

Leveraging today's tech business models as tools to provide insights for suicide interventions

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Disclosures

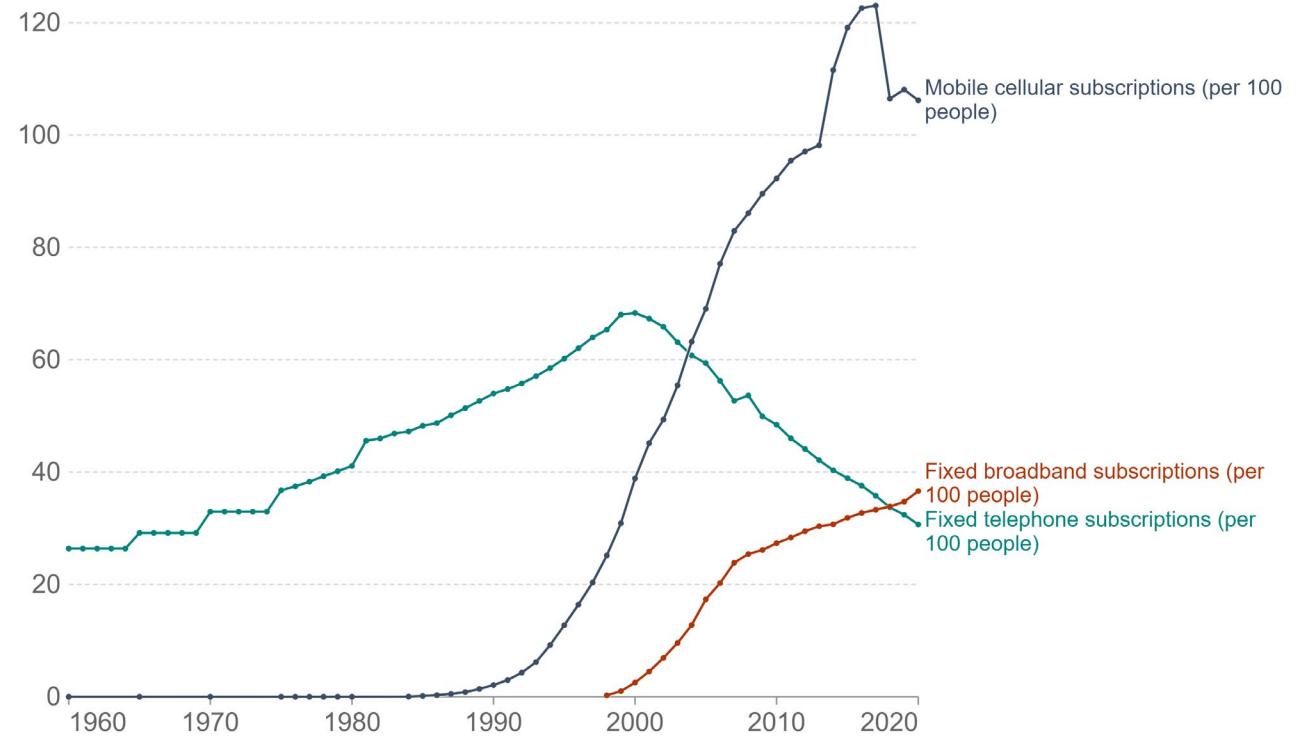
I am the cofounder of, and have an equity interest in, Ksana Health Inc., which provides commercial services based on some of the research methods discussed in this presentation.

Traditional
research models
are outpaced by
changes in
consumer
behavior

Mobile and fixed landline telephone subscriptions, United States, 1960 to 2020

Our World
in Data

The number of fixed landline telephone and mobile cellular phone subscriptions, measured per 100 people.

