



Innovation in the Changing Health Care Landscape

The Apple – J&J Collaboration

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The problem in industry

5%

of eligible patients
participate in trials

30%

average participant
dropout rate

20%

of trials shut down
because of lack of
enrolment

\$2 Bn

to develop a medicine
(factoring failures)

SOURCES:

JAMA. 2004;291(22):2720-2726. doi:10.1001/jama.291.22.2720

Am Soc Clin Oncol Educ Book. 2016; 35: 185–198

<https://www.forbes.com/sites/matthewherper/2017/10/16/the-cost-of-developing-drugs-is-insane-a-paper-that-argued-otherwise-was-insanely-bad/#3b80d9d72d45>

A first step: The mSToPs Study



Who

- At risk of
 - ✓ AF
 - ✓ Stroke

How

- ID via payer claims
- Virtual recruitment
- Virtually instrument

What

- Payer claims
- ECG tracing



National Institutes
of Health

More detection, fewer hospitalizations

//

...the mSToPS trial [is] especially noteworthy [because] the entire study was conducted remotely...

	AF Diagnosis	Hospitalizations / mo./100 persons
w/ Patch	6.3%	4.3
	vs.	vs.
w/o Patch	2.3%	16.9

This direct-to-participant clinical study shows the great potential of these types of in-home studies to evaluate the coming wave of wearable health // technologies

- Francis Collins, MD, PhD
NIH Director
07/17/2018 blog post

mSToPs to Heartline

Old School

Number of patients / events often modest

“Clean data” NOT available in real time for modeling

Megabytes to Gigabytes of data



- Hypotheses
- Data Structure
- ML
- Analytics
- Internal capabilities



New School

Larger number of patients and events

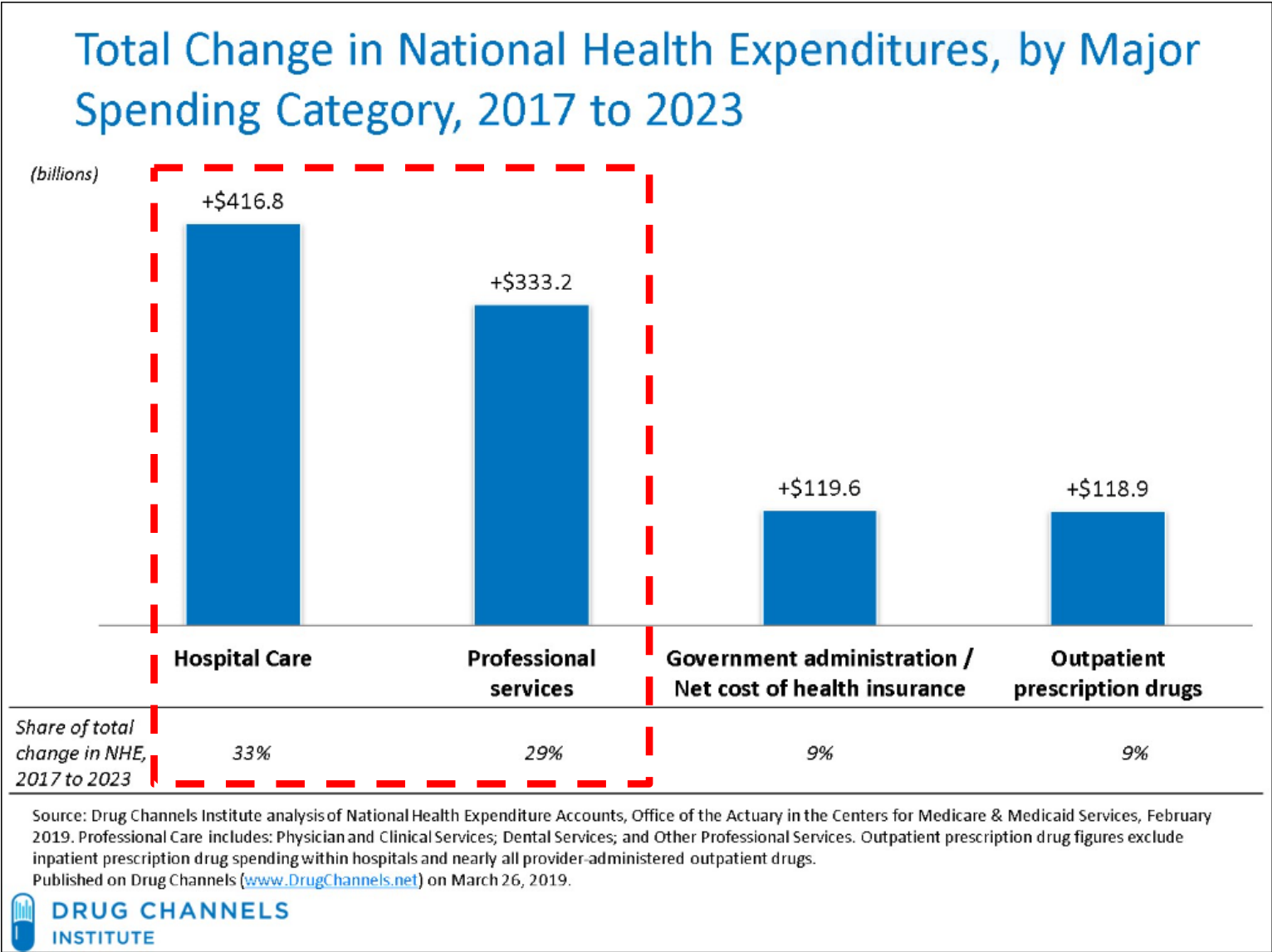
“Clean data” available in real time to guide trial modifications

With wearables can be Terabytes to Petabytes of data

Data Insights -- Goldmine vs. Landmine?

