

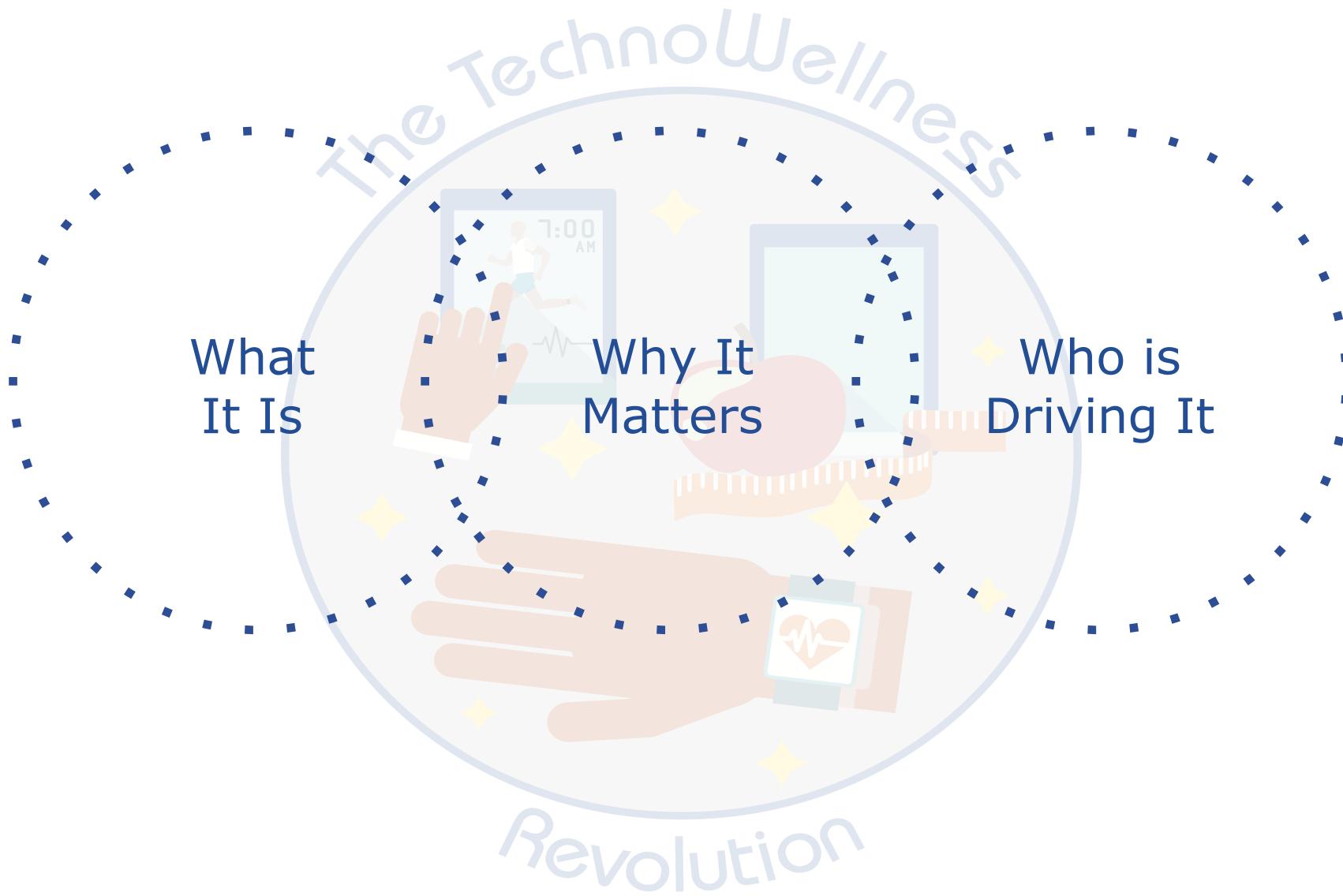


# How Wearables, Smart Devices and Big Data Can Save Lives: The TechnoWellness Revolution

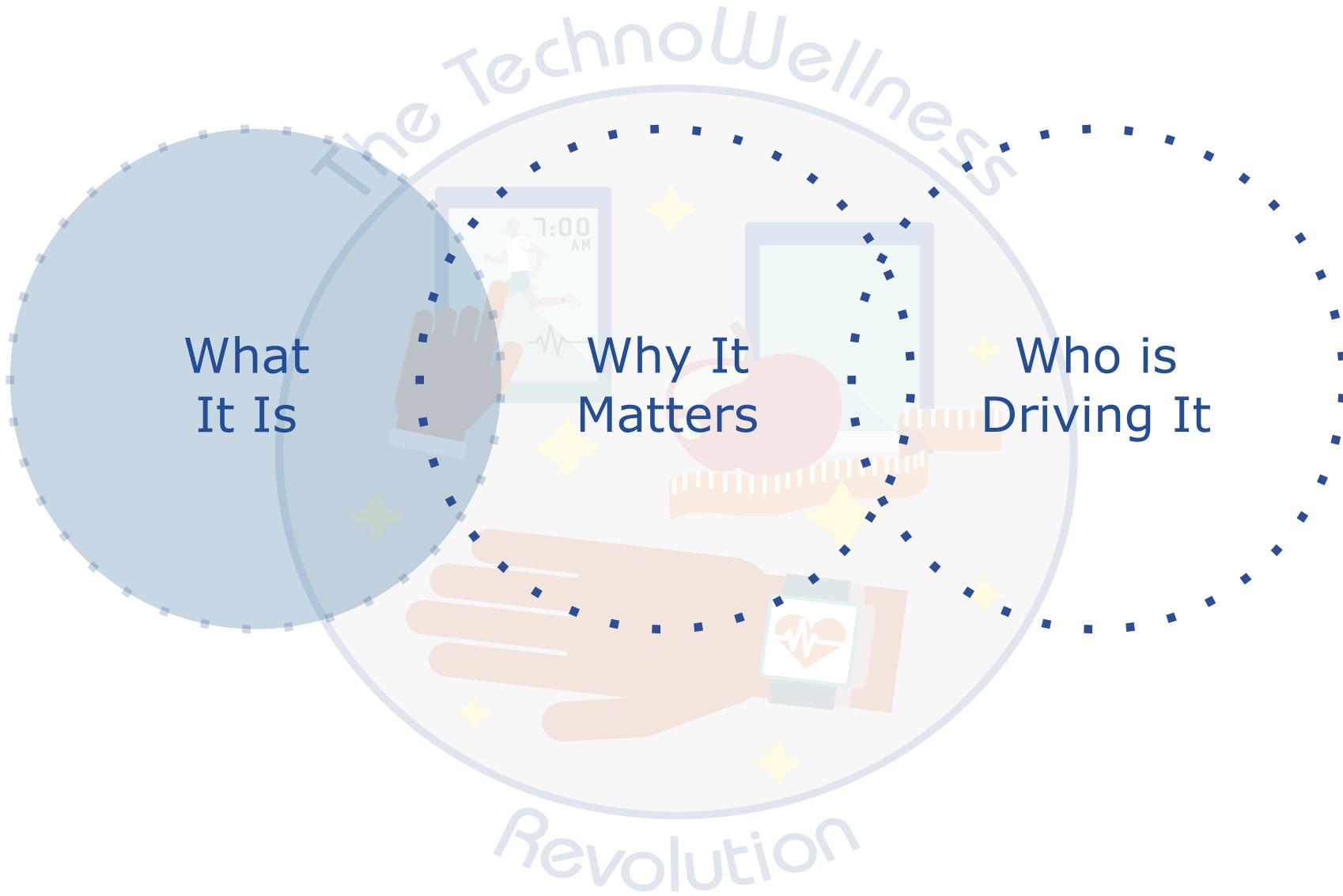


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# Understanding