS**
 - Overview
 - Finding “good” apps
 - Specific examples
- **Wearable & Connected Devices for CPS**
- **Discussion Questions**

Mobile Health Apps



What Teens Like About Mobile Apps for Health

Among 13- to 18-year-olds who have downloaded mobile apps and are very/somewhat satisfied with them, percent who cite the following reasons:



Wartella. *Teens, Health, and Technology* 2015

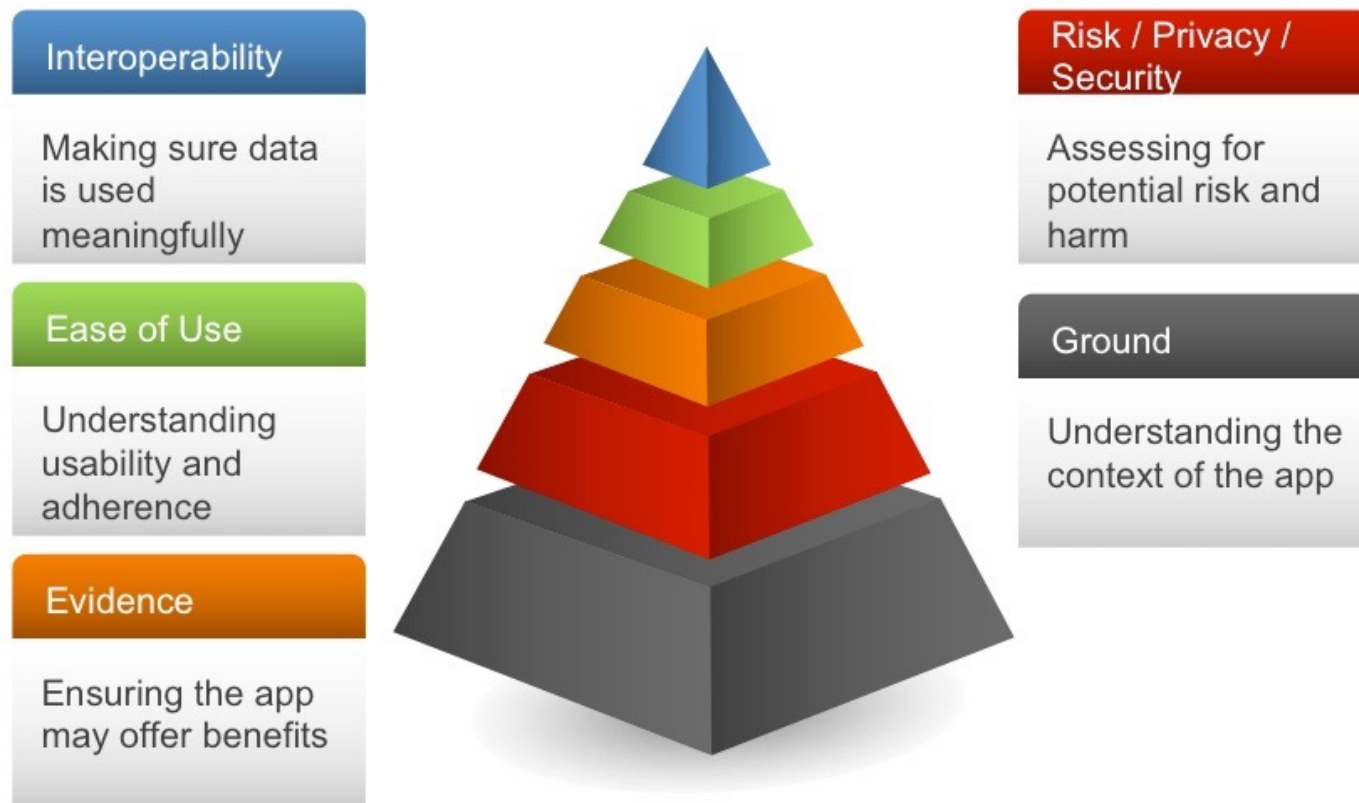
Key Challenges for Apps

- Privacy of data
 - 81% of reviewed DM apps had NO privacy policy (Blenner JAMA 2016)
- Endless living & dynamic app options



