Is There an App for That?

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Disclosures

No Disclosures to Report

Objectives

- Review the validity of physical activity trackers
- Gain an understanding of utilizing wearable technology to assist patients in being physical active.
- Share examples of wearable technology and health outcomes

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- Fitbit was founded on May 1, 2007
- The company sold *~11 million devices* in 2020
- 31 million active users in 2020
- Fitbit was purchased by Google in 2019

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Is FitBit data valid and reliable?

- Fitbit One and Fitbit Flex devices reliably measure step counts and energy expenditure; hip-based Fitbit devices are more accurate than wrist-based [illegible]1
- Found excellent agree[illegible]bit and visually counted ste[illegible]relation coefficient (ICC2,1)=0.8
  - Fitbit One and Fitbit Zip are sufficiently accurate to be used among community-dwelling older adults to monitor and give feedback on step counts.

Fitbit Step count and minutes of MVPA are sufficiently reliable

1 Diaz. Int J Cardiol.2015. 185. 2 Tiedemann. BMJ Open Sport Exerc Med 2015

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10,000 Steps???

The origins of the 10,000-steps recommendation aren't exactly scientific. Pedometers sold in Japan in the 1960s were marketed under the name "**manpo-kei**," which translates to "10,000 steps meter”

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Steps to Health

- Examined steps, intensity, sedentary time and cardiometabolic health; NHANES data
- 3388 participants 20+ years of age and older
- Median steps/day Men: 2247 – 12,334
- Median steps/day Women: 1755 – 9824
- Linear (+) relationship between quintiles of steps and 30 min cadence with BMI, waist circumference, weight, insulin level for both men and women *($p<0.001$)*

Tudor-Locke. Med. Sci. Sports Exerc., 49(2): 283–291, 2017.

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Does Fitbit Use Increase PA?

- **Randomized Trial of a Fitbit-Based Physical Activity Intervention for Women**
  - 51 inactive, overweight postmenopausal women were randomized to a 16-week Fitbit intervention (N=25) or a pedometer comparison group (N=26)
  - Fitbit group increased MVPA by 62 min/week ($p<.01$), and steps by 789 ($p=.01$), compared to non-significant increases in the Pedometer Group
  - Fitbit group wore the tracker on 95% of intervention days; 96% reported liking the website and 100% liked the tracker.

Cadmus-Bertram. Am J Prev Med. 2015

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Consumer-Based Wearable Activity Trackers Increase Physical Activity Participation: Systematic Review and Meta-Analysis

Brickwood. JMIR Mhealth Uhealth. 2019

- Significant increase in daily step count
- Significant increase in moderate-vigorous PA and energy expenditure
- Non-significant decrease in sedentary time

> *"Utilizing a consumer-based wearable activity tracker as either the primary component of an intervention or as part of a broader physical activity intervention has the potential to increase physical activity participation.*
>
> *As the effects of physical activity interventions are often short term, the inclusion of a consumer-based wearable activity tracker may provide an effective tool to assist health professionals to provide ongoing monitoring and support."*

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Effects of Mobile Health Including Wearable Activity Trackers to Increase Physical Activity Outcomes Among Healthy Children and Adolescents: Systematic Review

Bohm. JMIR Mhealth Uhealth 2019

- No evidence was found for the effect of mHealth tools, respectively wearable activity trackers, on PA-related outcomes.

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Prescribing PA Trackers to Improve Health

- Study was designed to test the efficacy of a physician delivered intervention using a pedometer to improve physical activity levels in patients seen for routine visits to a family medicine clinic
- 42% of patients randomized to the pedometer group were adherent over the 9-week study period
- Mean daily step counts in the pedometer group incr from 6779 -> 8855
- Average individual improvement was 41% over the study period.