the Emerging TechnoWellness Revolution



# Understanding the Emerging TechnoWellness Revolution





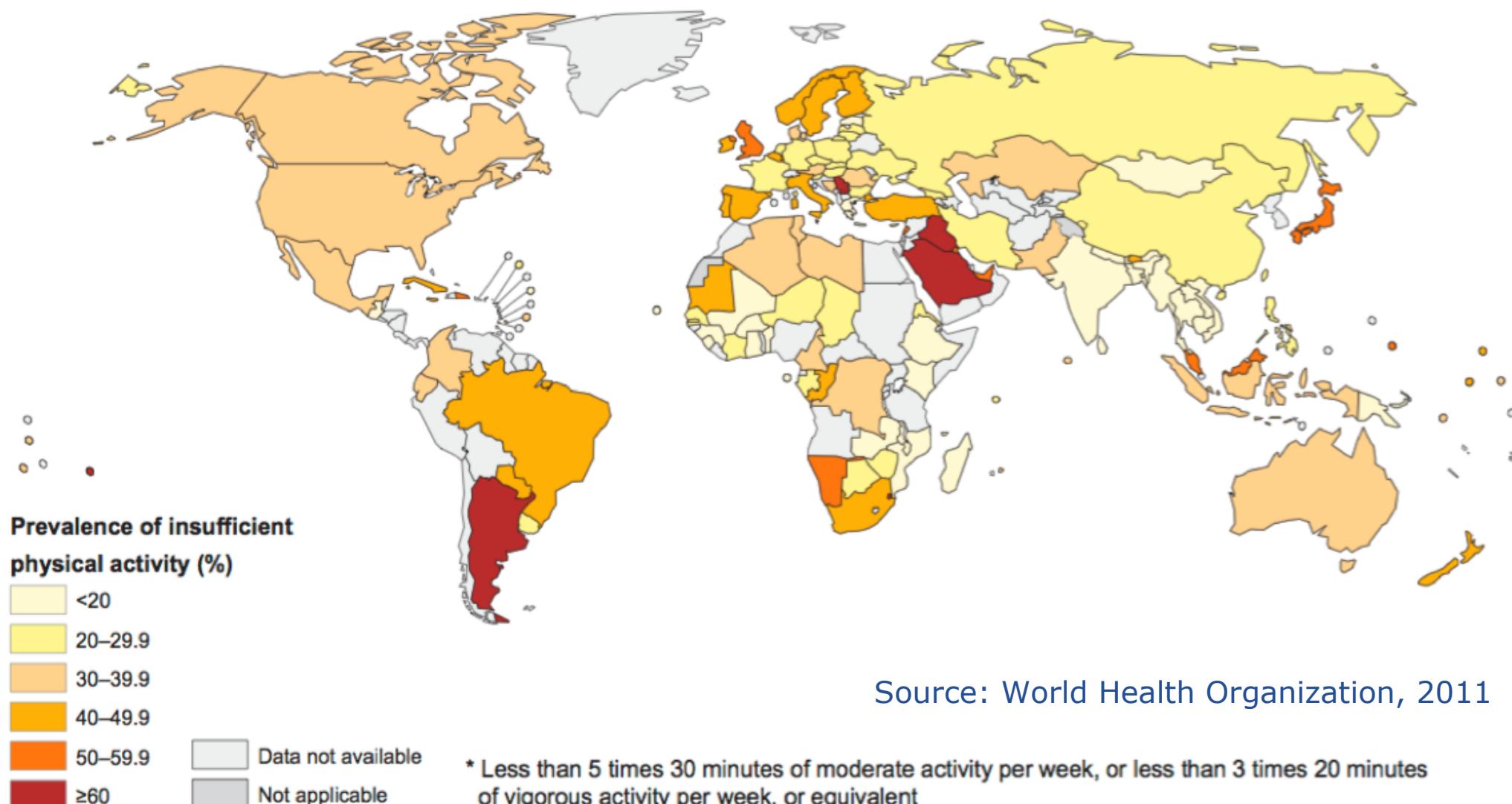
We've Spent Billions Trying to Get People to Engage in Healthy Behaviors

