Using Data from Activities on Mobile Devices

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Real-World Evidence Generation and Evaluation of Therapeutics: A Workshop—NAS—2016-10-19

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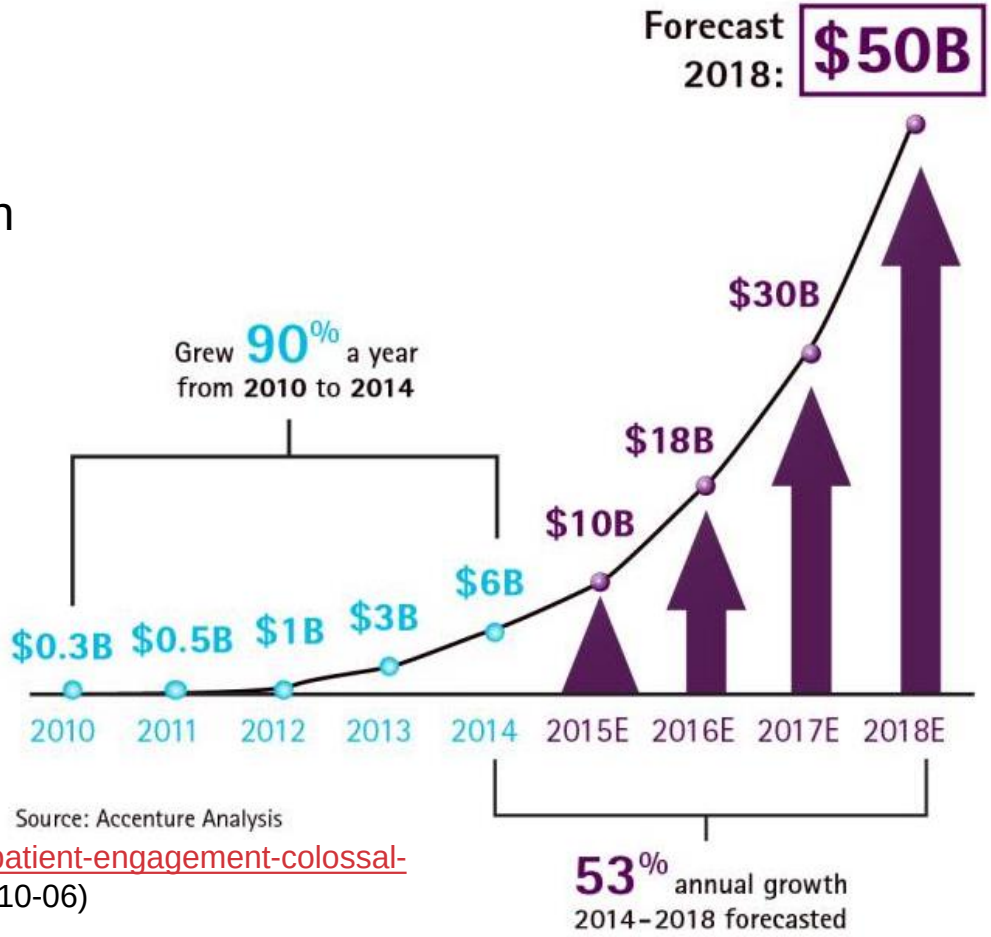
Digital Health

"The broad scope of digital health includes categories such as mobile health (mHealth), health information technology (IT), wearable devices, telehealth and telemedicine, and personalized medicine" (US Food and Drug Administration)

US Healthcare Annual Net Cost Savings Attributed to FDA-regulated Digital Health Solutions 2010-2018



https://www.accenture.com/us-en/insight-patient-engagement-colossal-clash-disrupt-infographic (accessed 2016-10-06)

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CES 2016

Source: CES 2016: Running list of health and wellness devices
By Jonah Comstock January 06, 2016