Lack of Curation in Multiple Domains

APA App Evaluation Model



Finding “Good” Health Apps

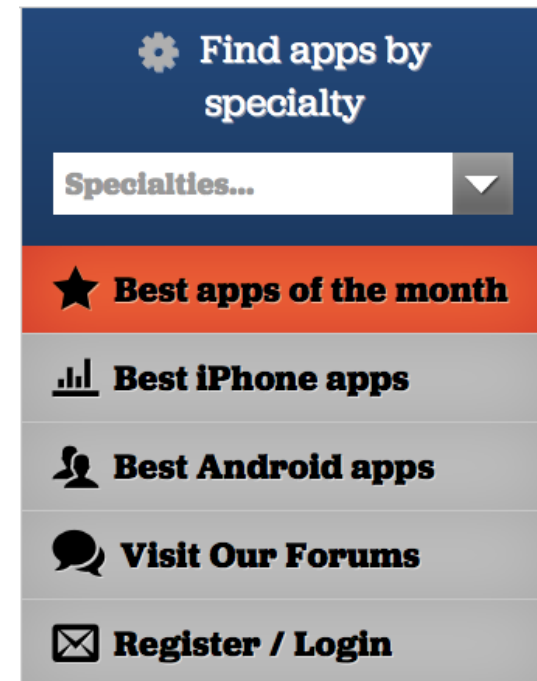
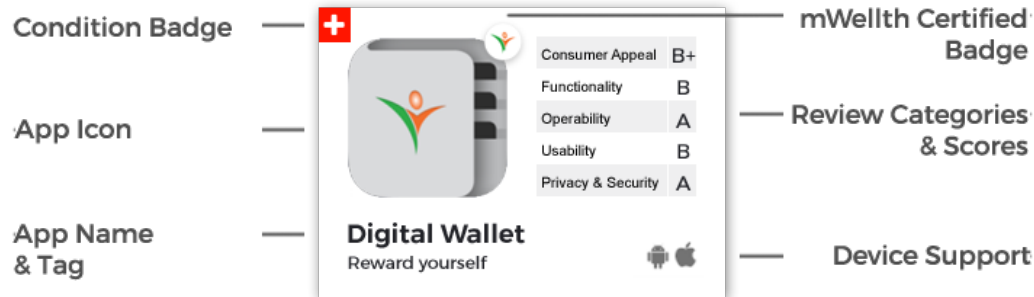
1. Review scientific literature
2. Search app clearinghouse websites
3. Search app stores
4. Review app descriptions, user ratings, reviews
5. Conduct a social media query within professional, and if available, pt networks
6. Pilot the apps
7. Elicit feedback from patients

Boudreaux 2014 TBM

App Clearinghouse Websites



Anatomy of an app card



Officially “Approved” Apps

- FDA approved 36 connected health apps & devices in 2016
- **Natural Cycles App** recently approved in Europe as a contraceptive



Finding AYA CPS Apps - Methods

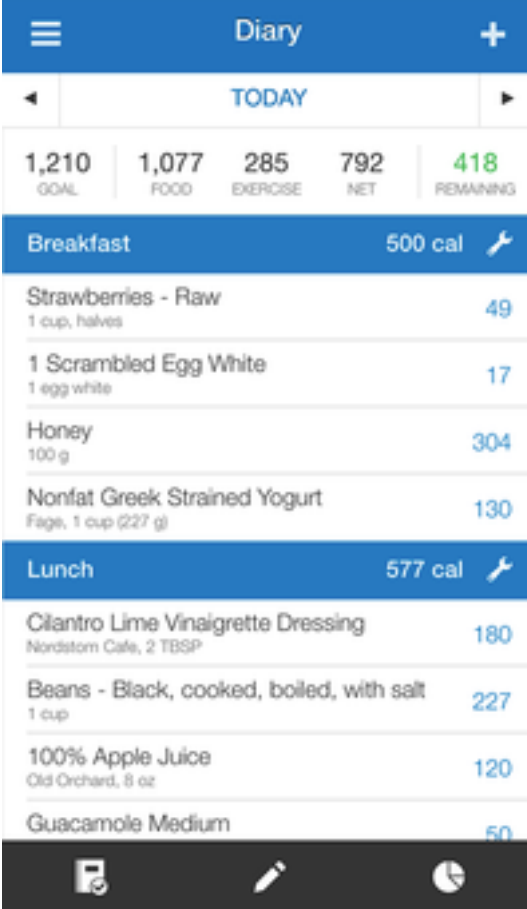
- January – February 2017
- Team of 3 researchers, including 2 young adults, searched for the top applications
- Preventive Health Domains
 - Nutrition/diet
 - Exercise
 - Immunizations
 - Substance use
 - Sexual/reproductive health
 - Mental health
 - Safety
- Targets AYAs (e.g., Seventeen magazine)

