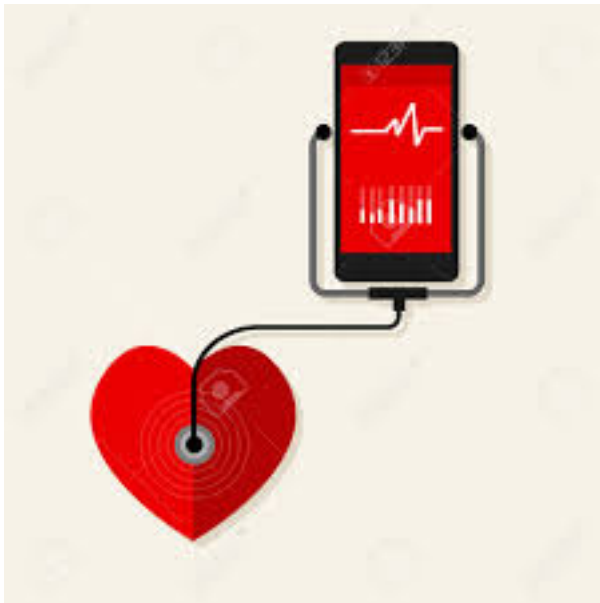


# Wearable Devices & Mobile Health for AYA Preventive Care



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

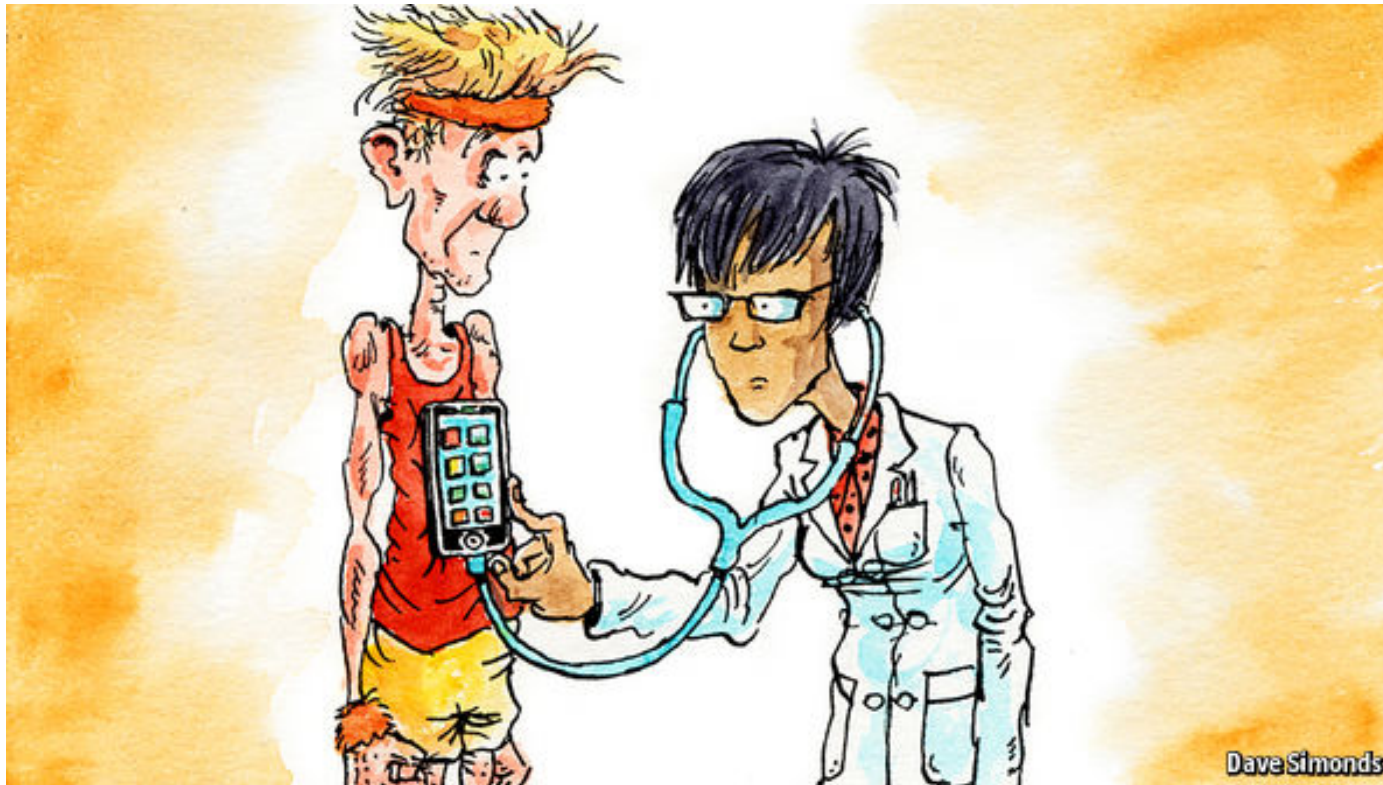
# Conflict of Interest Statement

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

# Outline

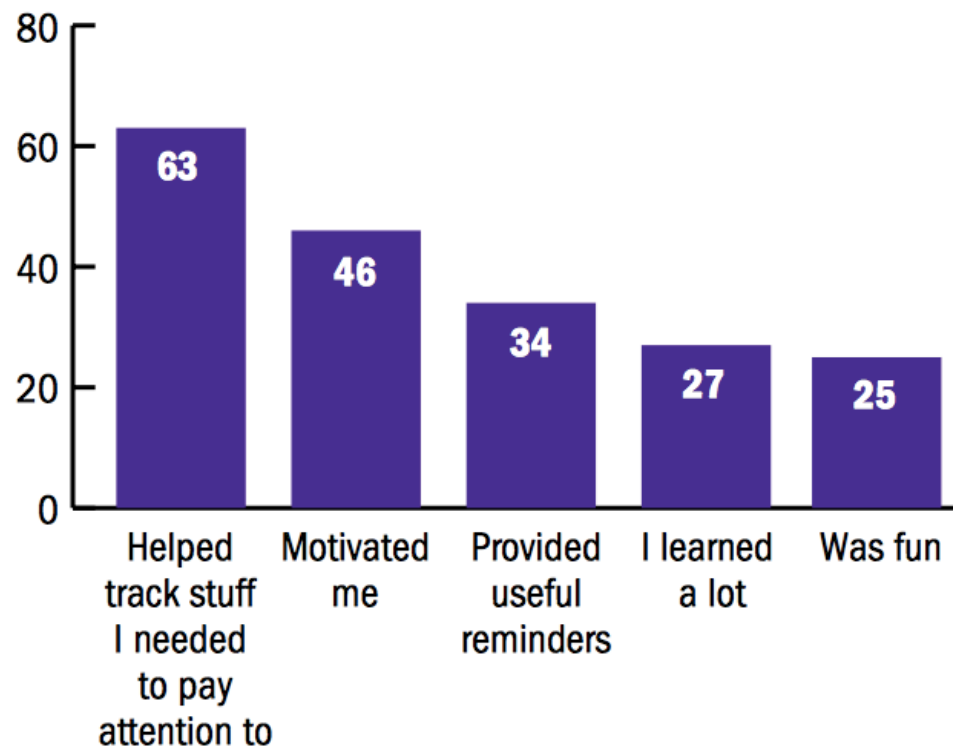
- **Mobile Health Apps for CPS**
  - Overview
  - Finding “good” apps
  - Specific examples
- **Wearable & Connected Devices for CPS**
- **Discussion Questions**