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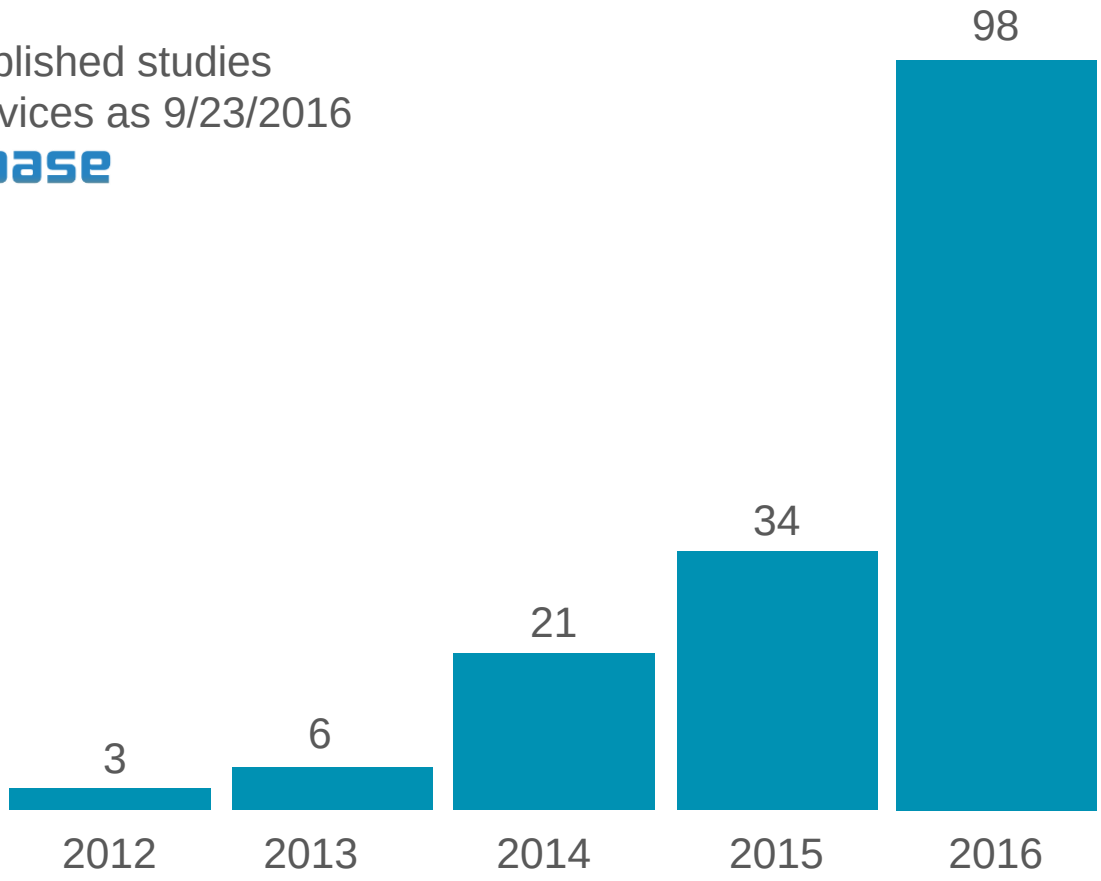
Yet Another Exponential Growth

Number of published studies
using Fitbit devices as 9/23/2016
Source: fitabase



Advantage of digital health devices and trackers in generating RWE: **Time and Space**