# We've Failed



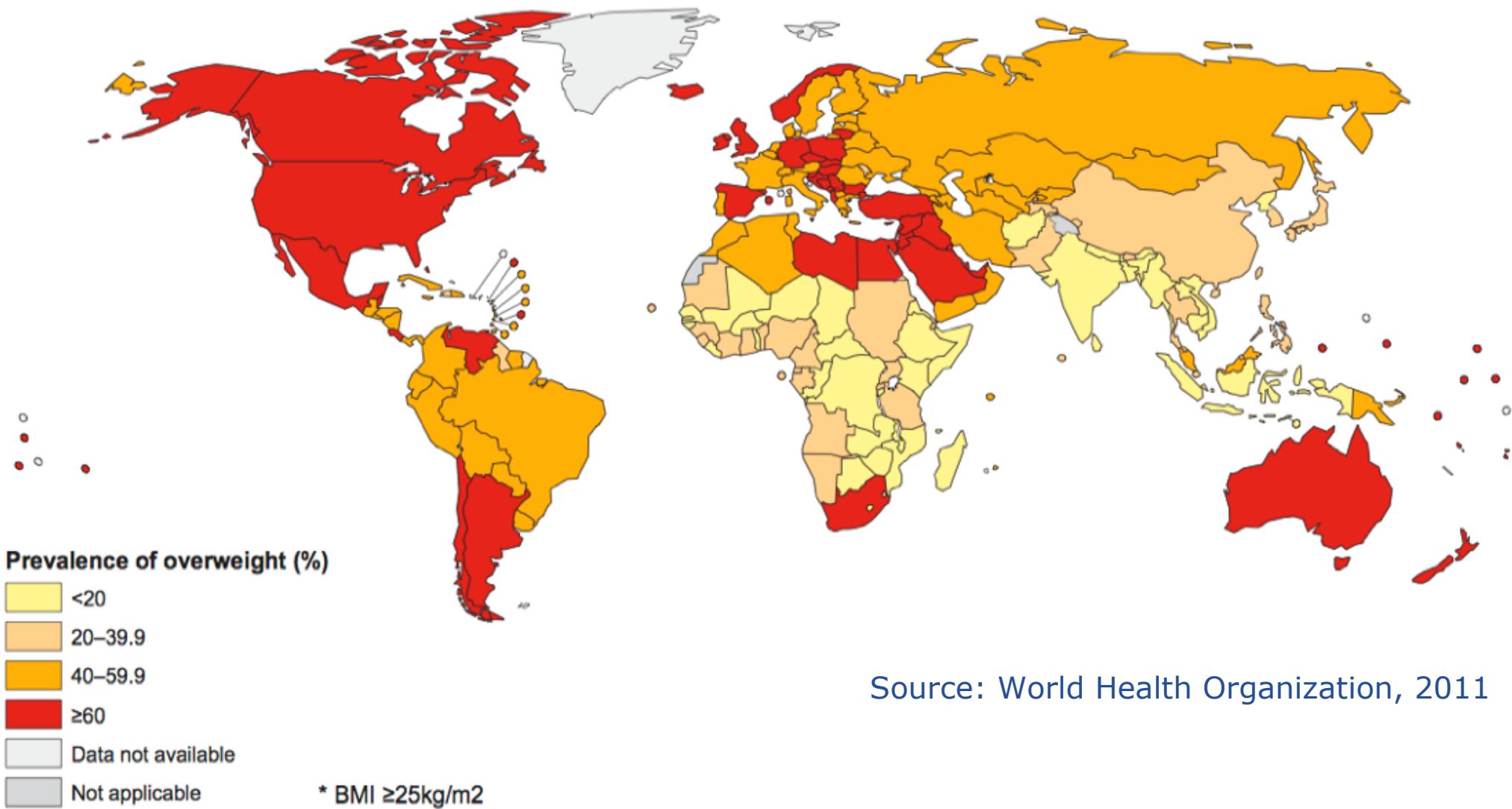
# We Don't Exercise Enough

**Prevalence of insufficient physical activity\*, ages 15+, age standardized  
Males, 2008**



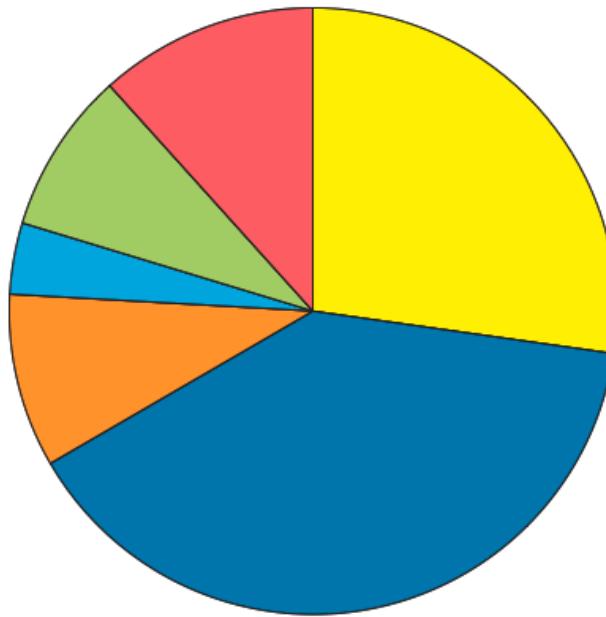
# We're Overweight

**Prevalence of overweight\*, ages 20+, age standardized  
Males, 2008**



# And, Because of This We're Dying from Preventable Conditions Like Heart Disease

**Figure 2. Proportion of global NCD deaths under the age of 70, by cause of death, 2008**



- Cancers
- Diabetes
- Cardiovascular disease
- Digestive diseases
- Chronic respiratory diseases
- Other noncommunicable diseases