Finding AYA CPS Apps - Methods

- **Top app criteria for workshop**
 - Free
 - Widely used
 - Highly rated
 - Recommended by top app lists
 - Appeals to broad populations
 - Adolescent/young adult focused
 - Interactive
 - Subjective “likability” on testing
- Selected top apps across several domains

Fitness – My Fitness Pal

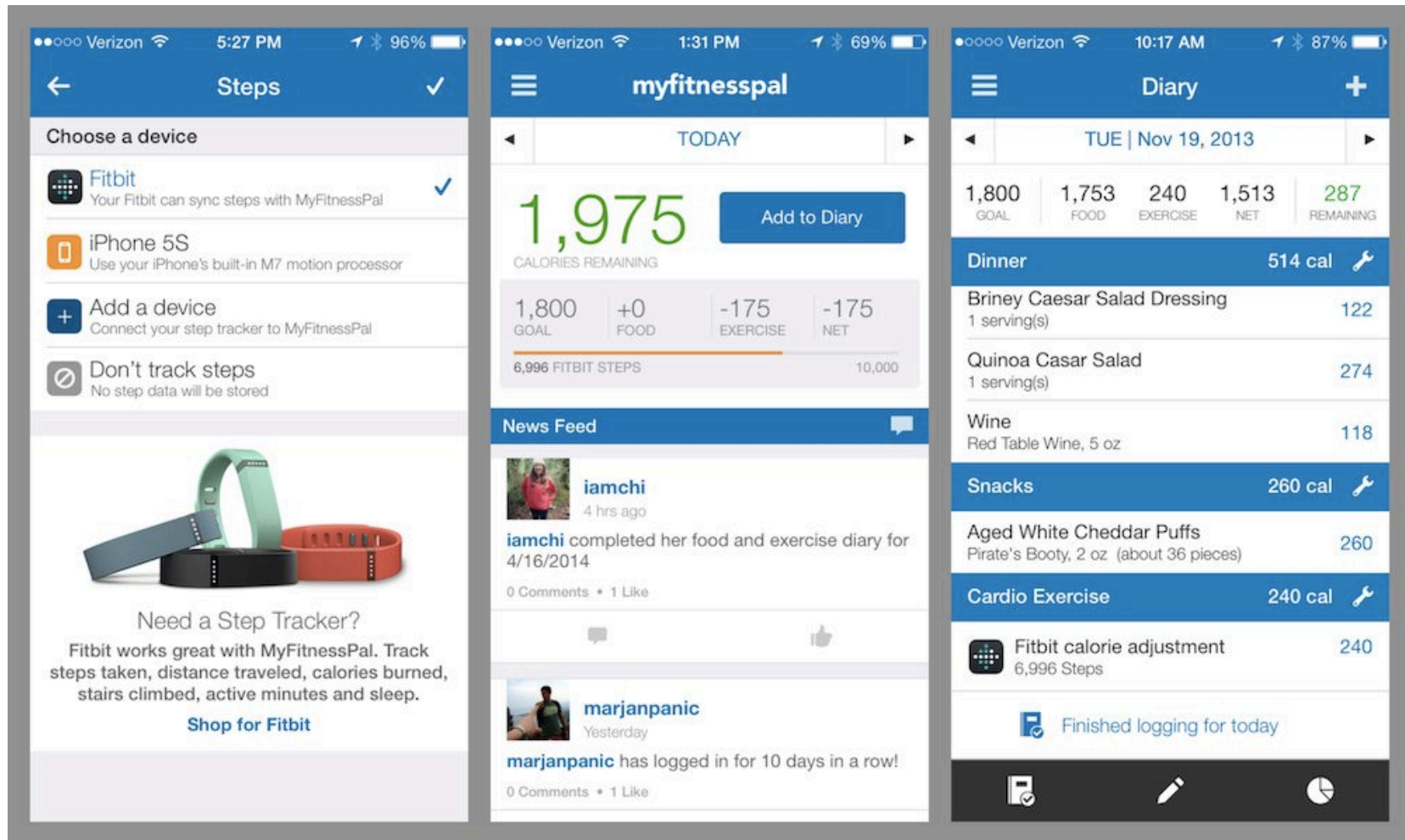
- All-in-one calorie counter & exercise tracker
- Exhaustive food & nutrition database
- Easy data entry
- Has received many awards/recognition



The screenshot displays the 'Diary' section of the My Fitness Pal app for 'TODAY'. It shows a goal of 1,210 calories, with 1,077 from food and 285 from exercise, leaving 792 net calories and 418 remaining. The diary is divided into 'Breakfast' (500 cal) and 'Lunch' (577 cal). The breakfast items are Strawberries - Raw (49 cal), 1 Scrambled Egg White (17 cal), Honey (304 cal), and Nonfat Greek Strained Yogurt (130 cal). The lunch items are Cilantro Lime Vinaigrette Dressing (180 cal), Beans - Black, cooked, boiled, with salt (227 cal), 100% Apple Juice (120 cal), and Guacamole Medium (50 cal).