# 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

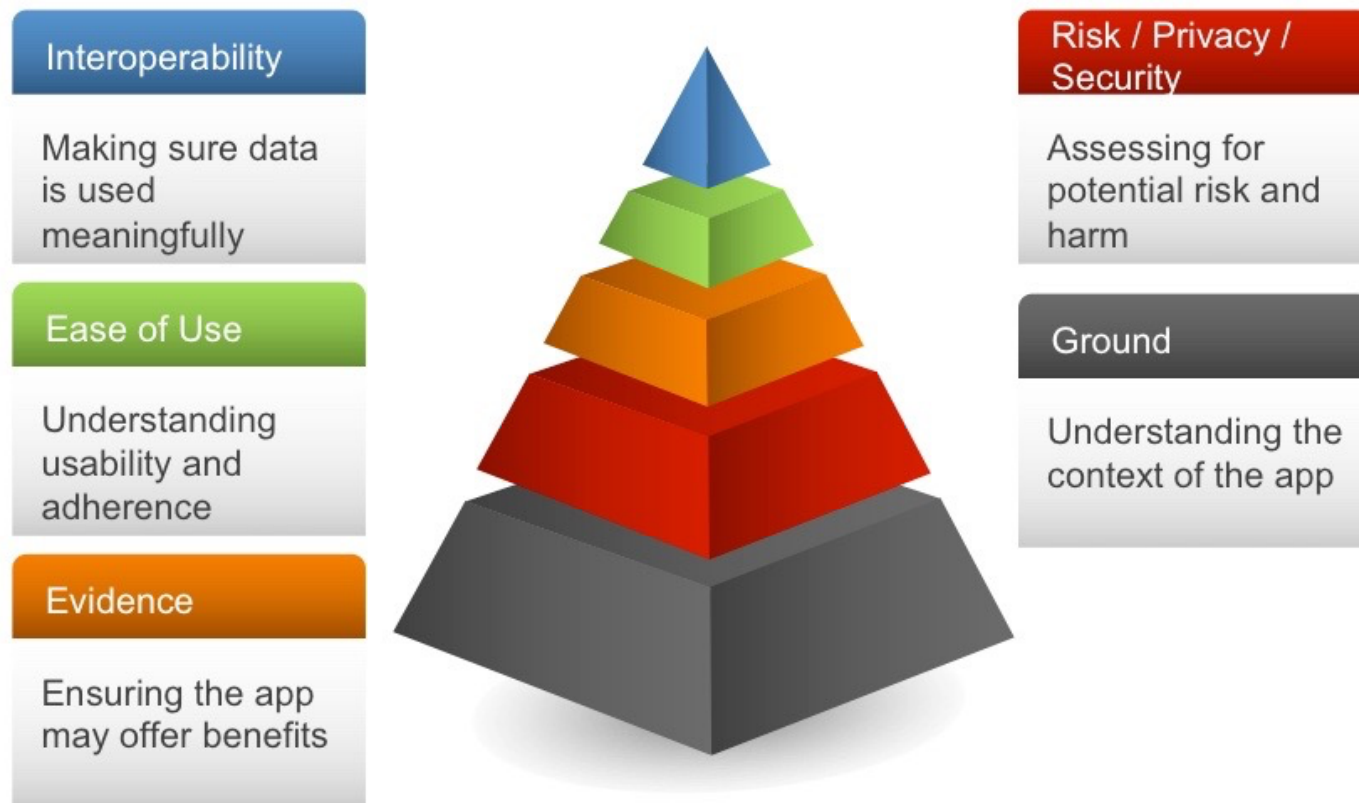
# Key Challenges for Apps

- 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

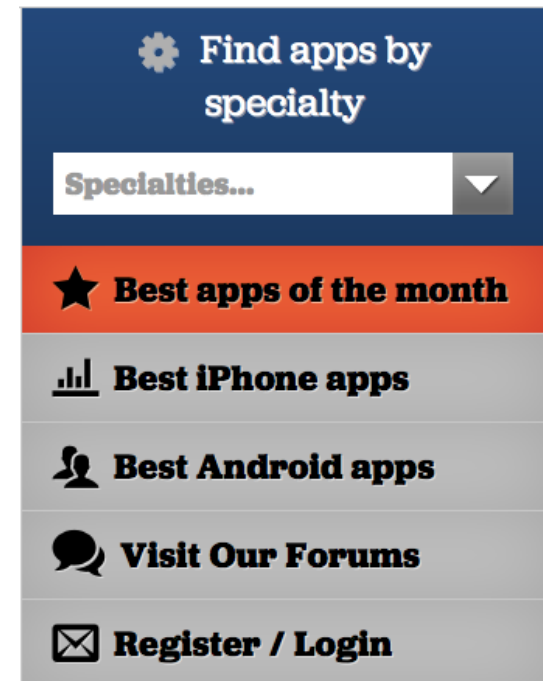
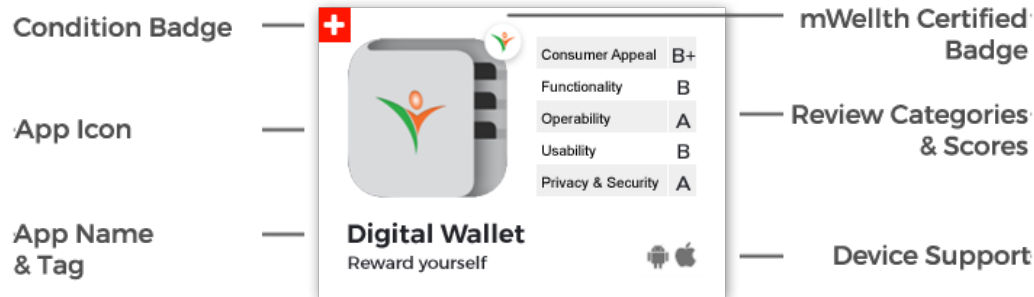
1. Review scientific literature
2. Search app clearinghouse websites
3. Search app stores
4. Review app descriptions, user ratings, reviews
5. Conduct a social media query within professional, and if available, pt networks