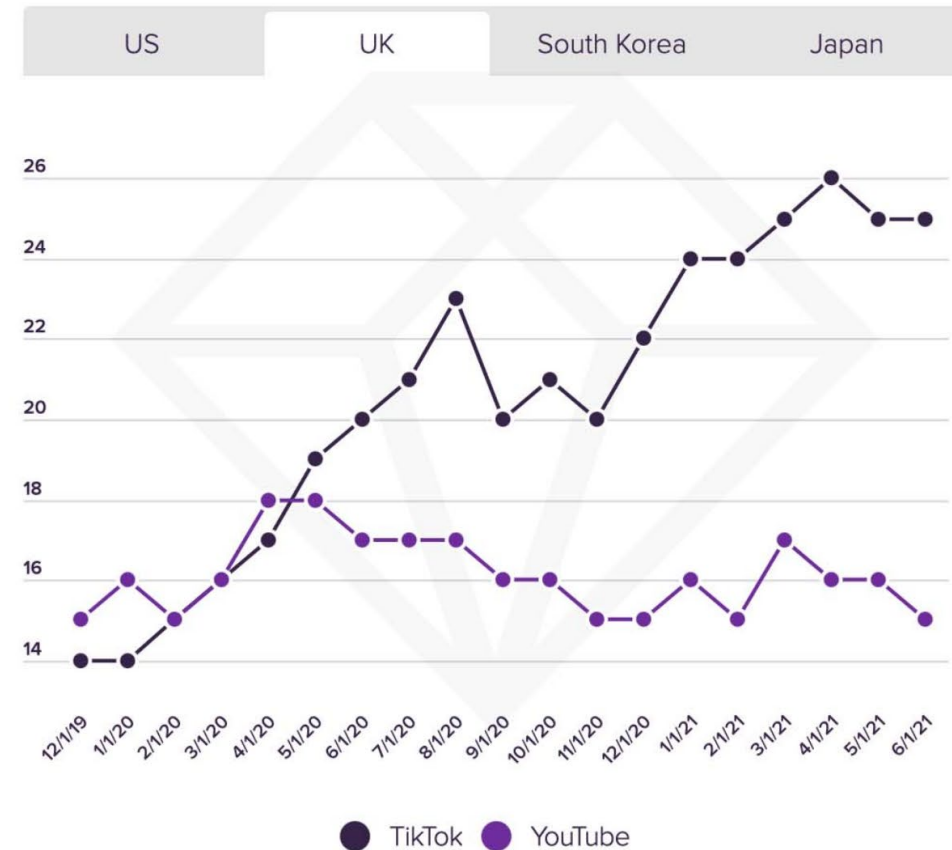


Source: International Telecommunication Union (via World Bank)