Category	Calories
GOAL	1,210
FOOD	1,077
EXERCISE	285
NET	792
REMAINING	418
Breakfast	500 cal
Strawberries - Raw 1 cup, halves	49
1 Scrambled Egg White 1 egg white	17
Honey 100 g	304
Nonfat Greek Strained Yogurt Fage, 1 cup (227 g)	130
Lunch	577 cal
Cilantro Lime Vinaigrette Dressing Nordstrom Cafe, 2 TBSP	180
Beans - Black, cooked, boiled, with salt 1 cup	227
100% Apple Juice Old Orchard, 8 oz	120
Guacamole Medium	50

Fitness – My Fitness Pal

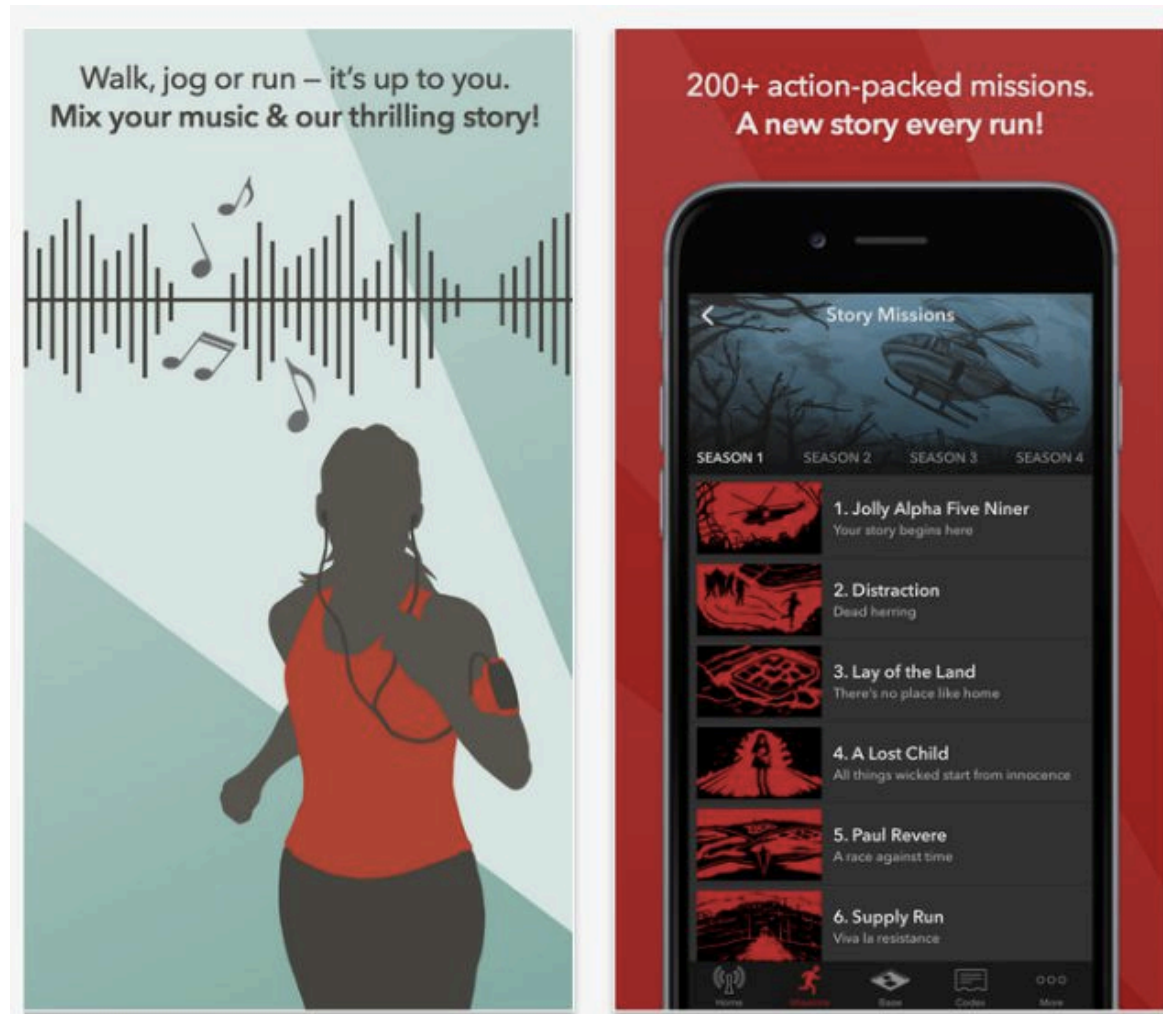


Fitness – Zombies, Run!