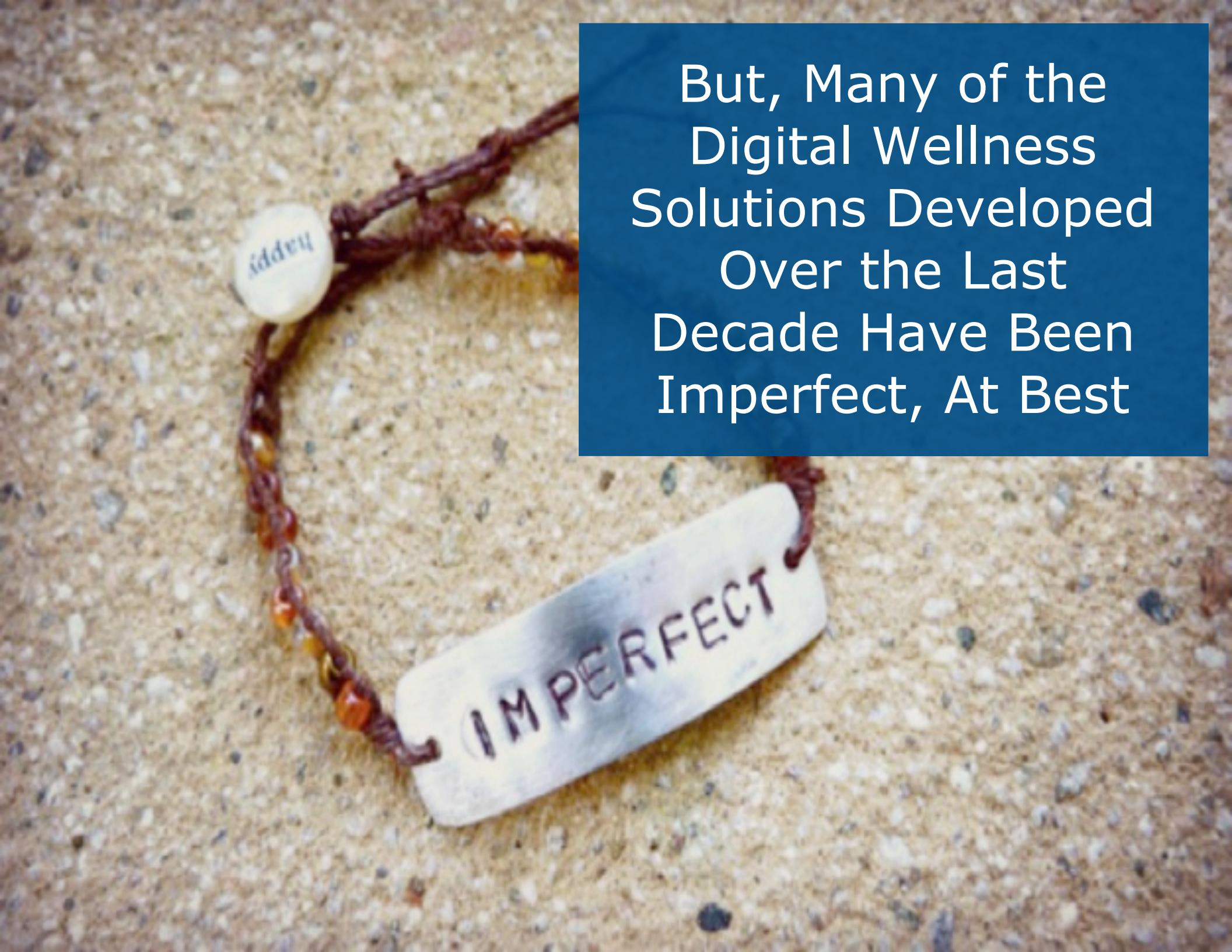
Source: World Health Organization, 2011



But, There's Hope

Digital Tools Like  
Mobile and the Web  
Are Being Used to  
Nudge People to  
Engage in Healthier  
Behaviors





But, Many of the  
Digital Wellness  
Solutions Developed  
Over the Last  
Decade Have Been  
Imperfect, At Best

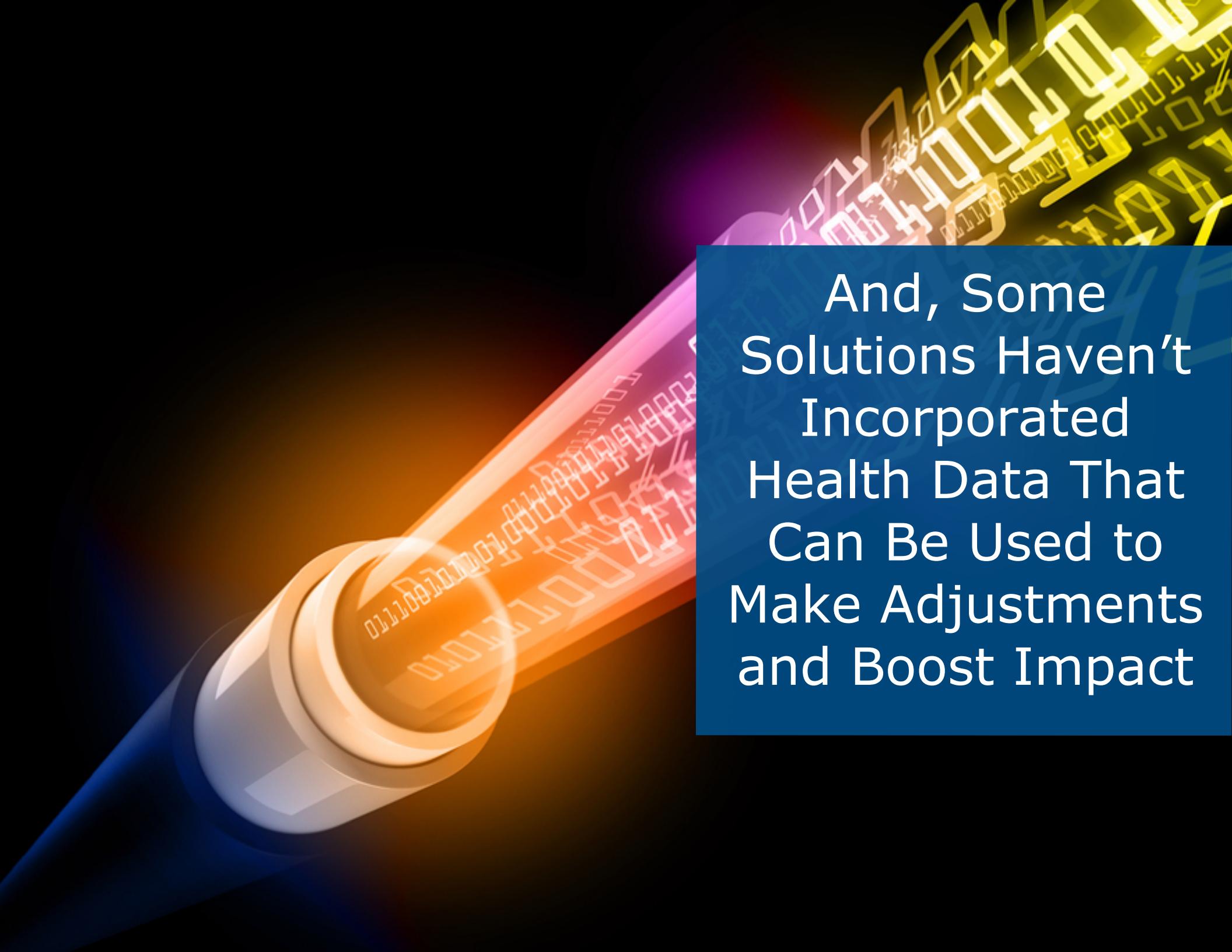


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**ONE SIZE FITS ALL**  
**HAND WASH ONLY**