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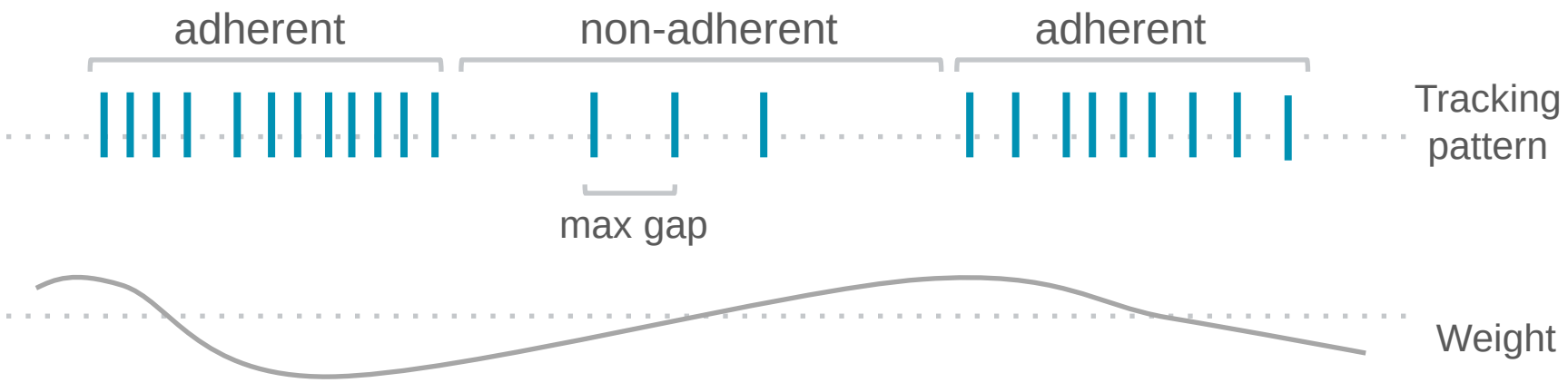
Time: Within-subject analyses

Adherent use of activity trackers is associated with weight loss
with Pourzanjani, Quisel, *PLOS ONE* (2016)

N=14k digital health trackers for weight, food, workout in 2012-2015



- 1.35% of additional weight lost per month, during adherent food tracking periods
- 2.4% of additional weight lost per month, during adherent weight tracking periods