- Ultra-immersive running game & audio adventure
- Each run is a mission in your own Zombie apocalypse, collect supplies as you go
- Provides audio drama + playlist
- Over 3 million runners



Fitness – Zombies, Run!



Nutrition - Waterlogged

- Improve water intake
- Charts & reminders
- Photos of cups to quickly record water intake
- Appeared on multiple top app lists
- Can integrate with MyFitnessPal



Reproductive Health - Clue

- Period, PMS, fertility tracking app

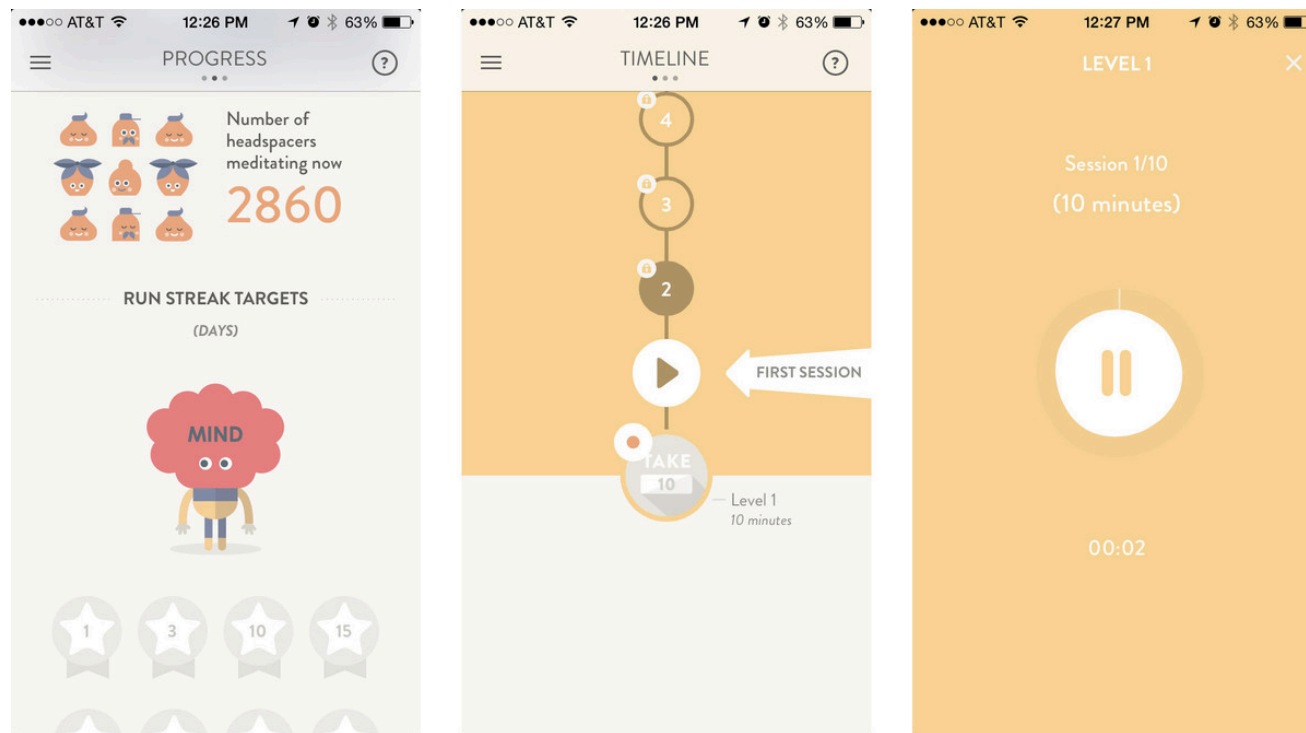


Clue



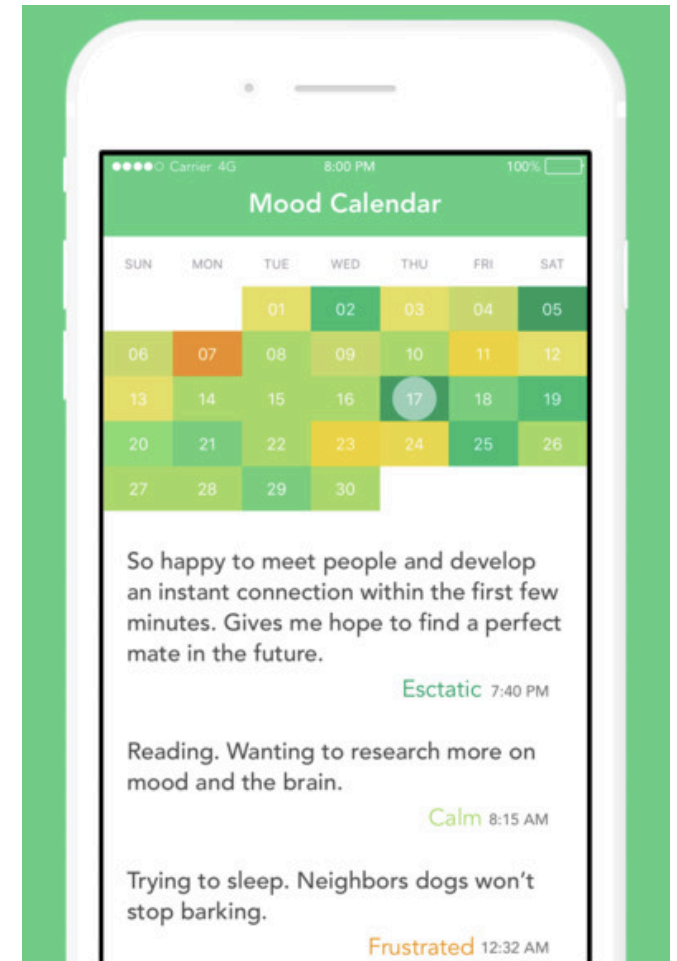
Mental Health - Headspace

- Guided meditation and mindfulness app