OurWorldInData.org/technology-adoption/ • CC BY

Traditional research models are outpaced by changes in consumer behavior

Average Monthly Hours Per User, TikTok vs YouTube

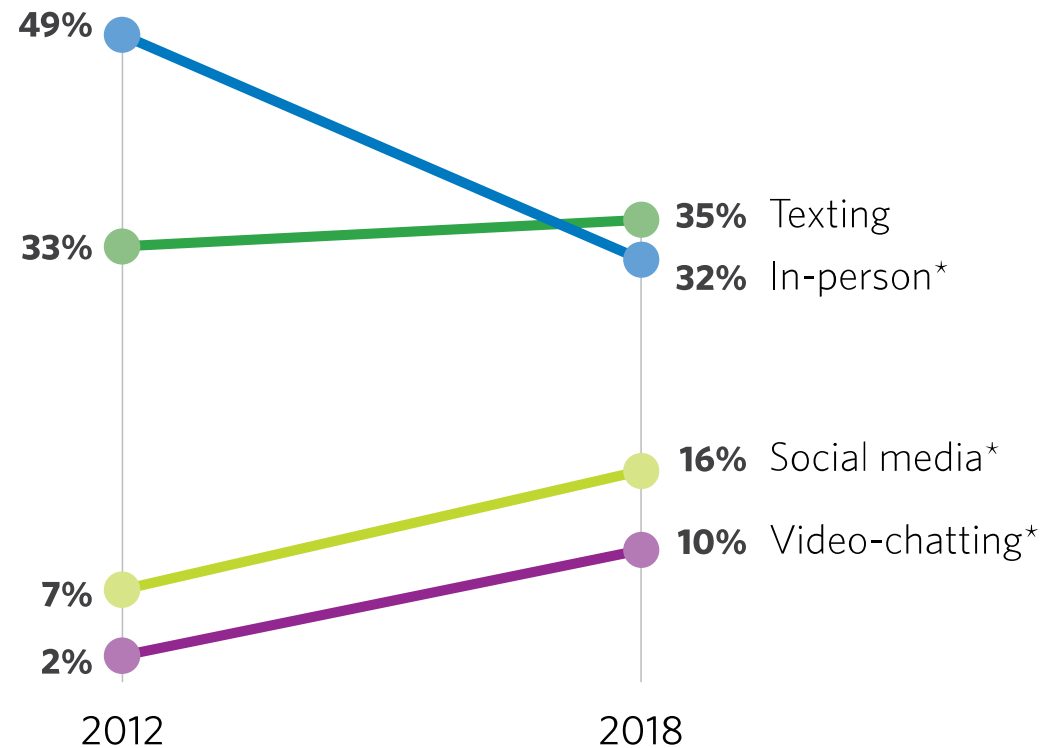


Source: App Annie Intelligence Note: Android phones only

Changing Patterns of Social Communication

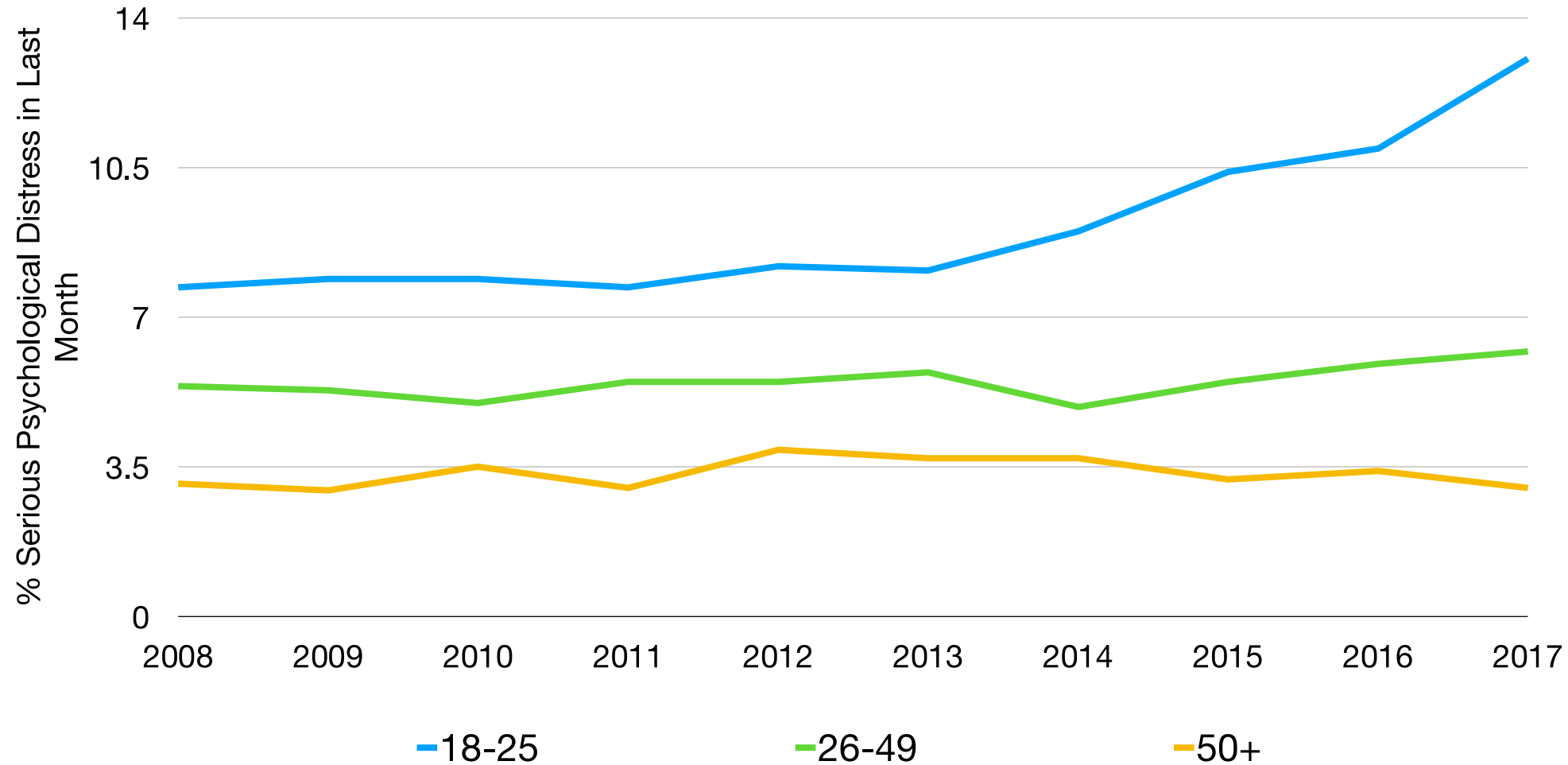
FIGURE F. Preferred Method of Communication, 2012 vs. 2018

Among 13- to 17-year-olds, percent who say the following is their favorite way to communicate with friends:



*Differences over time are statistically significant at $p < .05$.