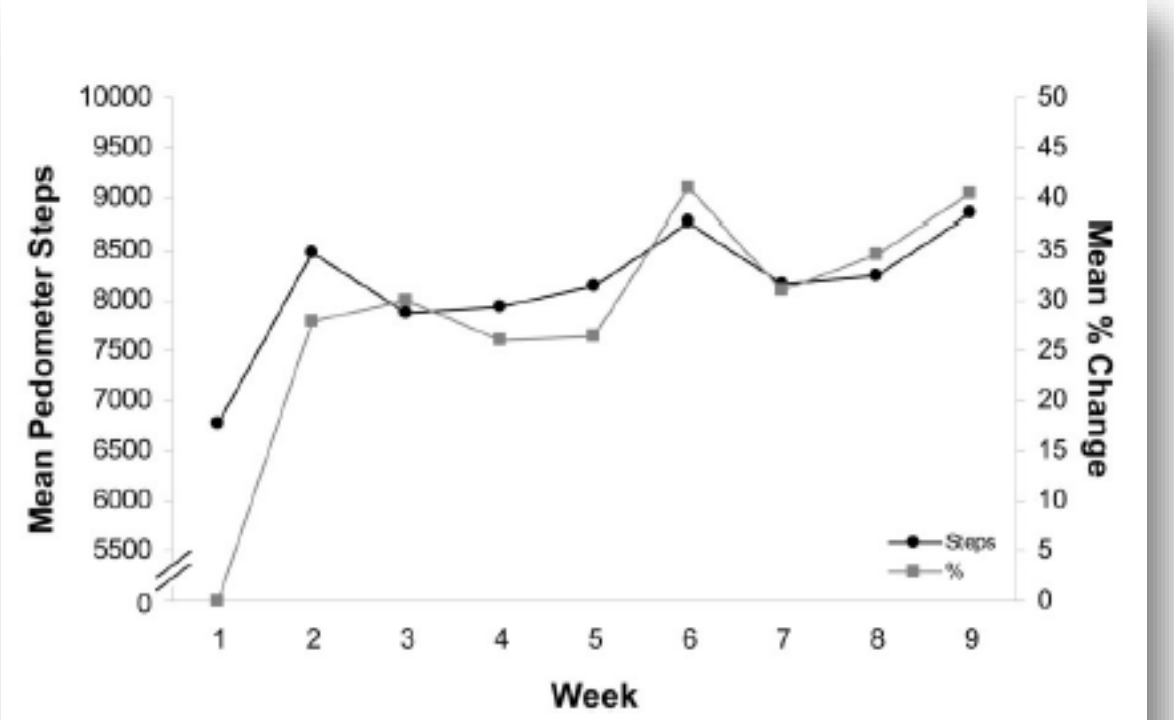

Figure 1. Mean (and percentage) of step improvement for the pedometer group.

Stovitz. J Am Board Fam Pract 2005

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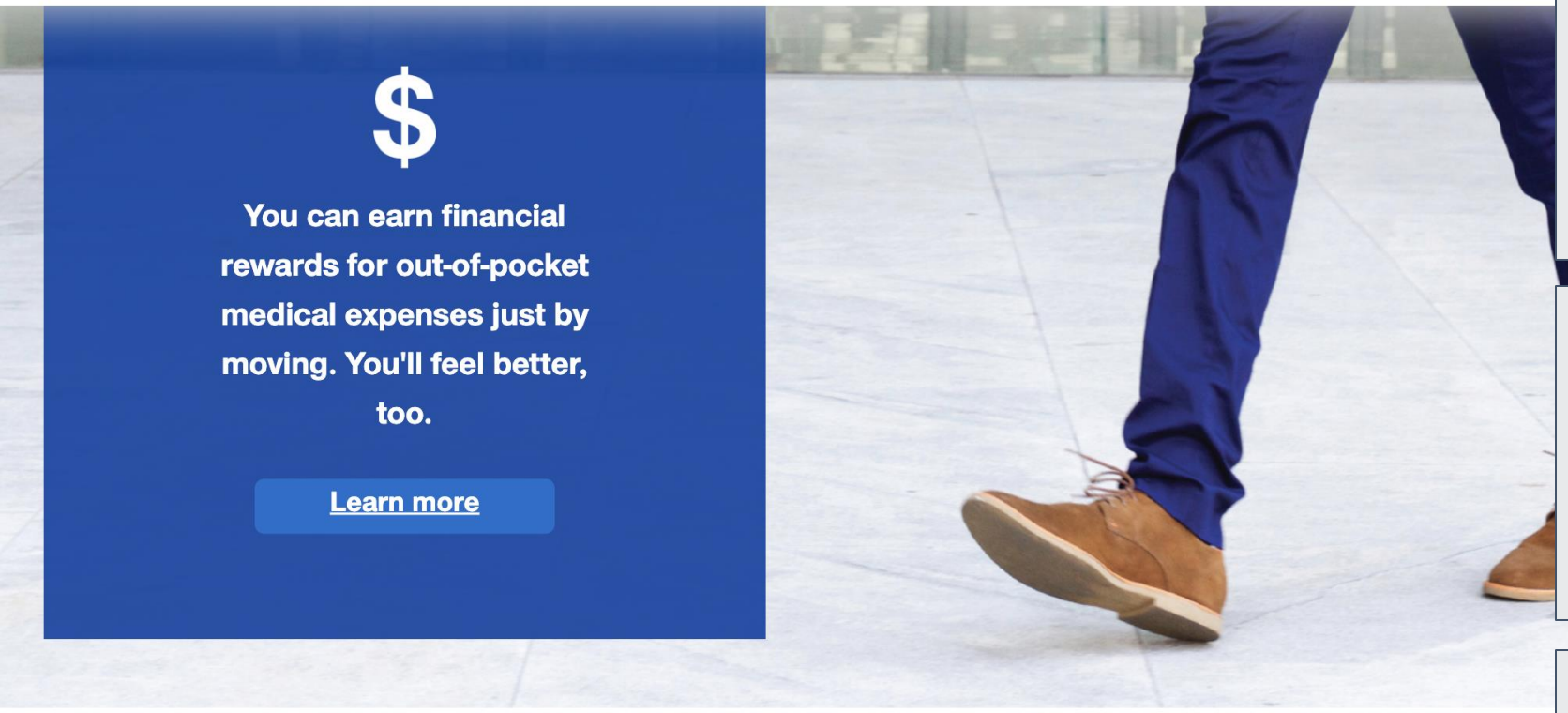
UnitedHealthcare | UnitedHealthcare Motion®

Sign up



$

You can earn financial rewards for out-of-pocket medical expenses just by moving. You'll feel better, too.