6. Pilot the apps
7. Elicit feedback from patients

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

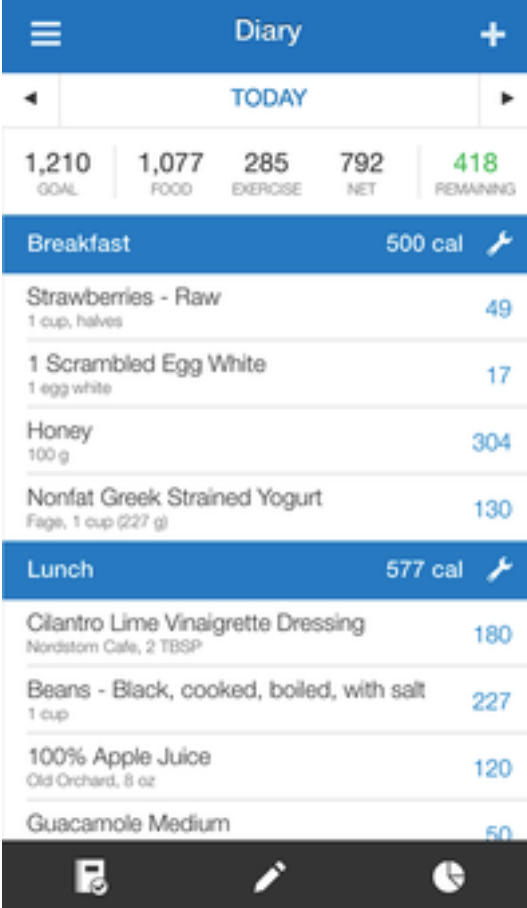
- January – February 2017
- Team of 3 researchers, including 2 young adults, searched for the top applications
- Preventive Health Domains
  - Nutrition/diet
  - Exercise
  - Immunizations
  - Substance use
  - Sexual/reproductive health
  - Mental health
  - Safety
- Targets AYAs (e.g., Seventeen magazine)