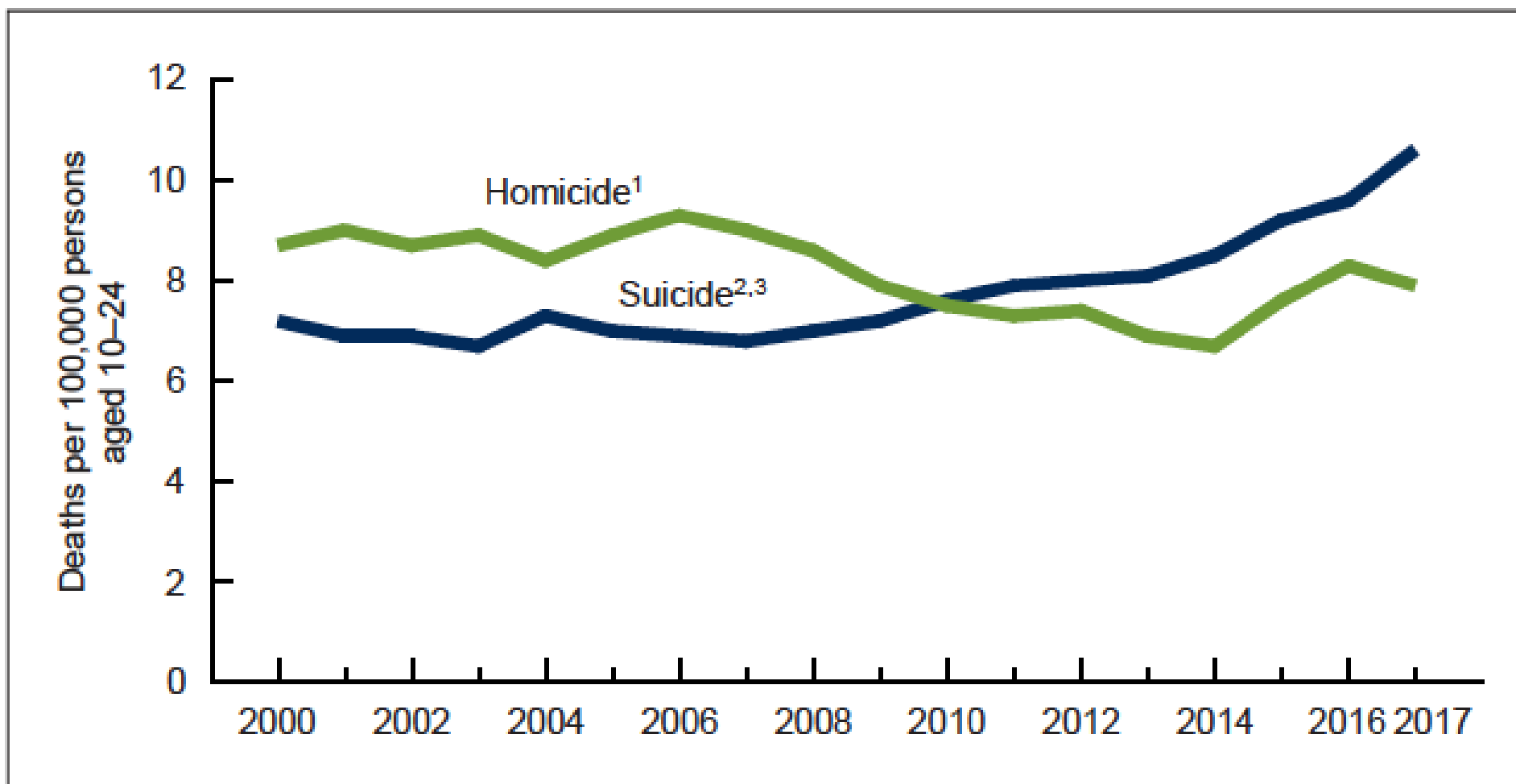
Rises in Mental Health Problems Mostly Occurring in Youth



Twenge et al, 2019,
J. Abnormal Psych

Suicide is a more common cause of death than homicide in youth

Figure 1. Suicide and homicide death rates among persons aged 10–24: United States, 2000–2017



“Move fast and break things” vs. “Move slow and get it right”

HEALTH RESEARCH

Emphasis on internal validity

- Exclude alternative explanations

Slow funding and research cycle

Assumes static environment

Use of rigorous measurement and methods

BUSINESS INNOVATION

Emphasis on external validity

- Product market fit – if it sells its working

Rapid iteration based on user centered design processes

Fail fast

Assumes dynamic environment via business competition and technological innovation