Learn more

It pays to move

UnitedHealthcare Motion® is an innovative program that lets you earn money for out-of-pocket medical expenses by moving. You are paid to take steps toward good health. What could be more motivating?

Manage your costs

This program gives you more power to manage your health-care costs. You and an enrolled spouse each have the opportunity to earn annual financial rewards for things like copays, prescriptions, and deductibles. Plus, by achieving activity goals, you and eligible coworkers will help your company qualify for a renewal-rate cap, which limits the increase to next year's insurance premiums.

Everything you need is included

You get a complimentary activity tracker that works with
account. Wear your activity tracker every day and earn m
achieve.

Big rewards

By regularly meeting 3 daily FIT goals, you'll understand the value that comes from being intentional about how you move throughout each day. The simple act of moving can be hugely rewarding—physically, mentally, and financially.

F Frequency:

Goal: Take six brief walks over the course of your day, at least an hour apart. (For each walk, you just need 500 steps within 7 minutes.)

I Intensity:

Goal: Move with intensity for 30 continuous minutes a day by walking or tracking your favorite activity on your activity tracker.

T Tenacity:

Goal: Take at least 10,000 steps in a day. (The activity tracker will reset at midnight.)

Results

UnitedHealthcare | UnitedHealthcare Motion®

- Motion participants
  - Average 12,000 steps per day
  - 60% of whom sustain participation over 6 months
  - More than half of eligible members participate in the program

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The Most Powerful Tool That We Have

https://www.pewresearch.org/internet/fact-sheet/mobile/

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Health & Fitness Smartphone Apps (2019)

Available on the App Store

47,911 apps

ANDROID APP ON Google Play

37,143 apps

Apps focused on <u>workouts</u> and <u>weight loss</u> account for the majority of health and fitness app usage by far, representing **73%**

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Top Health & Fitness Apps

Updated an hour ago

Free

1. **Planet Fitness Workouts**
   Free · Planet Fitness Holdings, LLC
2. **Paired: Couples & Relationship**
   Free · Better Half
3. **iHealth COVID-19 Test**
   Free · iHealth Labs Inc.
4. **AllTrails: Hike, Bike & Run**
   Free · AllTrails, Inc.
5. **Yuka - Food & Cosmetic scanner**
   Free · Yuca
6. **MyFitnessPal: Calorie Counter**
   Free · MyFitnessPal, Inc.
7. **Flo Period Tracker & Calendar**
   Free · FLO HEALTH, INC.
8. **FastEasy: Intermittent Fasting**
   Free · Funplex Limited
9. **ShutEye: Sleep Tracker**
   Free · Enerjoy
10. **Sweatcoin Walking Step Counter**
    Free · Sweatco Ltd
11. **Fitness Coach & Diet: FitCoach**
    Free · A.L. AMAZING APPS LIMITED
12. **Daily Yoga: Fitness+Meditation**
    Free · Daily Yoga Culture Technology Co., Ltd.