- Highly recommended, lots of buzz

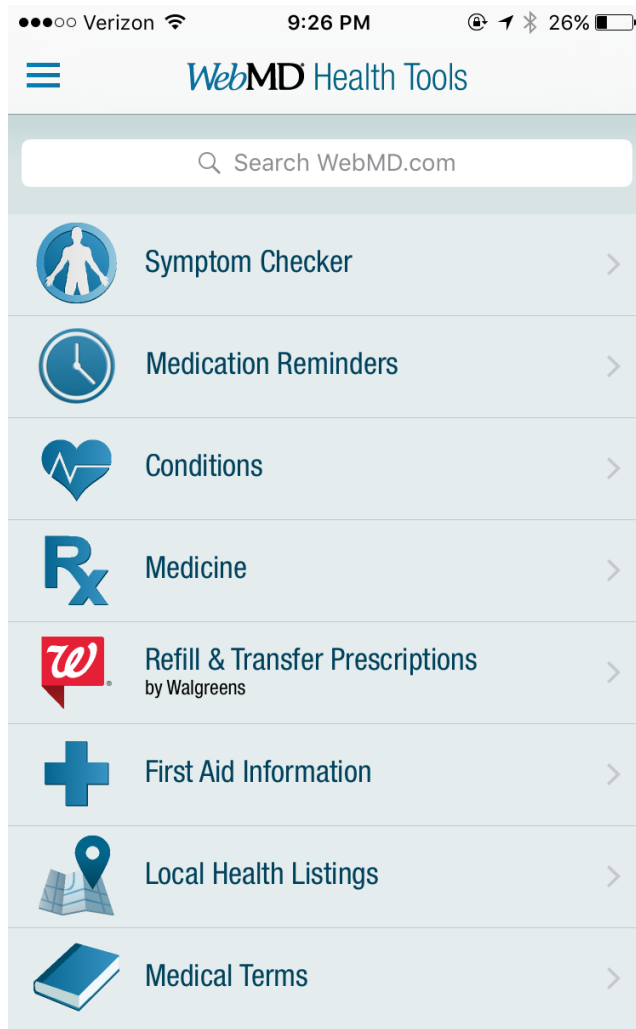


Mental Health - Stigma

- Personal journal, diary & mood tracker
- Find a supportive peer
- “Effortless” brief journaling
- Self-reflection word-clouds



Health Education - WebMD



Practical Tips for Incorporating Apps into Practice

- **Demo:** Have recommended apps downloaded on your own device to show patient during visit
- **Captive audience:** Ask patients to download applications onto their smartphone while waiting for vaccines, AVS
- **AVS:** Include curated app recommendations in templated patient instructions