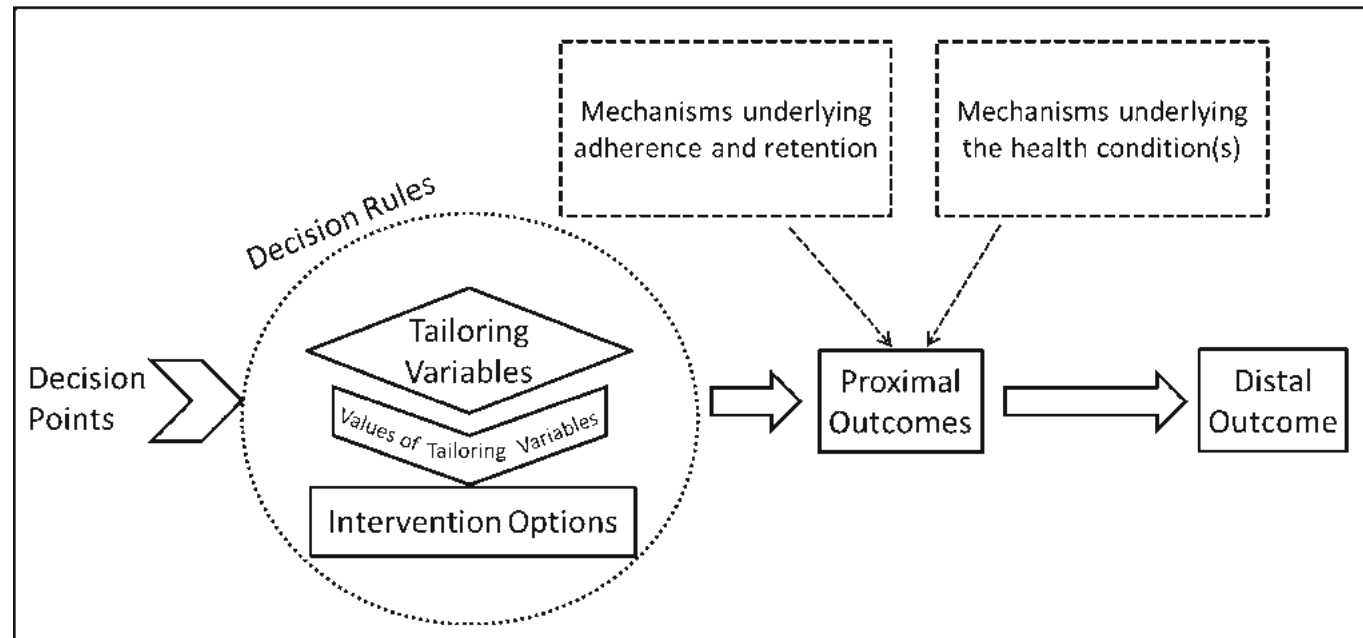
How to prevent Suicide

Interrupt suicidal crises through “just in time” intervention at the moment of highest risk

- Reduce access to means
- Provide support or diversion at high risk moments

Just-in-time Adaptive Interventions (JITAIs)

An intervention design that aims to provide just-in-time support by adapting to the dynamics of an individual's internal state and context, *which is measured continuously*.