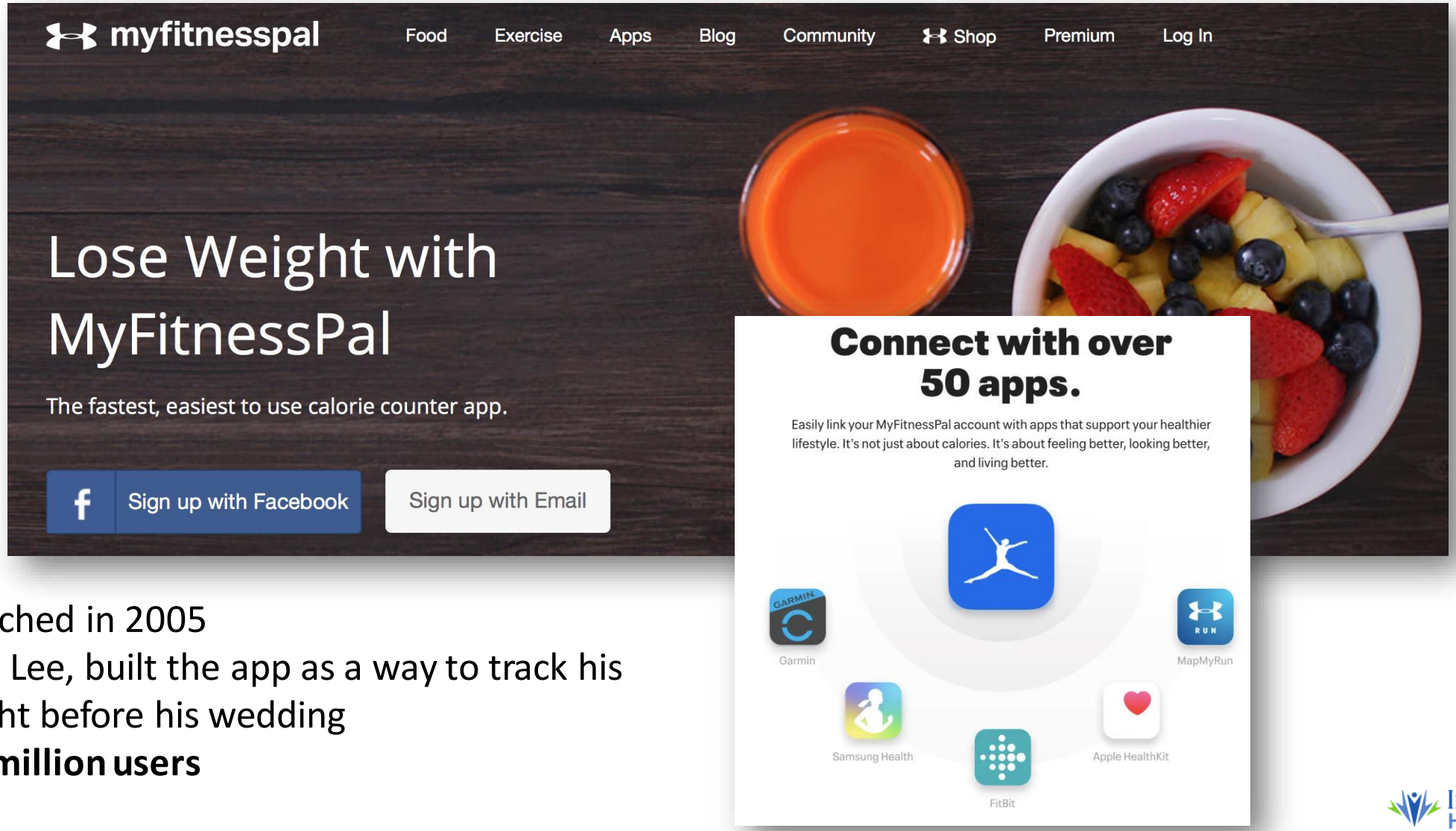
Paid

1. **The Wonder Weeks**
   $4.99 · Domus Technica
2. **75 Hard**
   $4.99 · 44SEVEN MEDIA, LLC
3. **AutoSleep Track Sleep on Watch**
   $4.99 · Tantsissa
4. **My Macros+ | Diet & Calories**
   $2.99 · My Macros LLC
5. **HeartWatch: Heart Rate Tracker**
   $4.99 · Tantsissa
6. **White Noise**
   $0.99 · TMSOFT
7. **Streaks**
   $4.99 · Crunchy Bagel
8. **MyFLO Period Tracker**
   $1.99 · Flo Living
9. **WaterMinder® · Water Tracker**
   $4.99 · Funn Media, LLC
10. **Blood Type Diet®**
    $3.99 · D'Adamo Personalized Nutrition®
11. **Start With Yoga**
    $2.99 · I/O Assembly
12. **WorkOutDoors**
    $5.99 · CCS Ltd

Grossing

1. **MyFitnessPal: Calorie Counter**
   Free · MyFitnessPal, Inc.
2. **WW / WeightWatchers**
   Free · WW International, Inc.
3. **AllTrails: Hike, Bike & Run**
   Free · AllTrails, Inc.
4. **Fitbit: Health & Fitness**
   Free · Fitbit, Inc.
5. **Noom: Healthy Weight Loss**
   Free · Noom, Inc.
6. **Peloton: Fitness & Workouts**
   Free · Peloton Interactive, Inc.
7. **Calm**
   Free · Calm.com
8. **Flo Period Tracker & Calendar**
   Free · FLO HEALTH, INC.
9. **Headspace: Mindful Meditation**
   Free · Headspace Inc.
10. **Strava: Run, Ride, Hike**
    Free · Strava, Inc.
11. **Workouts by Muscle Booster**
    Free · A.L. AMAZING APPS LIMITED
12. **Lose It! – Calorie Counter**
    Free · FitNow

MyFitnessPal



- Launched in 2005
- Mike Lee, built the app as a way to track his weight before his wedding
- **200 million users**