- Valuable insights vs. Distractions
- Time well-spent vs. Lost time
- Helping vs. Hurting
- Value creation vs. Value destruction

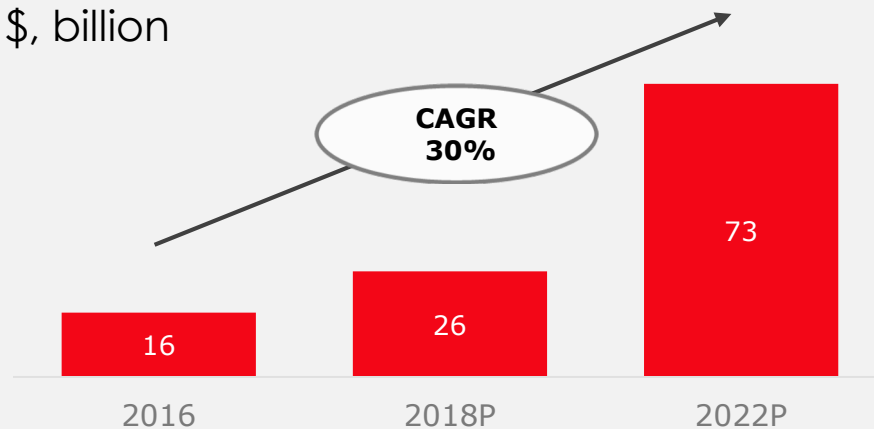
The external market dynamic: High cost incumbents are trapped by their economics



Wearable devices are proliferating, and will play an increasingly central role in health care in the coming years

The global wearable market is projected to more than quadruple between 2016 and 2022¹

Wearables revenue (global)
\$, billion



Global wearable unit sales will grow **60%** through 2021, to 500 million units per year²

Wearables will create tangible near-term value in healthcare while building a platform for future models

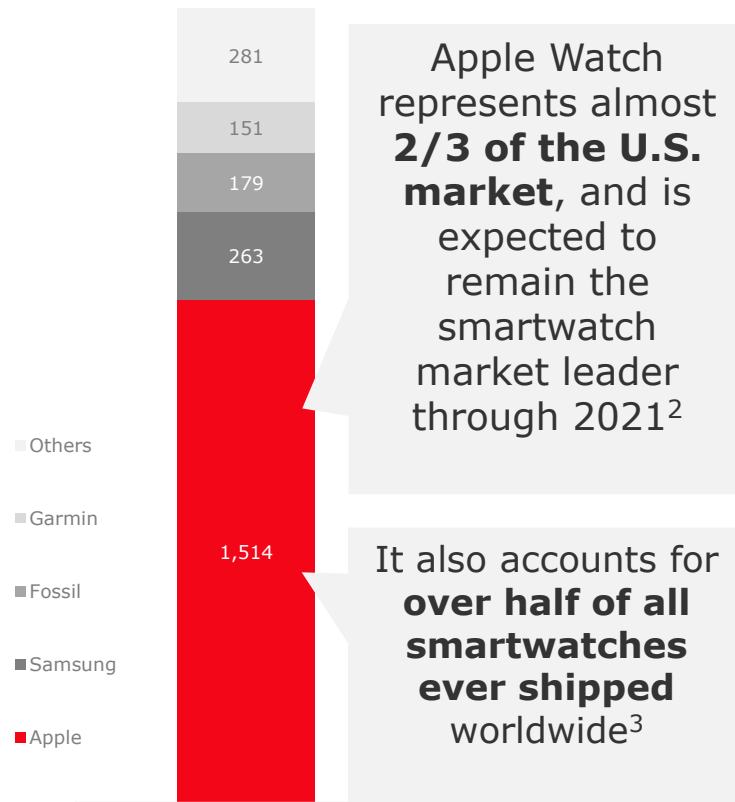


Wearables are nearing a tipping point in terms of their utility in healthcare. They are becoming much **smarter and more integrated** into our lives, driven by passive monitoring of biometrics and machine learning. They will soon play a critical role in **improving patient and economic outcomes**

Apple is an ideal partner in wearables given their leading position in the smartwatch space and ability to collect rich consumer and biometric data

U.S. smartwatch marketshare¹

Million units (Q3 2017)



Apple's strategic advantages

- **90+ million iOS users in the US⁴**, including **6 million aged 65 and older⁵**
- iOS provides a **seamless, integrated user experience** (vs. other fragmented mobile operating systems)
- Retail and **service/support infrastructure** through retail footprint
- Apple is a highly valued brand worldwide⁶
- Major investment in **sensor technologies** and **health-related algorithms**

New and combined data inputs provide better insights

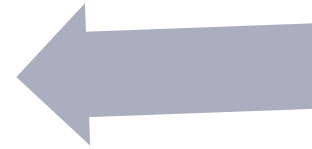


- Claims



Blue Button
Download
My Data

- Sensor



- Validated PROs
- Symptoms



- Privacy
- Regulatory – Law, FDA, AKS
- Compliance



- Security
- Data structure to run analytics
- Data rights

Apple and J&J will study the impact of the S4 Watch on atrial fibrillation detection and outcomes



Johnson & Johnson