Many Aren't Personalized Enough

Others Work,  
But Are  
Hard to Scale





And, Some  
Solutions Haven't  
Incorporated  
Health Data That  
Can Be Used to  
Make Adjustments  
and Boost Impact

But, New Technologies Are  
Helping to Change the Game



# These Innovations Are Fueling the Rise of the TechnoWellness Revolution

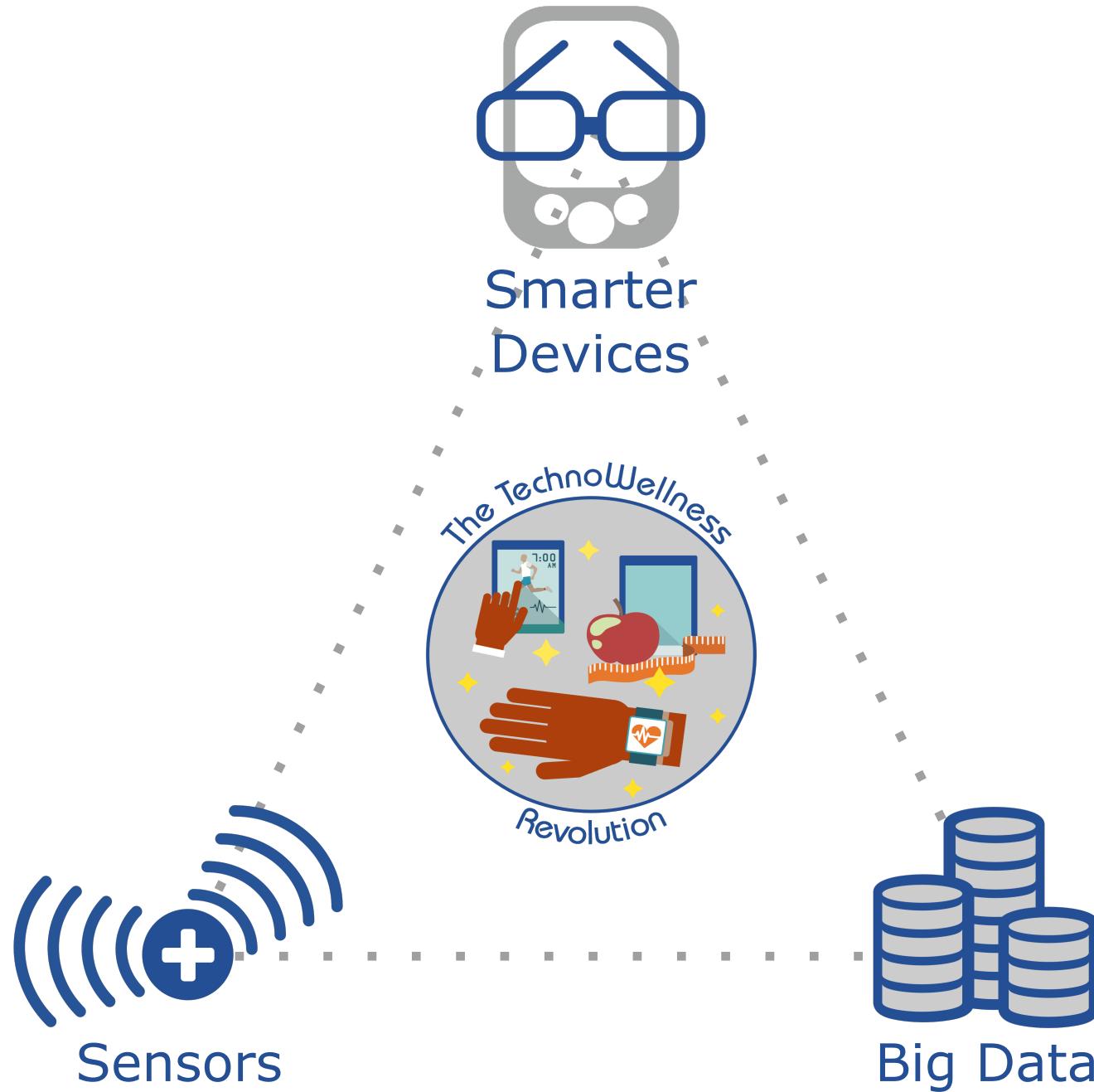


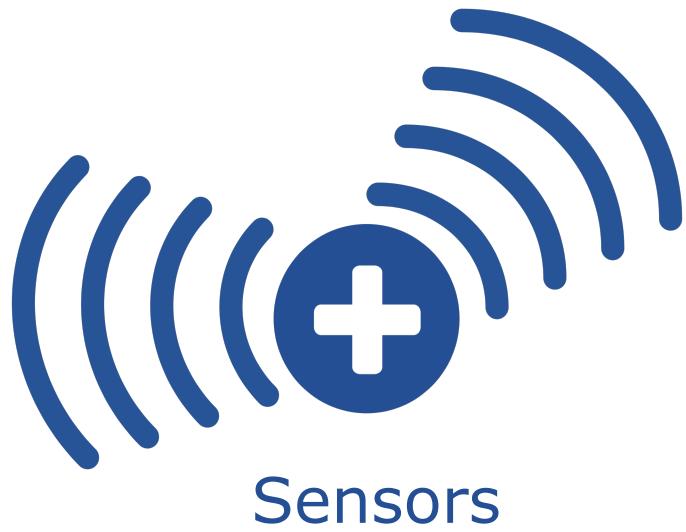


## What is It?

A New Breed of Wellness Solutions That Combine Data, Devices, Analytics and Human Experts to Boost Healthy Behaviors