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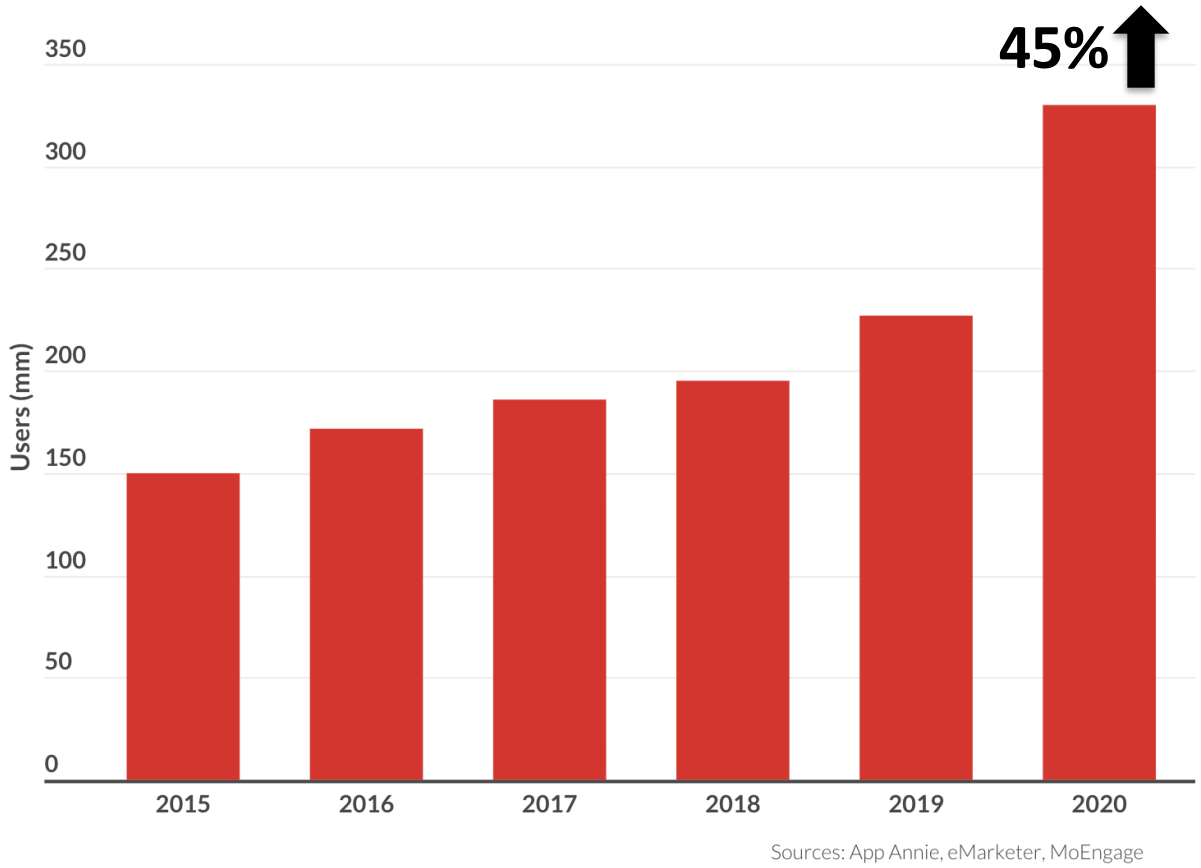
Fitness App Users

The fitness app market was almost stagnating before the pandemic. It received a 45% boost in users in 2020, and interest has remained high in 2021, with total sessions at the same level as 2020.



