

Journey Toward “Smart” Exam Rooms in Behavioral Healthcare

HEALTHCARE

CONNECTED TRANSPORT

MANUFACTURING

ENERGY AND UTILITIES

BUILDINGS & INFRASTRUCTURE

OPEN INDUSTRY

ENABLING IoT



Agenda

1. The University of California, San Francisco
2. Crisis in Behavioral Healthcare
3. Telemedicine and Scalable Therapeutics
4. The Variables of Mental Health Data
5. Internet of Things and Healthcare
6. The Future of Care

Overview of UCSF *“Advancing Health Worldwide”*

43,127 total
hospital admissions
and generated 1.1+
million outpatient
visits in 2015.

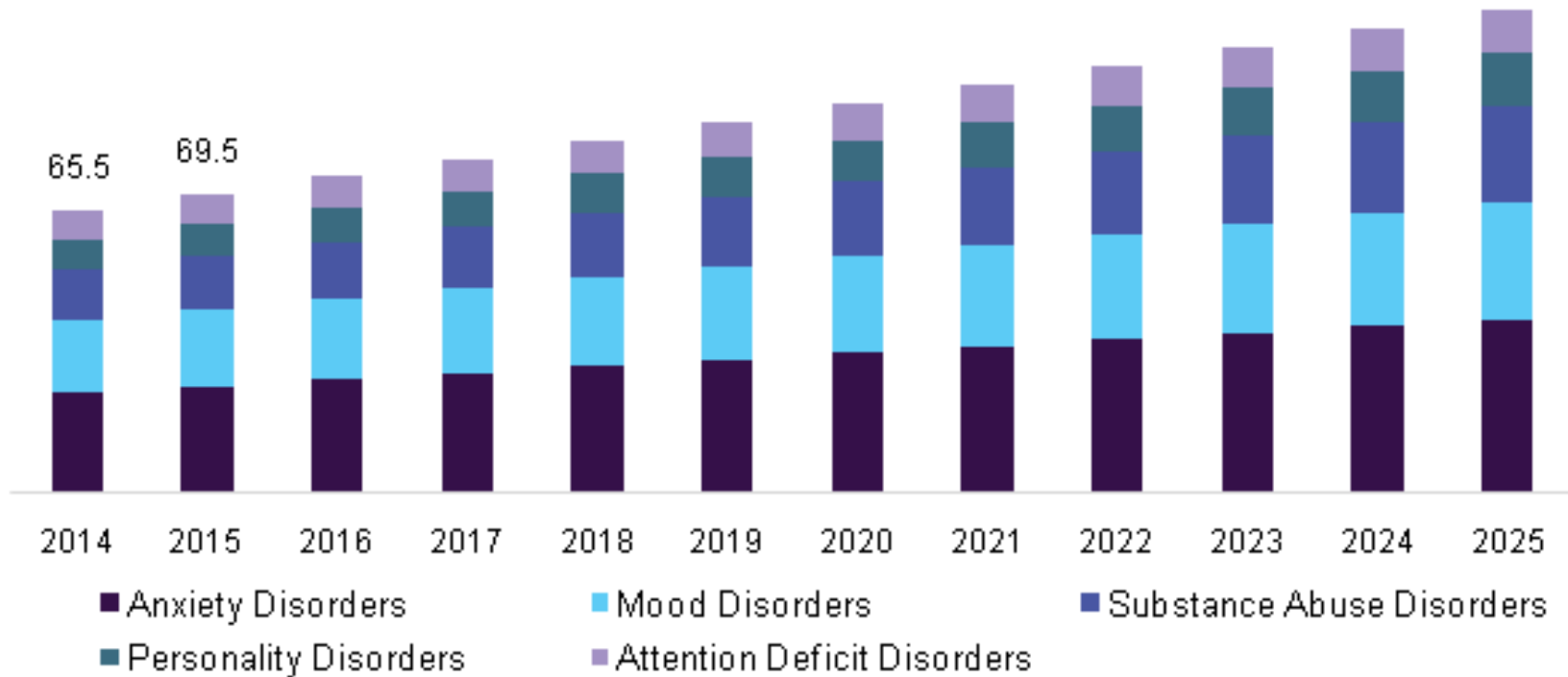


About 61 percent of our
revenue - **\$3.9 billion
(USD)** - comes from
clinical services through
UCSF Health.