Nahum-Shani et al., 2016 Annals of Behavioral Medicine

Data is central to Tech Business models

TYPES OF MODELS

Subscription Models

Contextual advertising

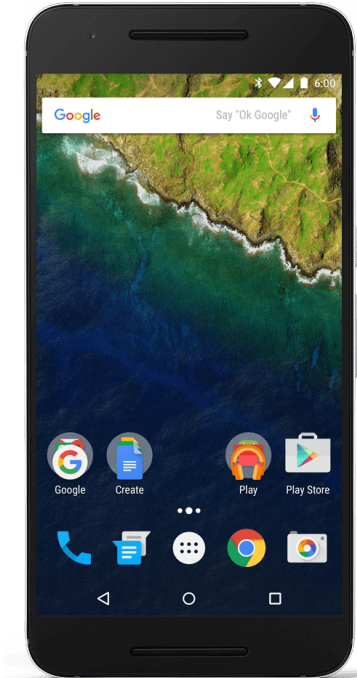
Behavioral Advertising



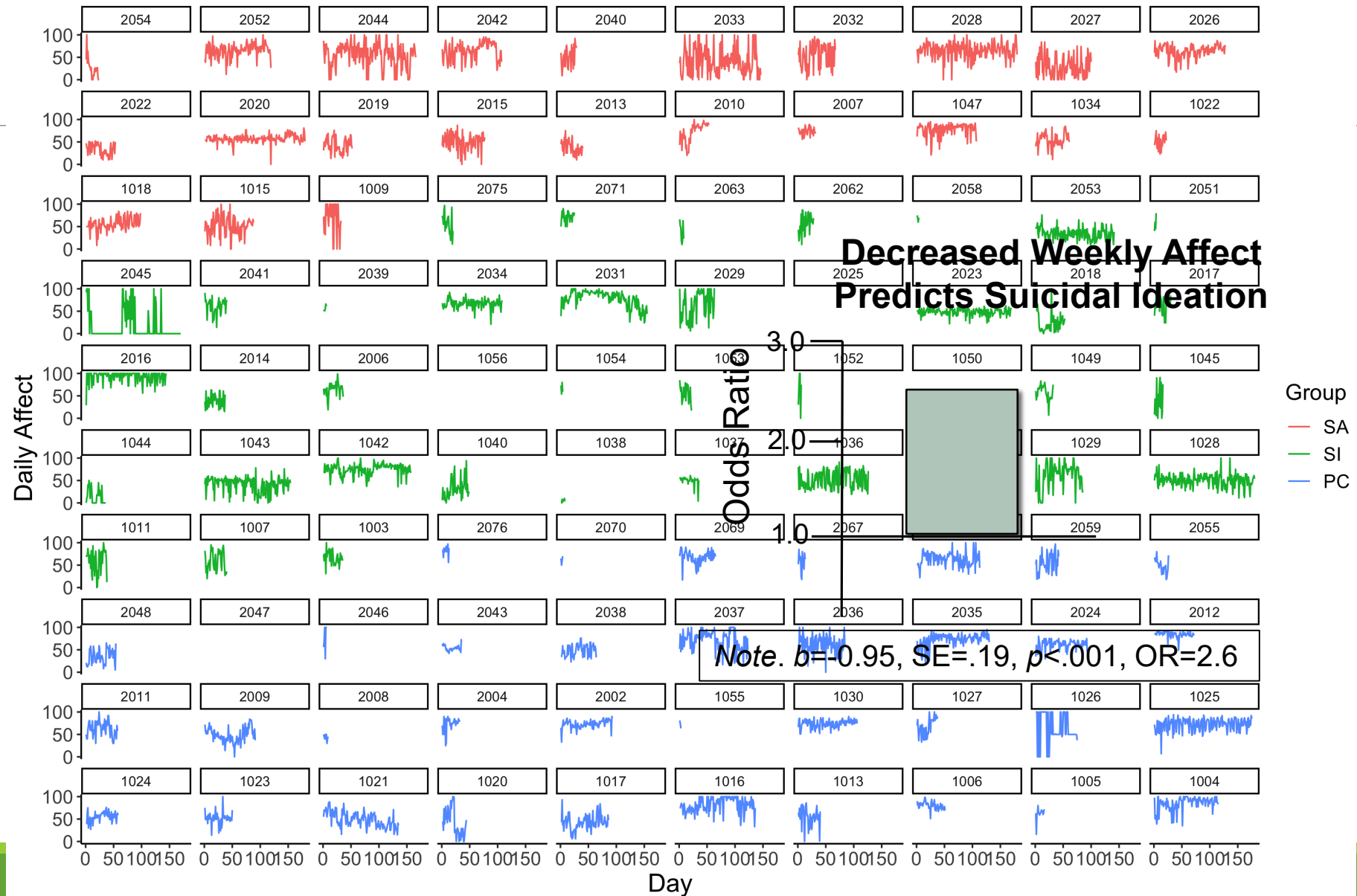
Mental Health + Mobile Computing



Language
Patterns of Usage
Circadian Rhythms
Autonomic physiology
Geographic movement
Acoustic voice quality
Facial expressions
Social interactions
Physical activity
Sleep