Sources: App Annie, eMarketer, MoEngage

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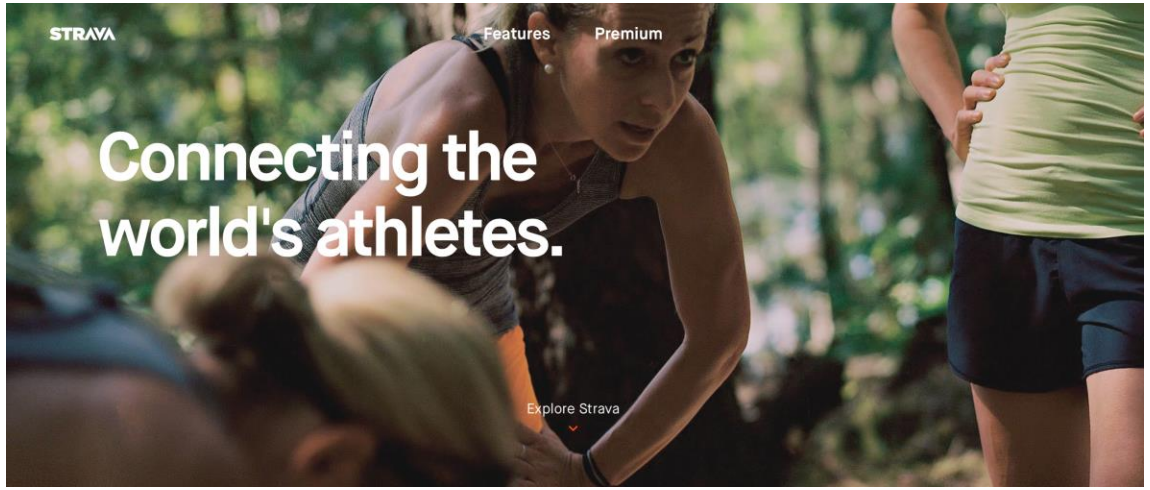
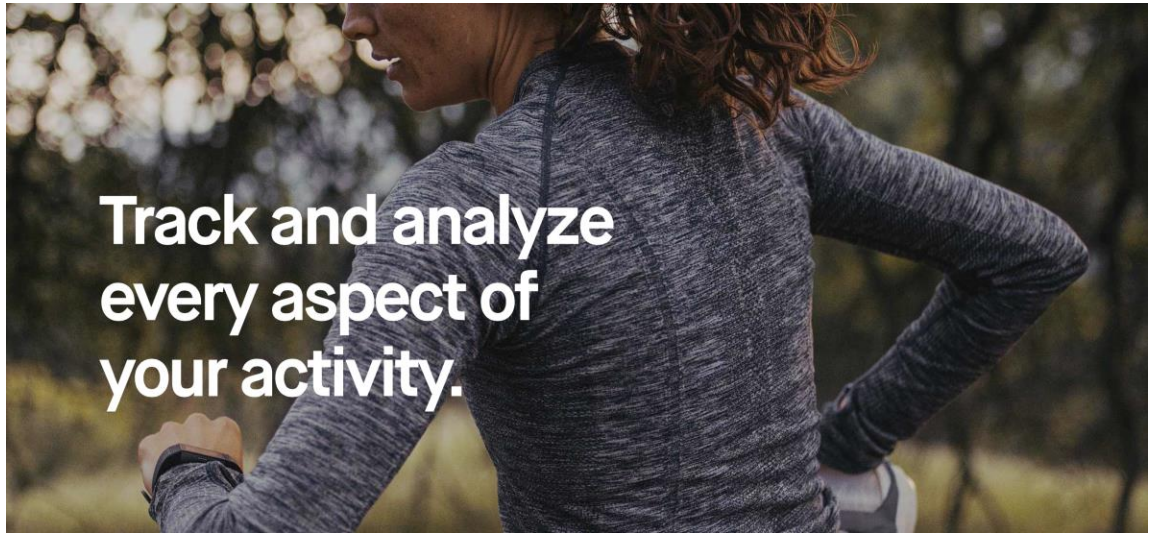
Preaching to the converted……

- Exercise
  - MapMyRun
  - Runkeeper
  - Strava
  - Sworkit





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Can Smartphone Apps Increase Physical Activity? Systematic Review and Meta-Analysis

Romeo. J Med Internet Res. 2019

- Examined 6710 studies
- 7 included, 1740 participants
- Compared to control conditions, smartphone apps produced a non-significant (p=0.19) increase in participants' average steps per day, with a mean difference of 476.75 steps per day
- Physical activity apps that targeted physical activity in isolation were more effective than apps that targeted physical activity in combination with diet(p=.04)

Effects of Mobile Health App Interventions on Sedentary Time, Physical Activity, and Fitness in Older Adults: Systematic Review and Meta-Analysis

- mHealth app interventions
  - Trials 3 months or longer:
    - Decreases in sedentary time (SMD=−0.49)
    - Increases in PA (506 steps/day)
    - Increases in fitness (SMD=0.31)
  - Trials 6 months or longer:
    - Increases in PA (753 steps/day)

Yerrakalva D. Effects of Mobile Health App Interventions on Sedentary Time, Physical Activity, and Fitness in Older Adults: Systematic Review and Meta-Analysis. J Med Internet Res. 2019 Nov 28;21(11):e14343.