About 5% of services
are behavioral related
22,000 Patients



About 10% of
revenue is
behavioral health
related - **\$390
million (USD)**

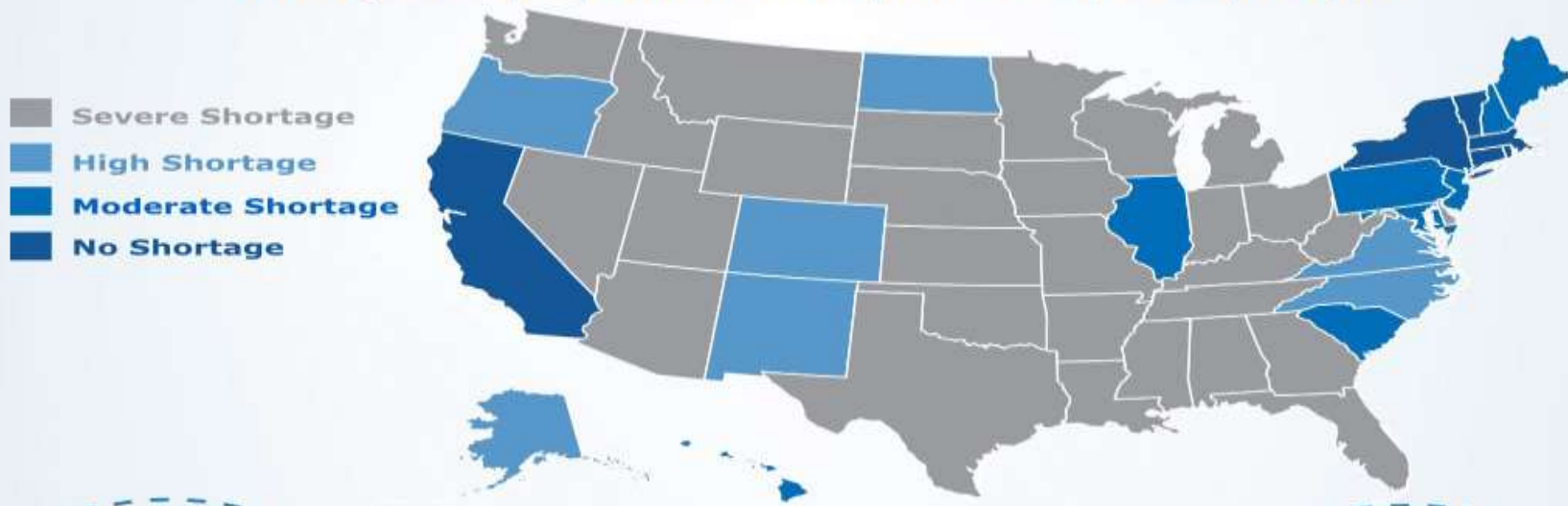


Crisis in Behavioral Healthcare

Shortage of Psychiatrists

A population of 100,000 people should be supported by 14.7 psychiatrists¹

In the U.S., only five states and D.C. meet or surpass this goal, with the national average being 8.9 psychiatrists per 100,000 people¹



Solution: Telemedicine and Scalable Therapeutics

1st In-Person (1-to-1)



2nd Telemedicine (1-to-1)



3rd Scalable Therapeutics (1-to- ∞)