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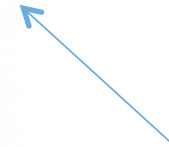
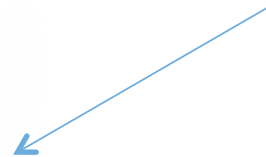
Wearable & Connected Devices

- Increasing number of medical devices are getting connected to the internet
- Technology companies are shifting focus towards population health (Apple, Google)

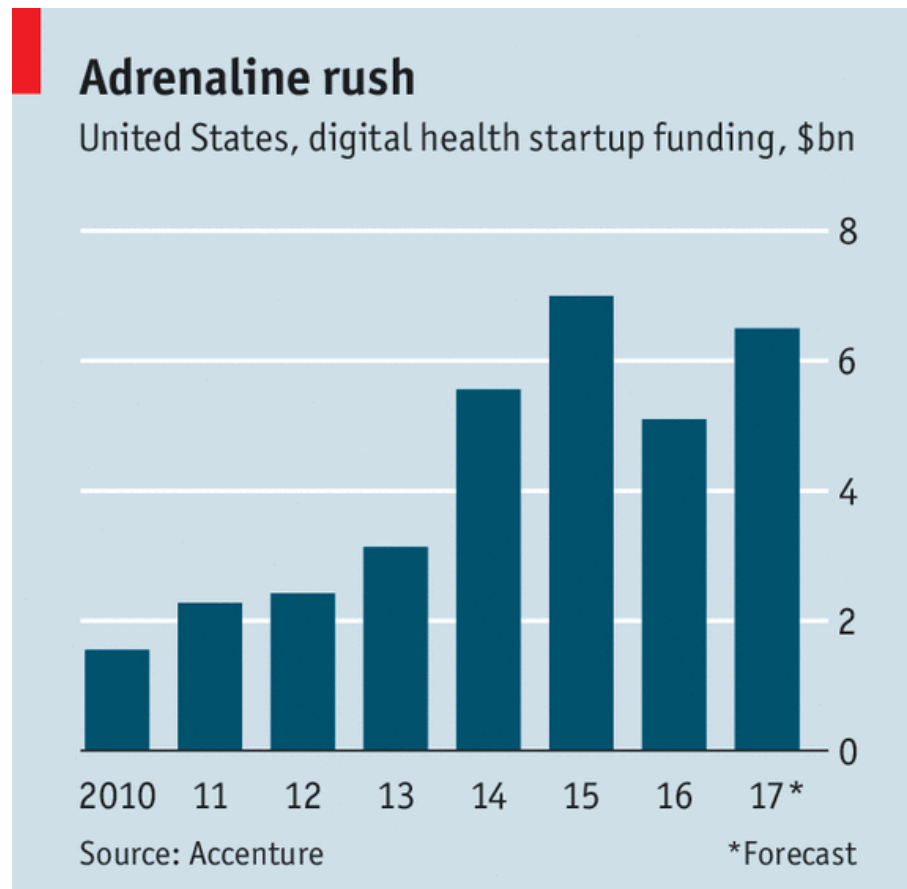


Patel et al. *JAMA*. 2015

Wearable & Connected Devices



Investment in Digital Health is Soaring



Economist.com

Wearable & Connected Devices

- **Use of wearable devices**
 - 1-2% of US population
 - Estimated that sales will increase to \$50 billion over the next few years
- Can track **many behaviors**
- **Versatility** and **portability** appeals to pts