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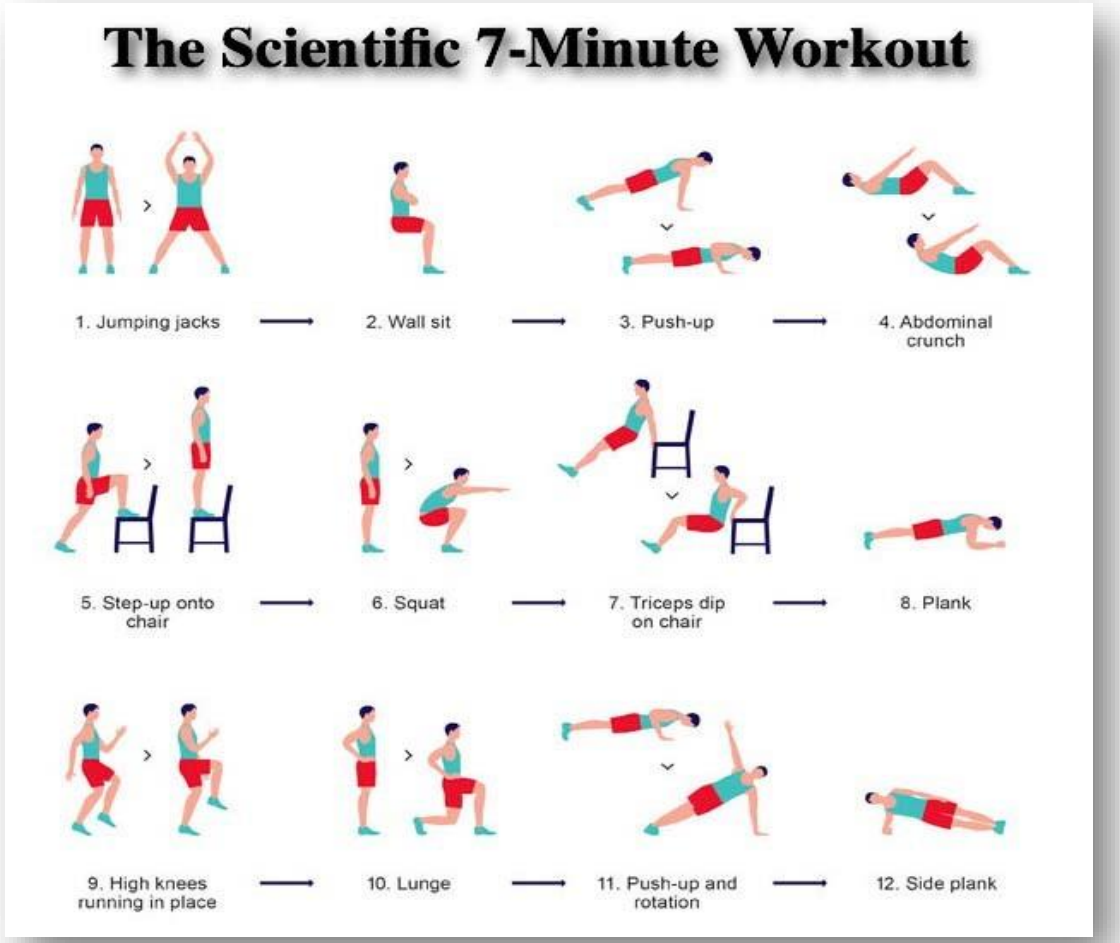