# 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

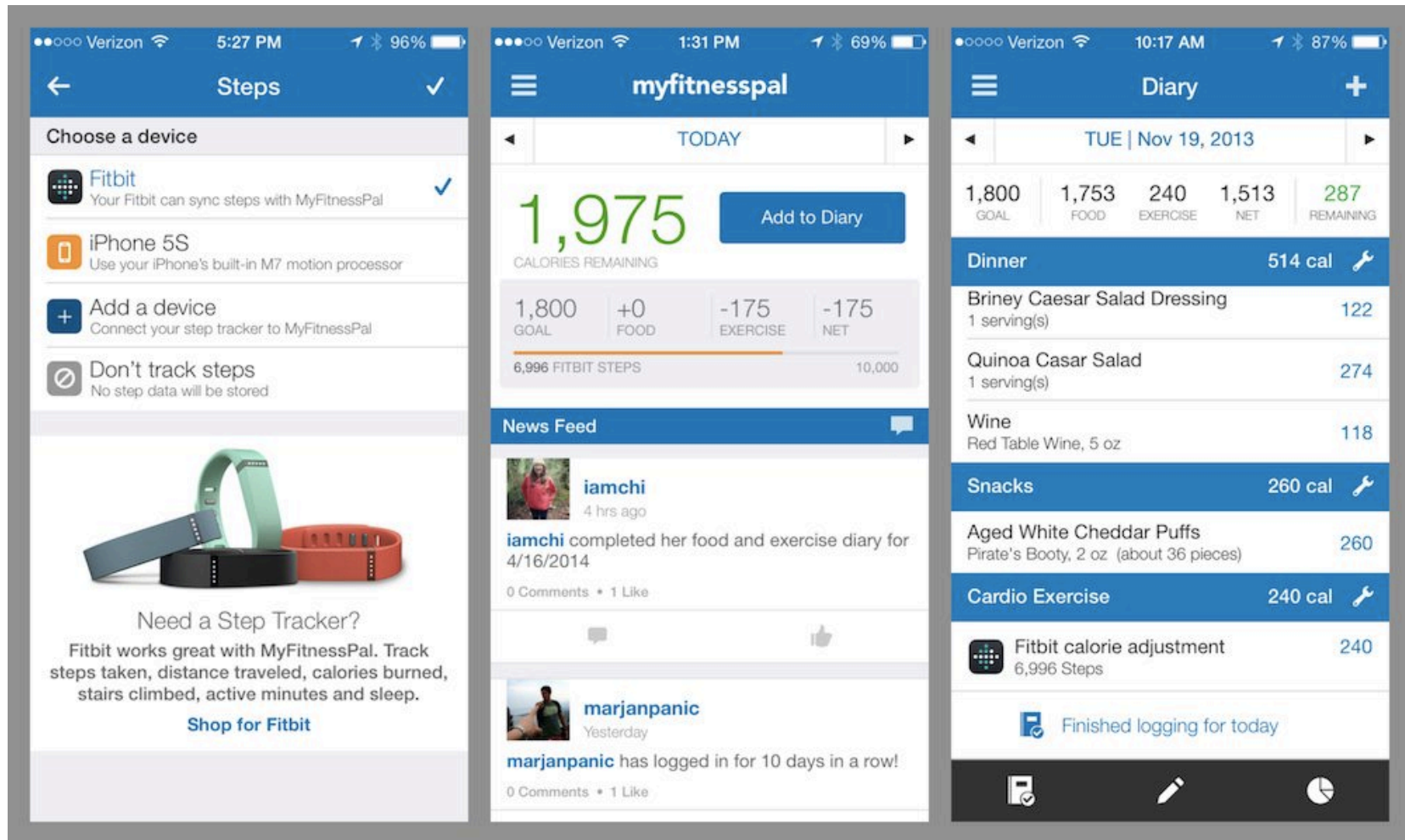
- All-in-one calorie counter & exercise tracker
- Exhaustive food & nutrition database
- Easy data entry
- Has received many awards/recognition



The screenshot displays the 'Diary' section of the My Fitness Pal app for 'TODAY'. It shows a summary of calorie intake and remaining calories, followed by a list of food items with their respective calorie counts.