Daily Affect Ratings Over 6-Months



Geographic mobility

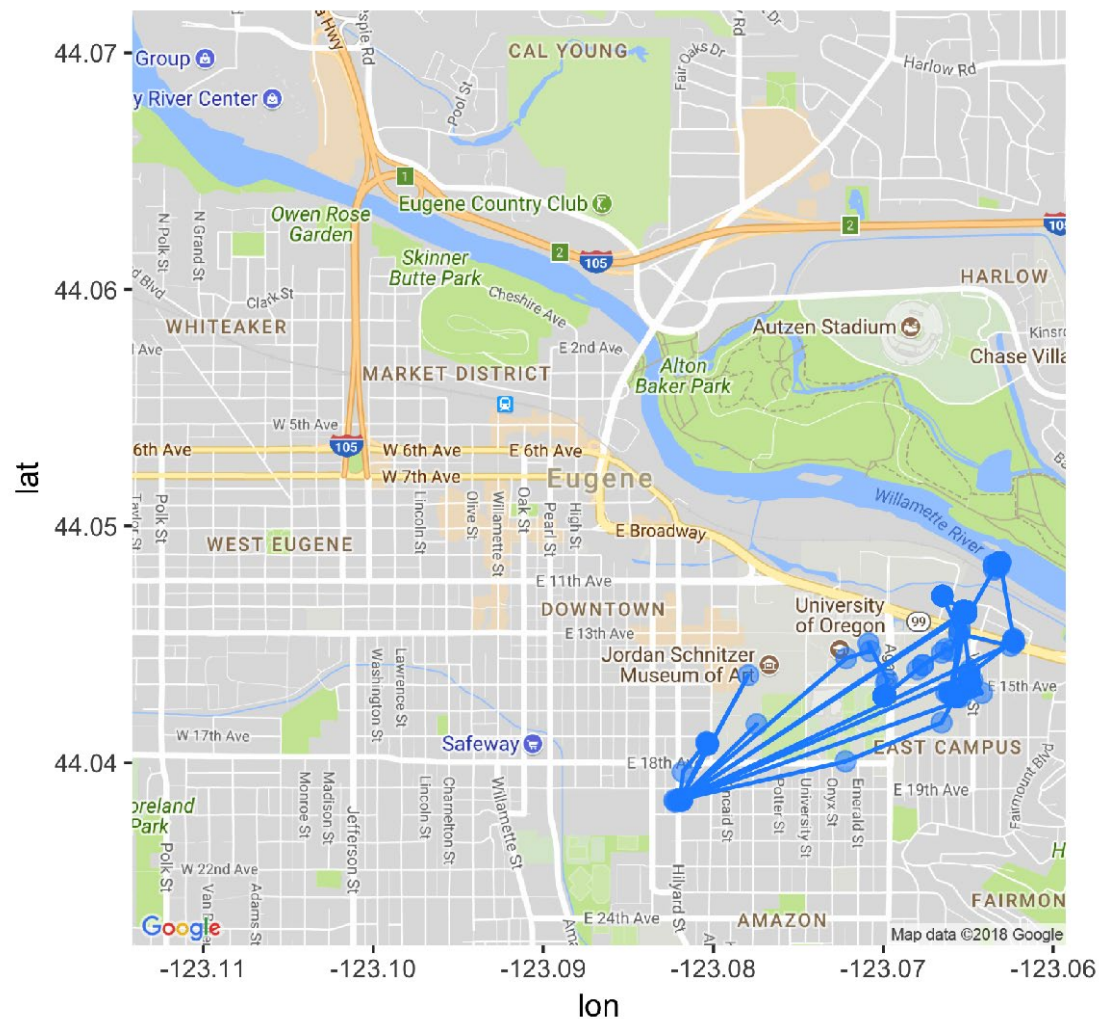


Figure 10: An example GPS sample of mobility for an individual over one day

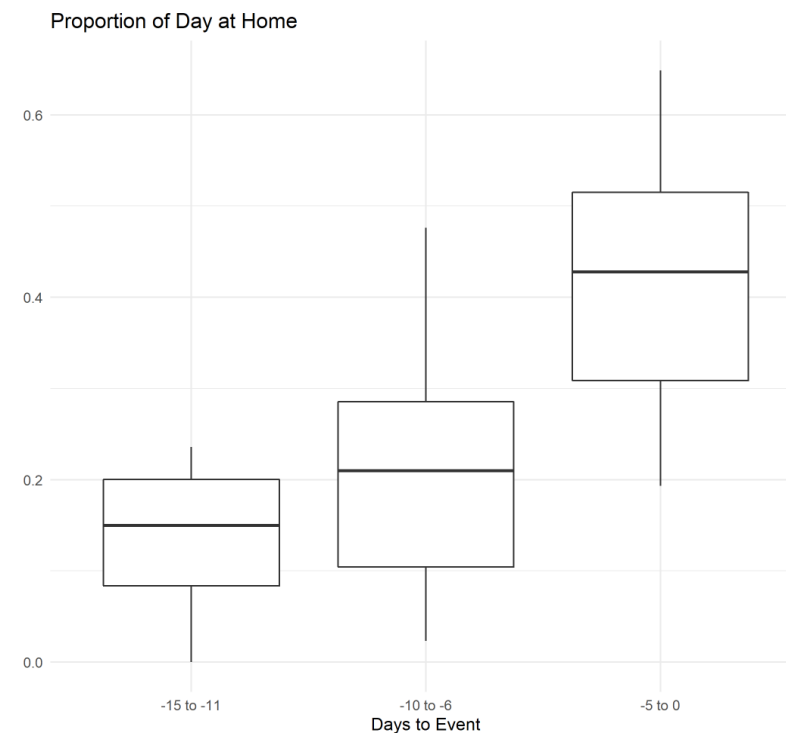


Figure 11: Increasing home stay prior to a suicide risk event (n=9)