Patel et al. *JAMA*. 2015

Wearable & Connected Devices

TOP AREAS

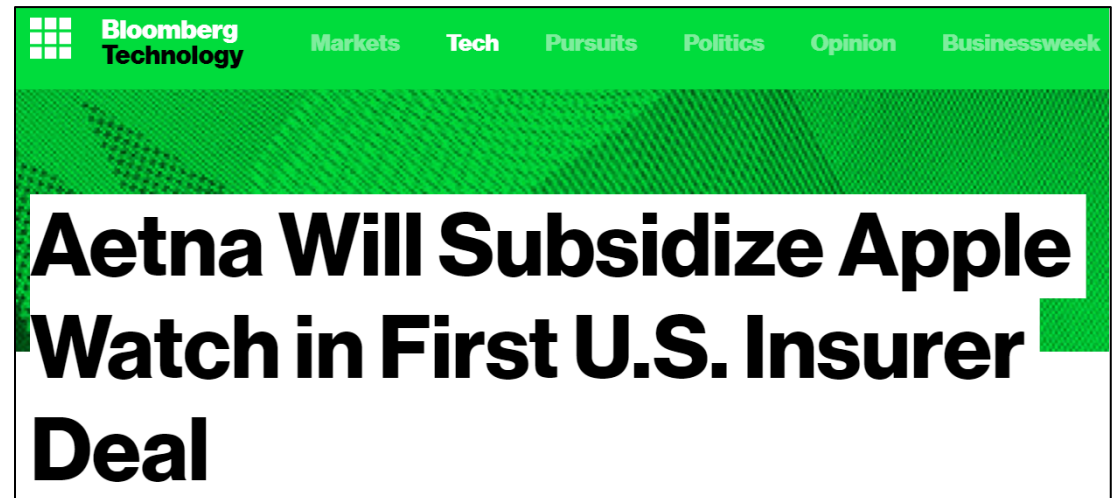
- Movement
- HR
- Sleep



Rock Health. 2014 Report

Key Challenges for Wearable Devices

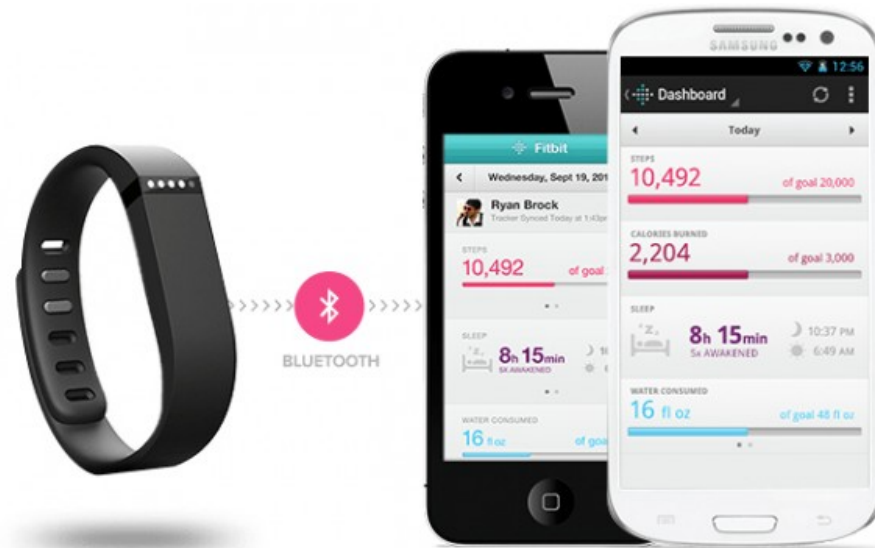
- **Improving Access:** Individuals with most to gain less likely to use them



Patel et al. *JAMA*. 2015

Key Challenges for Wearable Devices

- **Improving Access:** Individuals with most to gain less likely to use them
- **Sustaining Use:** Wear it, regularly use/sync. Half stop using within a few months



Patel et al. JAMA. 2015

Key Challenges for Wearable Devices

- **Improving Access:** Individuals with most to gain less likely to use them
- **Sustaining Use:** Wear it, regularly use/sync. Half stop using within a few months
- **Accuracy:** Many devices, little evaluation



Patel et al. JAMA. 2015

Key Challenges for Wearable Devices

- **Improving Access:** Individuals with most to gain less likely to use them
- **Sustaining Use:** Wear it, regularly use/sync. Half stop using within a few months
- **Accuracy:** Many devices, little evaluation
- **Efficacy:** Mixed evidence

Patel et al. *JAMA*. 2015



I can't believe I work out so hard just to impress my Fitbit.

whisper



Wearing my Fitbit is like wearing yoga pants, they make me feel sporty even if we both know I slept in bed all day!

whisper

Efficacy of Wearable Devices

- Weight Loss with Fitness Trackers
 - ✓ More weight loss when combined with effective engagement strategies (Patel 2015 JAMA)
 - ✓ Increased steps with fitness trackers (Shuger 2011 Int J Beh Nut)
 - = No difference in weight (Harris 2015 Plos Med)
 - ✗ Fitness tracker group with less weight loss than control group (Jakicic 2016 JAMA)

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Discussion Questions

- How do you recommend apps (if at all)?
Which apps are your favorites?
- Experiences with patients using wearable/
connected devices +/- integrating that data
into your care?

Thank You

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- Duke-Margolis Center for Health Policy
 - Annabel Wang, BS
 - Megan Moore
 - Madison Mastrangelo

- University of Pennsylvania
 - Mitesh Patel, MD MBA MS