Category	Calories
<b>Breakfast</b>	<b>500 cal</b>
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
<b>Lunch</b>	<b>577 cal</b>
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

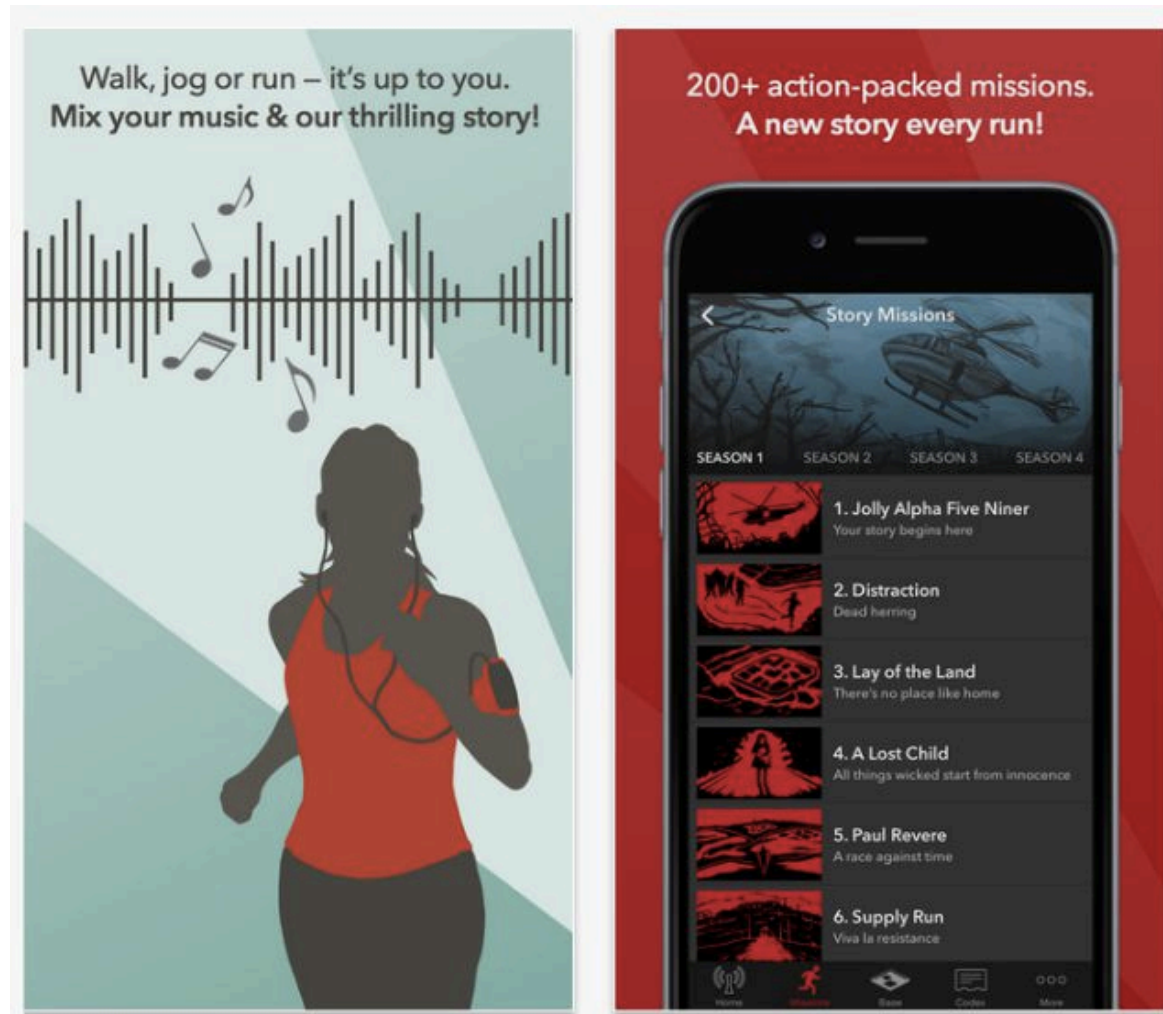


# Fitness – Zombies, Run!

- 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

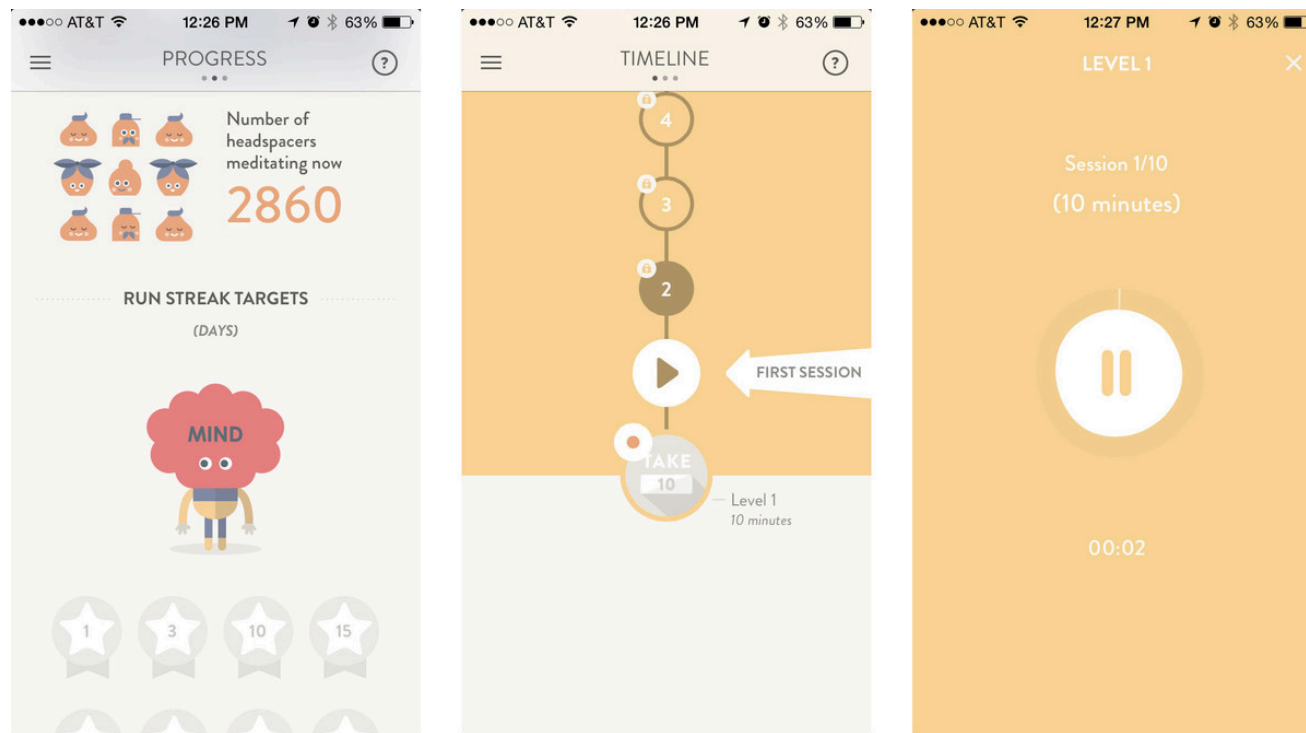
- Period, PMS, fertility tracking app



# Clue

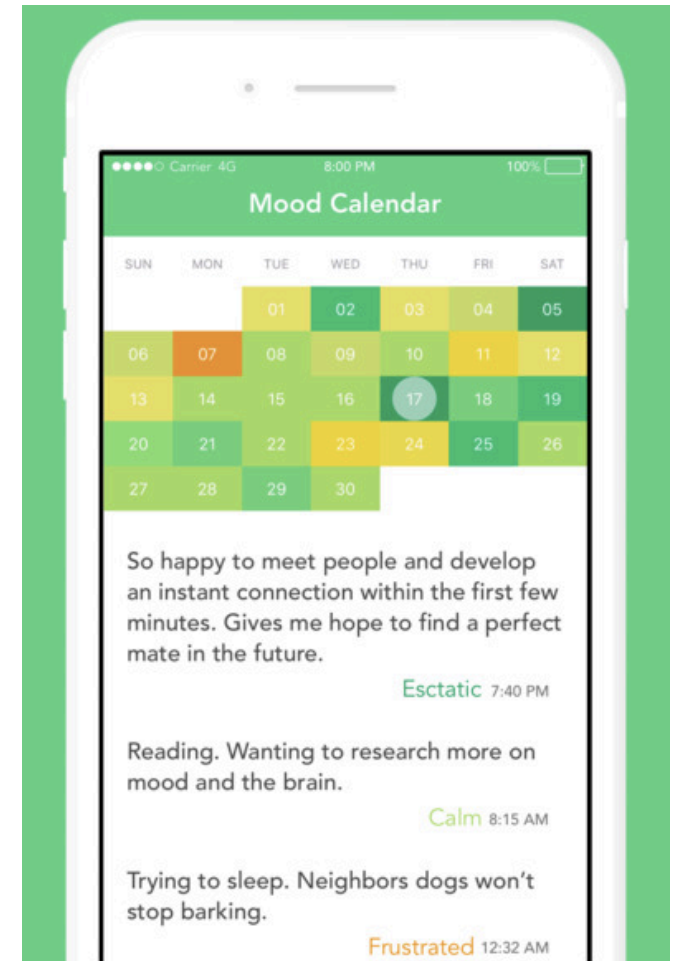