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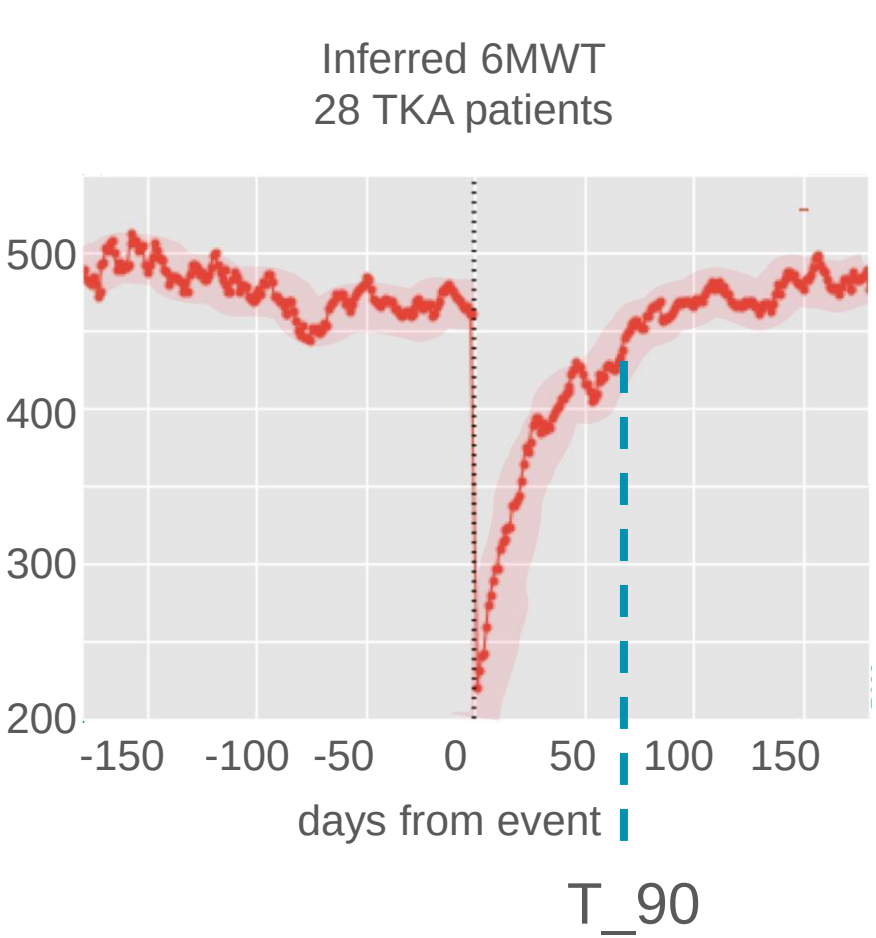
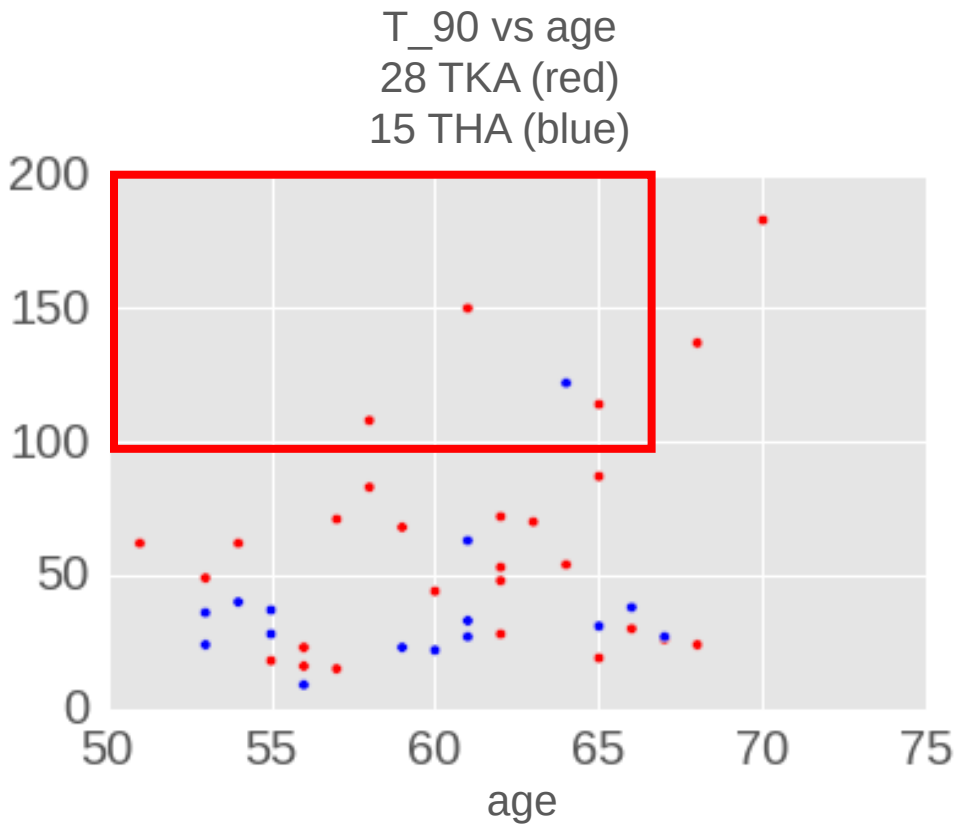
Time: Effect of Medical Events on Activity





Quantifies effects of therapeutics, comparative effectiveness of drugs, impact of acute events

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Space: Easier Recruitment

Efficiency Of Virtual Recruitment Methods For Broad And Specific Study Populations
Kumar, Oley, Juusola. SMDM (2016)

Virtual recruitment for digital heath clinical studies uses social media, email campaigns, online advertising.

	No. Enrolled	Time to Complete Recruitment	Patients Enrolled/day
Study A (Self-reported type 2 diabetes)	108	3 days	36 patients/day
Study B (Uncontrolled hypertension (BP > 140/80 mmHg))	244	15 weeks	2.3 patients/day
Study C (Uncontrolled type 2 diabetes (HbA1c ≥ 7.5))	413	23 weeks	2.6 patients/day
Study D (Historic use of specific healthcare product)	45	5 weeks	1.3 patients/day

Results: Studies A, B, C and D were 6-12x faster in recruiting their target patient populations when compared to similar studies in the literature that used traditional recruiting methods

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Conclusion

- Growth in digital health drives research and applications
- **Time** advantage: within-subject analyses, capture behavior, reactive to interventions, track outcome improvements.
- **Space** advantage: enable virtual trials, ease to enroll, achieve diversity, quick iterative hypothesis generation.