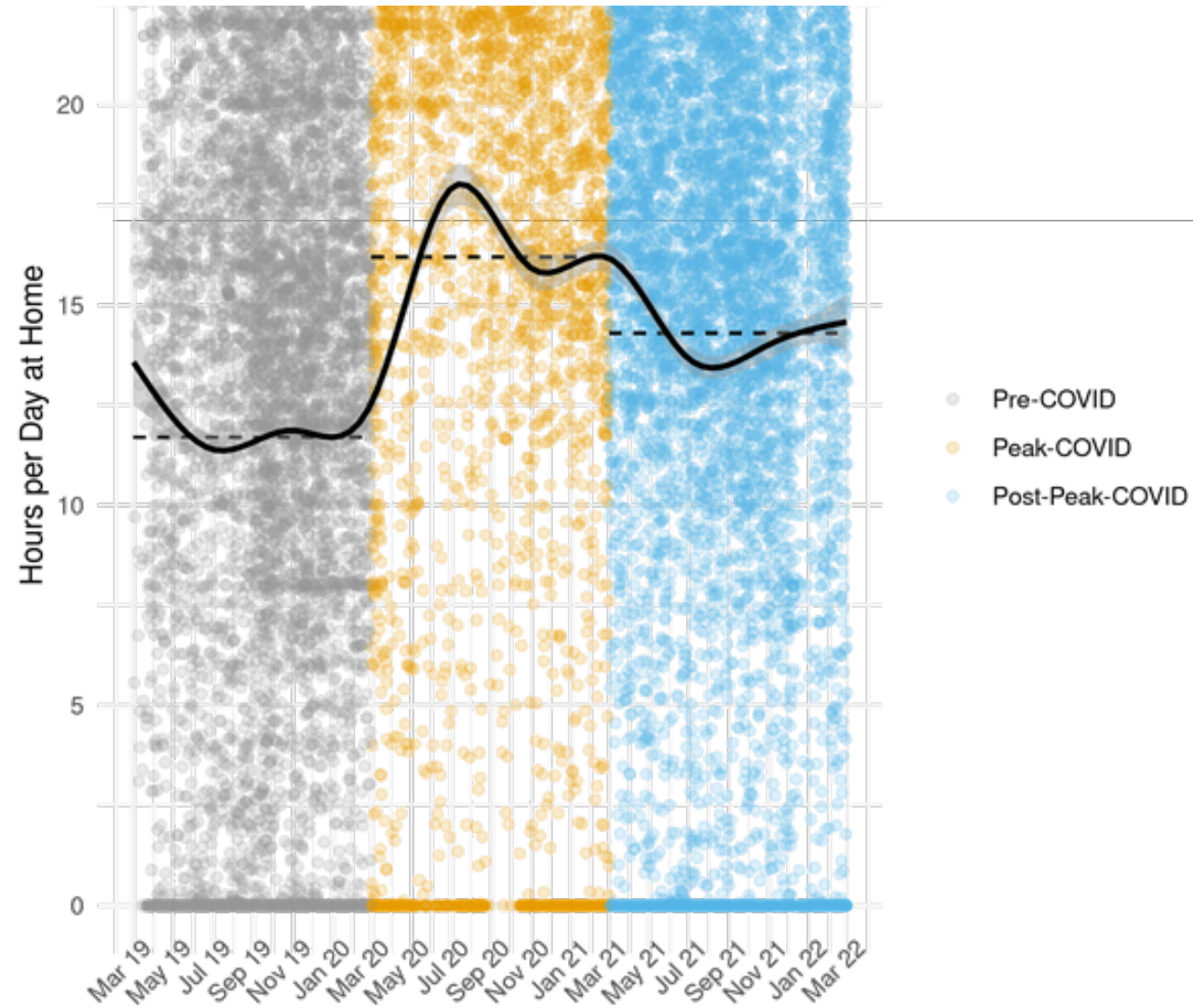


Figure 3. Comparing Home Stay during Pre-COVID (gray), Peak-COVID (yellow), and Post-Peak-COVID (blue)

Ubiquitous Liability

COST OF KNOWING

Awareness of risk requires timely duty of care

Systems for 24/7 response often not adequate

Cost of false positives

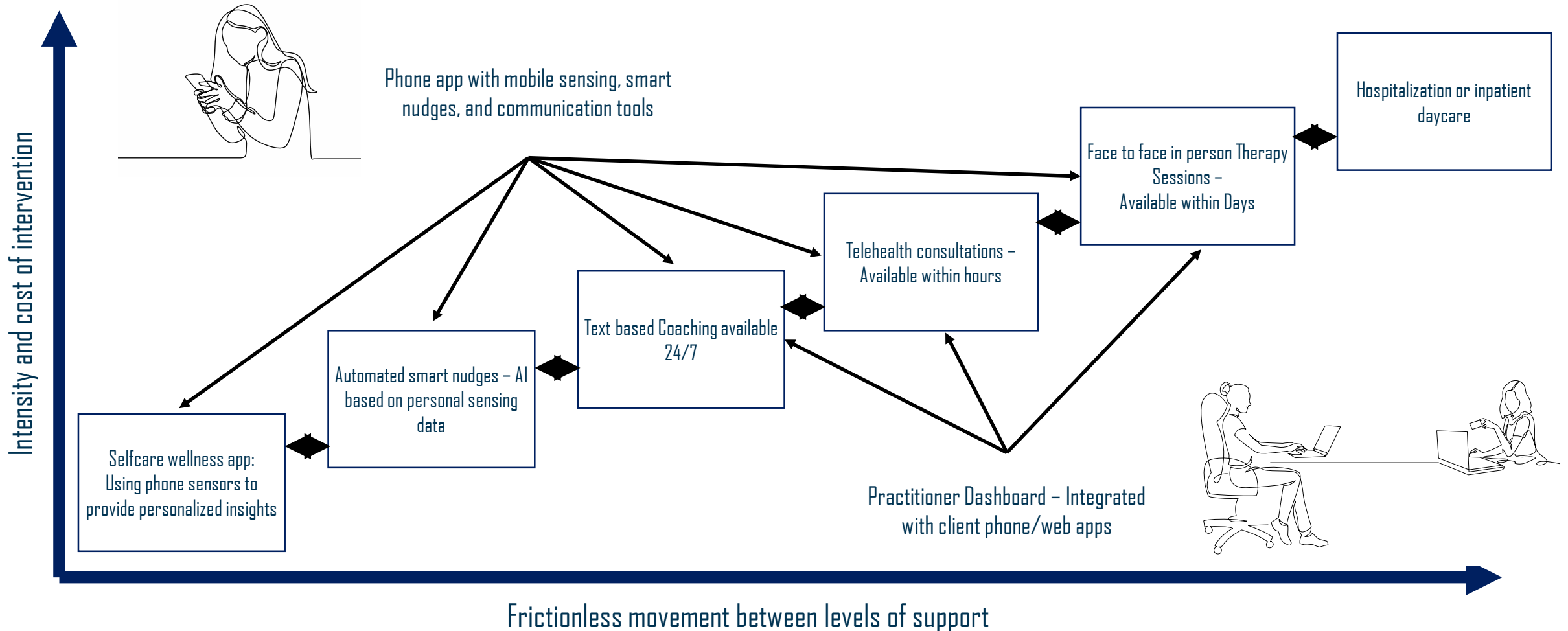
COST OF NOT KNOWING

Harm and loss of life

As Remote Patient Monitoring solutions become available in behavioral healthcare, standards of practice may change to liability of not knowing

Digitally Enhanced Mental Health Care

A frictionless, efficient, scalable, and personalized digital mental health platform that provides people with easy access to the right level of support exactly when they need it



Thank You!



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