# What is Its Technological Foundation?





Small Devices Embedded into Mobile, Wearables, Clothing and More Can Track a Range of Health Activities and Biometric Data Like Pulse Rate, Weight and Temperature



Big Data

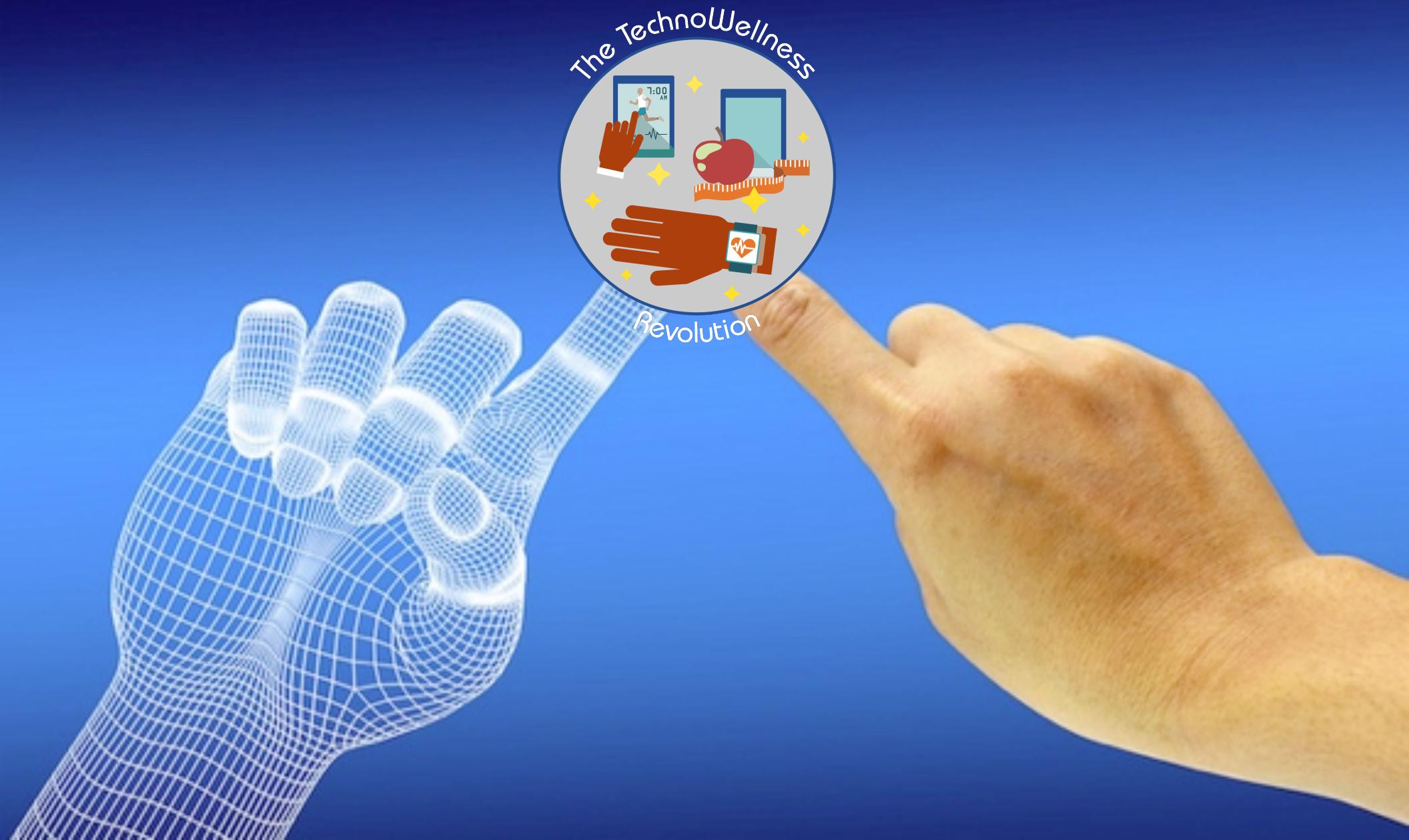
Information Collected by Sensors and Other Tools Are Gathered into Large Data Sets That Can Be Analyzed for Patterns and Used to Predict Behavior



Smarter  
Devices

Mobile Phones  
Serve As **Mini**  
**Mainframes**, Helping  
to Collect, Analyze,  
Visualize and Distribute  
Various Types of  
Health Data