Open issues

- Lack of standardization
- Shift toward patient-centered – more attention needed to UX/HCI
- Reliability (accuracy, engagement)

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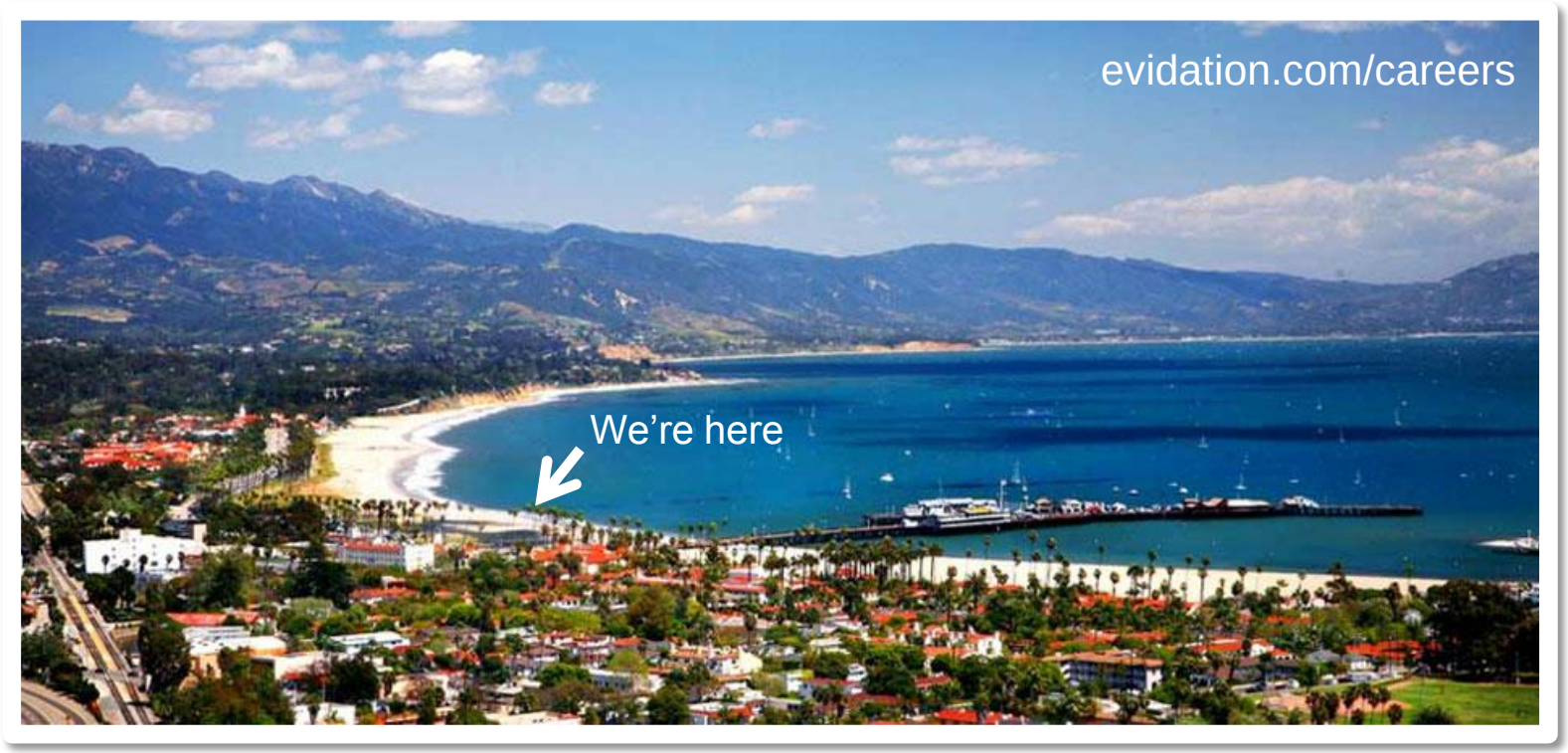
Thank you!



Positions available:

Researcher in ML/biomedical informatics.

Strong academic background. MD preferred.

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