# Mental Health - Headspace

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



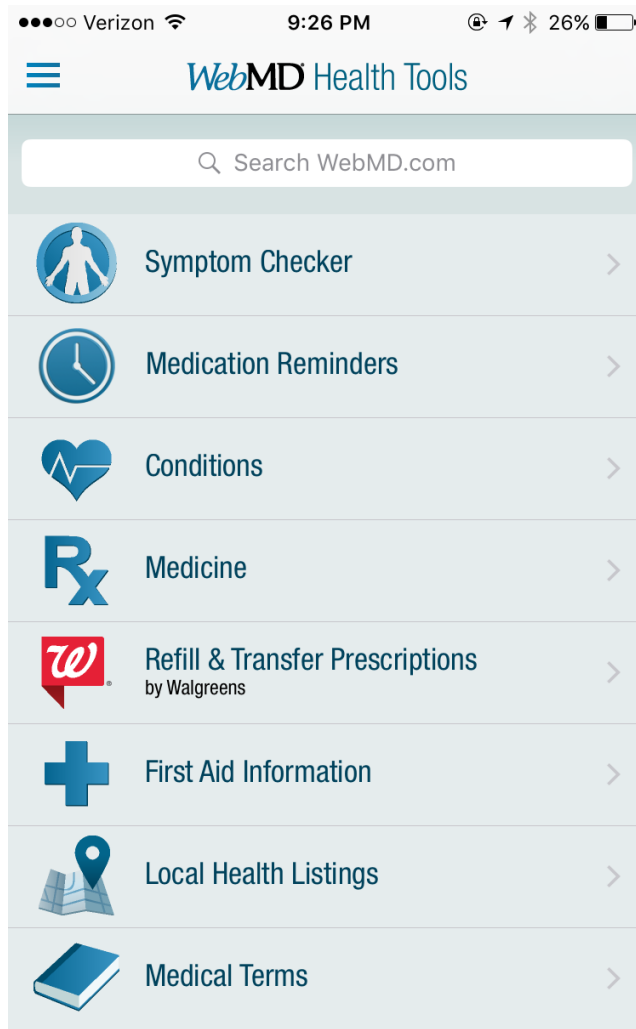
# Mental Health - Stigma

- 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

# Outline

- Mobile Health Apps for CPS
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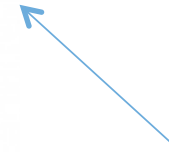
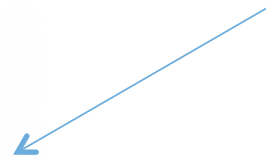
# Wearable & Connected Devices