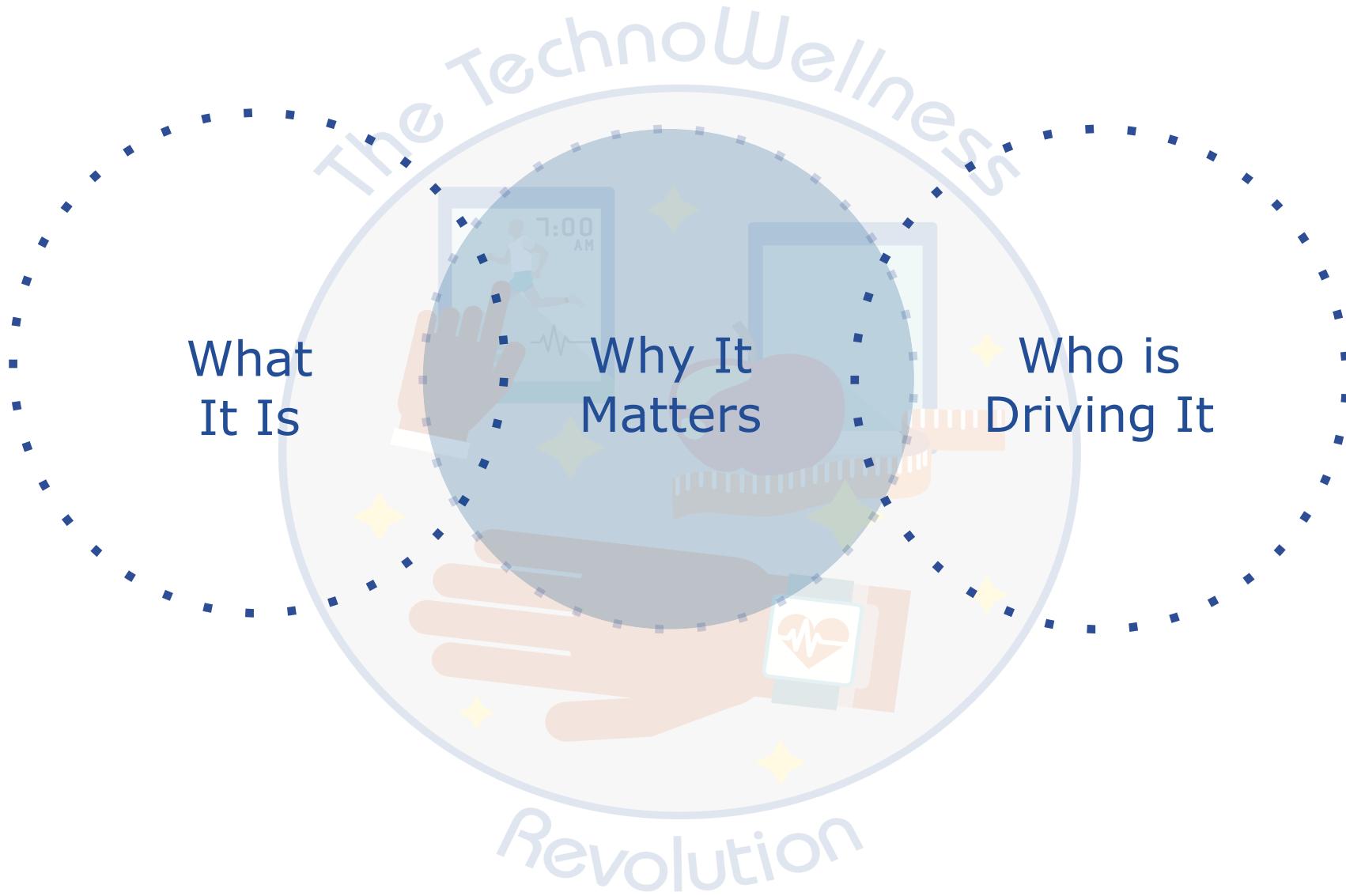
# But, TechnoWellness Requires a Human Touch to Be Most Effective



Coaches, Clinicians, Counselors and Other Experts Who Can Use Data in Smart Ways to Provide Personalized Advice and Encouragement Are Vital



# Understanding the Emerging TechnoWellness Revolution



TechnoWellness Matters  
Because It Could Save Lives



SAVE A LIFE



ORIGINAL ARTICLE

## Digital Health Interventions for the Prevention of Cardiovascular Disease: A Systematic Review and Meta-analysis

R. Jay Widmer, MD, PhD; Nerissa M. Collins, MD; C. Scott Collins, MD; Colin P. West, MD, PhD; Lilach O. Lerman, MD, PhD; and Amir Lerman, MD

### Abstract

**Objective:** To assess the potential benefit of digital health interventions (DHIs) on cardiovascular disease (CVD) outcomes (CVD events, all-cause mortality, hospitalizations) and risk factors compared with non-DHIs.

**Patients and Methods:** We conducted a systematic search of PubMed, MEDLINE, EMBASE, Web of Science, Ovid, CINHAL, ERIC, PsychINFO, Cochrane, and Cochrane Central Register of Controlled Trials for articles published from January 1, 1990, through January 21, 2014. Included studies examined any element of DHI (telemedicine, Web-based strategies, e-mail, mobile phones, mobile applications, text messaging, and monitoring sensors) and CVD outcomes or risk factors. Two reviewers independently evaluated study quality utilizing a modified version of the Cochrane Collaboration risk assessment tool. Authors extracted CVD outcomes and risk factors for CVD such as weight, body mass index, blood pressure, and lipid levels from 51 full-text articles that met validity and inclusion criteria.

**Results:** Digital health interventions significantly reduced CVD outcomes (relative risk, 0.61; 95% CI, 0.46–0.80;  $P<.001$ ;  $I^2=22\%$ ). Concomitant reductions in weight ( $-2.77 \text{ lb}$  [95% CI,  $-4.49 \text{ to } -1.05 \text{ lb}$ ];  $P<.002$ ;  $I^2=97\%$ ) and body mass index ( $-0.17 \text{ kg/m}^2$  [95% CI,  $-0.32 \text{ kg/m}^2 \text{ to } -0.01 \text{ kg/m}^2$ ];  $P=.03$ ;  $I^2=97\%$ ) but not blood pressure ( $-1.18 \text{ mm Hg}$  [95% CI,  $-2.93 \text{ mm Hg to } 0.57 \text{ mm Hg}$ ];  $P=.19$ ;  $I^2=100\%$ ) were found in these DHI trials compared with usual care. In the 6 studies reporting Framingham risk score, 10-year risk percentages were also significantly improved ( $-1.24\%$ ; 95% CI,  $-1.73\%$  to  $-0.76\%$ ;  $P<.001$ ;  $I^2=94\%$ ). Results were limited by heterogeneity not fully explained by study population (primary or secondary prevention) or DHI modality.

**Conclusion:** Overall, these aggregations of data provide evidence that DHIs can reduce CVD outcomes and have a positive impact on risk factors for CVD.

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**C**ardiovascular disease (CVD) is the primary cause of morbidity and mortality and is associated with markedly increasing health care costs in the United States.<sup>1</sup> Approximately 1 in 3 deaths can be attributed to CVD,<sup>2,3</sup> and more than 90% of CVD morbidity and mortality can be attributed to preventable risk factors.<sup>3</sup> According to 2012 statistics, poor diet, smoking, and lack of physical activity continue to account for an overwhelming majority of CVDs and death,<sup>4</sup> with the cost of CVD in the United States approaching \$200 billion per year.<sup>5</sup> Moreover, the average hospitalization for acute coronary syndrome is estimated to cost roughly \$20,000, with repeated events costing up to 2 and 3 times the original amount.<sup>6</sup> Clearly, better interventions to improve CVD prevention, both primary and secondary, are needed.



From the Division of Cardiovascular Diseases (R.J.W., A.L.), Division of General Internal Medicine (N.M.C., C.S.C., C.P.W.), Division of Biomedical Statistics and Informatics (C.P.W.); and Division of Nephrology and Hypertension (L.O.L.), Mayo Clinic, Rochester, MN.