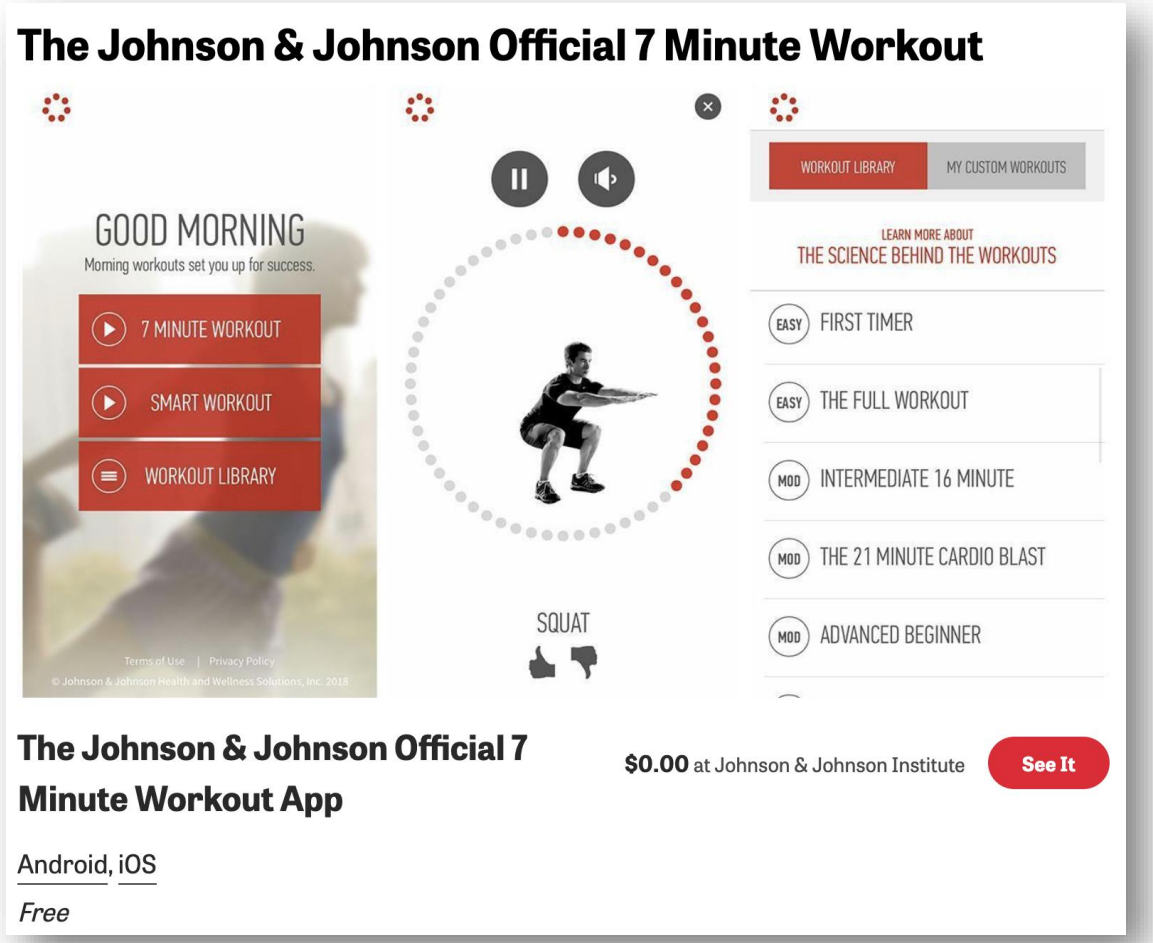

- **10 million downloads**
- **Reviewed by 350,000 users**

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The Science (& Hype) Behind the Workout

- High-Intensity Circuit Training Using Body Weight: Maximum Results with Minimal Investment
  - *Brett Klika and Chris Jordan. ACSM'S Health & Fitness Journal. 2013 May-June 17(3).*

- The Scientific 7-Minute Workout
  - *Gretchen Reynolds, New York Times Magazine. May 9, 2013*
  - → 6th most viewed 2013 NYT article
- Acute Responses to the 7-Minute Workout
  - *Michelle Riegler. J Strength Cond Res. 2017 Sep;31(9)*
  - → Vigorous intensity
- Effect of 7-minute workout on weight and body composition
  - *Lama Matter. J Sports Med Phys Fitness. 2017 Oct;57(10)*
  - → Favorably impacts body composition

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Apple HealthKit

- HealthKit is a framework designed to house healthcare and fitness apps, allow them to work together and collate their data under the Health app.
- Integrations with Apple Health are done at a platform level – meaning that a wearable's app connects to Apple Health – and most of the big wearable players offer data syncing.
- Physical Activity
  - Steps - differentiate walk vs. run, flights of stairs
  - Swimming strokes
  - Cycling distance
  - Rolling (wheelchair) distance
  - Standing hours

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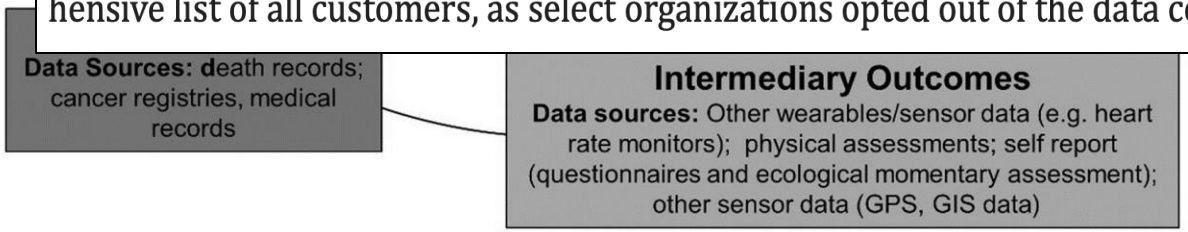
Integration of Wearable Data into Healthcare

JMIR Mhealth Uhealth. 2019 Sep; 7(9): e12861.
Published online 2019 Sep 11. doi: 10.2196/12861: 10.2196/12861
PMCID: PMC6746089
PMID: 31512582

Wearable Health Technology and Electronic Health Record Integration: Scoping Review and Future Directions

Innovations in Wearable Health Technology

In response to these challenges, a number of health systems and organizations have begun to use a user-centered design approach to adapt workflows and collaborate with third-party applications to improve their integration of remote patient data [58,59]. Numerous health care providers have piloted and/or implemented wearable-EHR integration projects with Apple Health, Google Fit, Fitbit, Nokia, and Withings [60]. A number of devices on the market have the capability to connect directly to EHRs through HealthKit and Google Fit; simple data such as steps and weight are currently collected and displayed, with more devices and data types being brought on the Web over time [58,60]. In addition, as of October 2018, Epic customers representing at least 565 hospitals and 14,427 clinics support connecting data from Fitbit, HealthKit, or Withings today. Epic customers representing at least 1152 hospitals and 24,496 clinics support connecting other devices through Health Level-7 or manual entry of patient data through MyChart. Note that this is not a comprehensive list of all customers, as select organizations opted out of the data collected by Epic (data provided by Epic, October 2018).



Wearable Technology Physical Activity in Chronic Disease AJPM 2018

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Summary

- Wearables and fitness related apps are being used by millions!
  - Accessible to nearly everyone
- Wearables and apps are reasonably valid and reliable in counting steps
- Limited evidence that use of wearables can increase physical activity
  - Limited evidence that *prescribed* wearables/apps can increase physical activity – even improve health!
- Healthcare HAS TO figure out how best to leverage the power of the wearable and smart phone data to improve physical activity and health