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

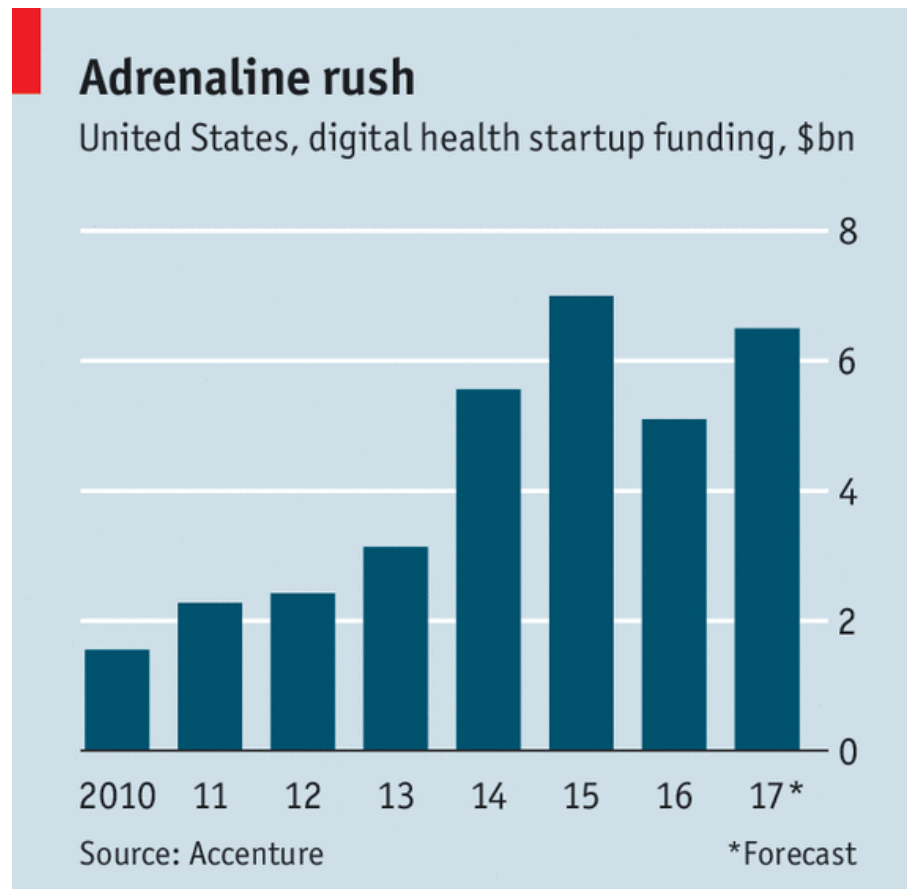


Patel et al. *JAMA*. 2015

# 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

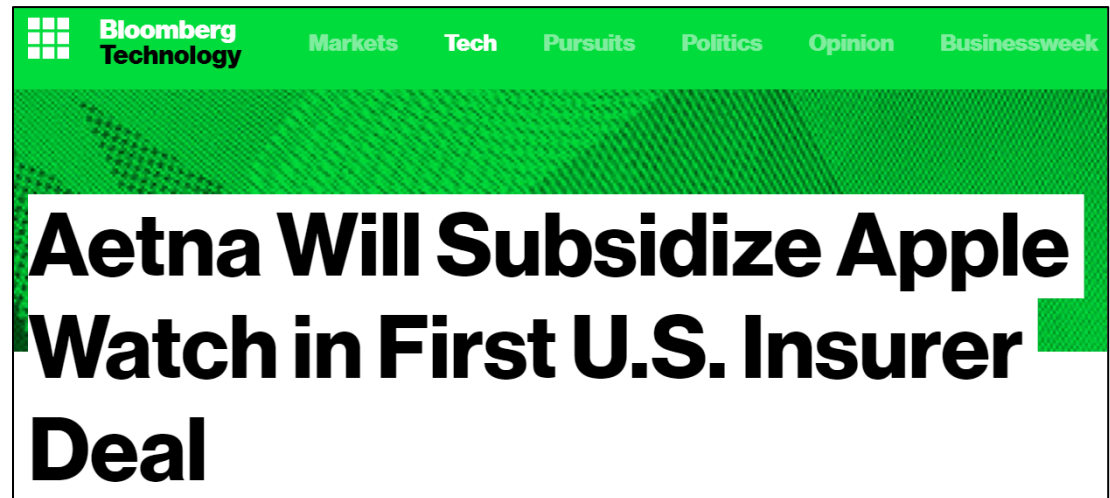
- Movement
- HR
- Sleep



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

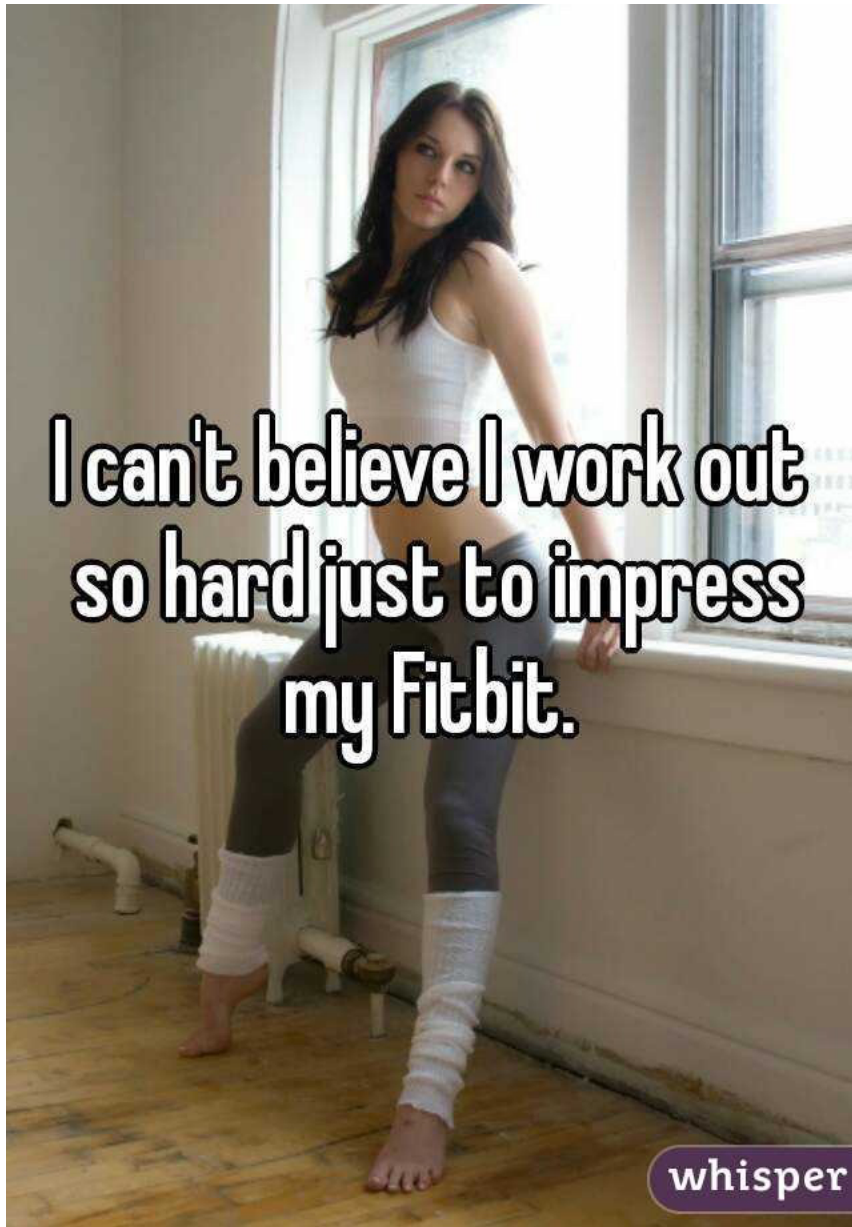


Patel et al. JAMA. 2015

# 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)

# Outline

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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

- charlene.wong@duke.edu
- @DrCharleneWong
  
- Duke-Margolis Center for Health Policy
  - Annabel Wang, BS
  - Megan Moore
  - Madison Mastrangelo
- University of Pennsylvania
  - Mitesh Patel, MD MBA MS