From the Division of

Cardiovascular Diseases

(R.J.W., A.L.), Division of

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(N.M.C., C.S.C., C.P.W.),

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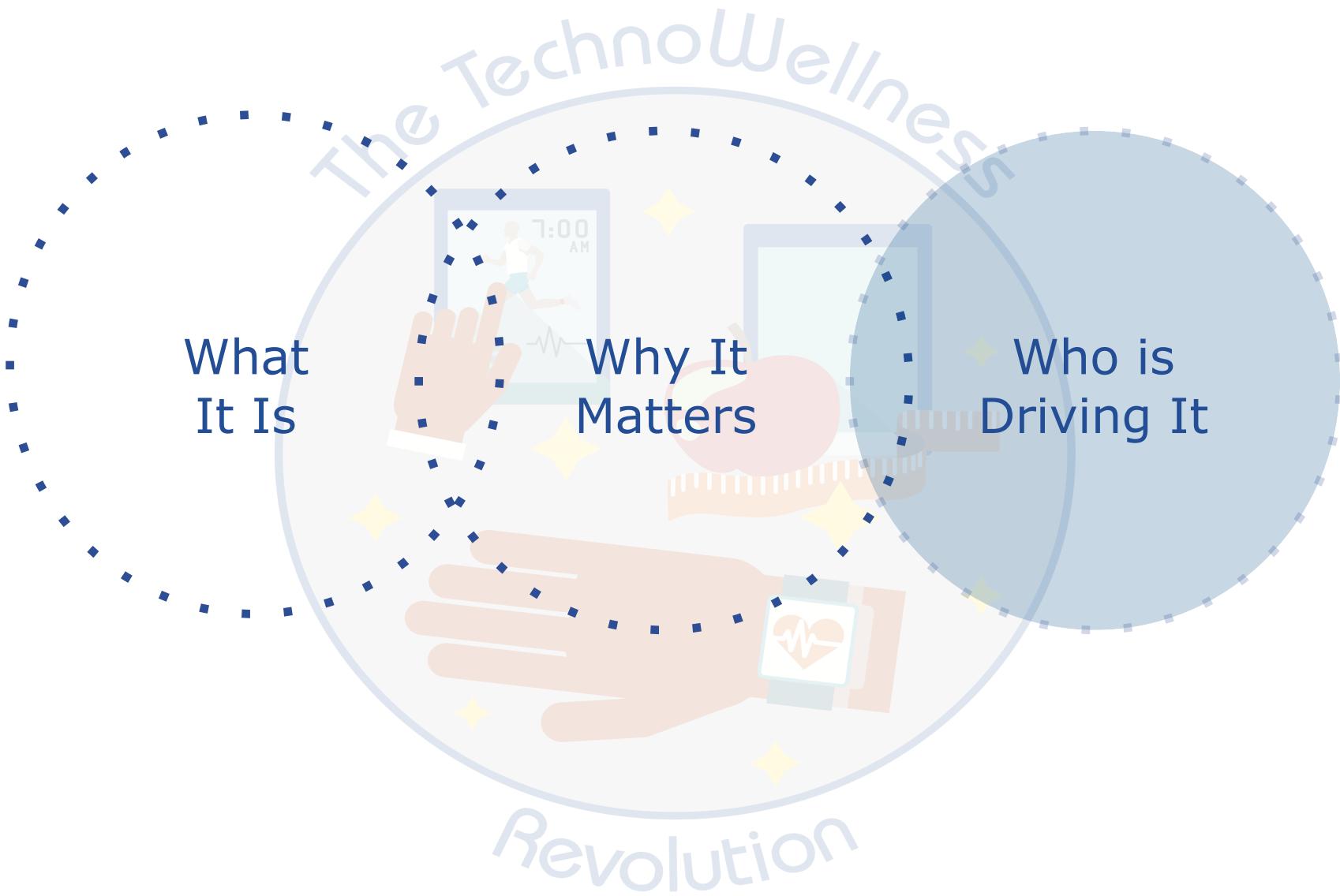
Rochester,

MN.

# A Recent Literature Review Revealed That TechnoWellness Interventions Are Helping Prevent Heart Disease

VIEW THE REPORT NOW

# Understanding the TechnoWellness Revolution





Here Are Some Examples of Companies Leading the Way in TechnoWellness



Pharmacy

Prescription  
RefillsHealth Info  
& ServicesContact  
LensesShop  
Products

Photo

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# Nudge Launches Nudge+Coach; Bridges Gap Between Consumers, Healthcare Providers and Fitness Wearables

Company Introduces Network Of Coaches To Help Users Makes Sense Of Health And Fitness Data, And Improve Their Lifestyle.

## Nudge Synchs Health Data from Sensors, Wearables, Mobile and Provides Human Coaches to Help Users Make Sense of and Act on This Information

*"Our goal is to create an ecosystem where health data goes beyond the consumer and can be leveraged by health professionals to enhance the care model," said Nudge co-founders, Mac Gambill and Phil Beene. "We created Nudge+Coach to address this problem – a way to standardize the data that's being pulled in by the various health tracking devices, and the ability for consumers to make sense of this data by pairing up with a virtual accountability partner who can help them improve their lifestyle."*

*"At Withings, we're focused on not only providing people with the tools needed to track and monitor their health levels, but also helping them truly understand what the data collected by our devices means and empowering them to use this information to make the changes needed to reach their personal health goals," said Cédric Hutchings, CEO of Withings. "We're thrilled that our devices are now compatible with Nudge+Coach, so consumers can receive an extra element of personal coaching throughout their health and fitness journey."*



In 12 weeks, you could  
*feel confident*

Joyable Combines Mobile, Web and  
Coaching to Help People Overcome  
Anxiety and Depression

Resources That Will  
Help You Get Smarter  
About TechnoWellness  
and Other Digital  
Health Topics





## Digital Health Funding and Insights Brief: The TechnoWellness Revolution

A resource co-developed by [StartUp Health](#) and [Enspektos, LLC](#) featuring data and insights that illustrate the shape and scope of the fast-moving digital health landscape.

Digital Health Funding Data Source

StartUp Health Insights Report - Digital Health Funding Rankings Q1 2015

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Digital Health Insights Data Source

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