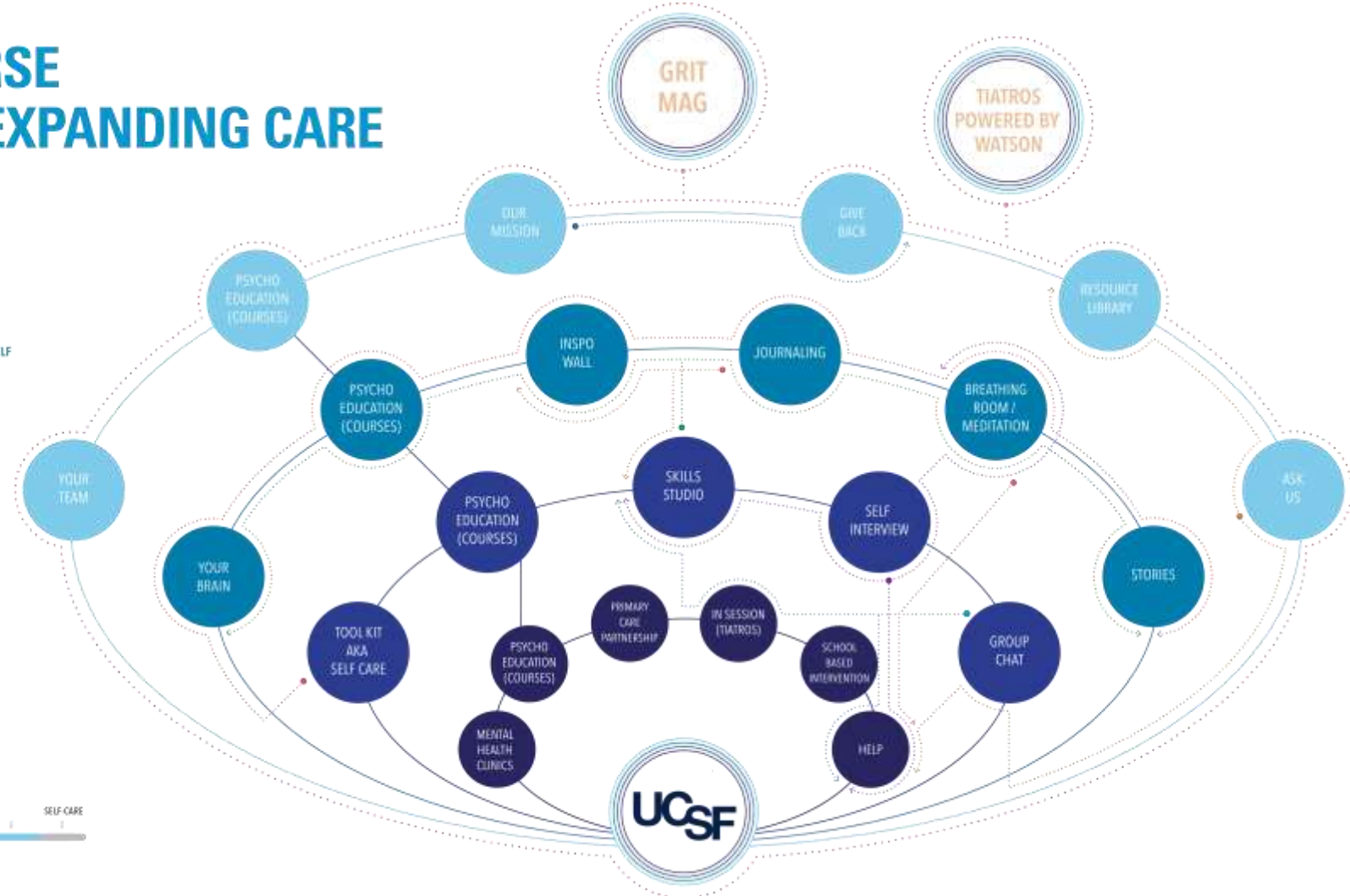


“Scaling the services of a single clinician to millions”

UCSF's Telemedicine and Scalable Therapeutics Program

A UNIVERSE OF EVER EXPANDING CARE

- GETTING TO KNOW Y&FC
- KNOWING AND EXPRESSING ONESELF
- EXPLORING ONESELF DEEPLY
- DIRECT CARE (HIPAA COMPLIANT)
- SHOW PATHS



IoT in Healthcare

The Healthcare Internet of Things (IoT) Market Map

Clinical Efficiency



Clinical-Grade Biometric Sensors



Consumer / Home Monitoring



Infant Monitoring



Sleep Monitoring



Fitness Wearables



Brain Sensors / Neurotechnology



Created By



Main capabilities of connected devices

1



Real-time data collection and analysis

2



Device remote control / configuration

3



Remote software and firmware updates

4



Notification of other devices

5



Medical asset management / procurement solution

6



Fault monitoring and malfunction prevention

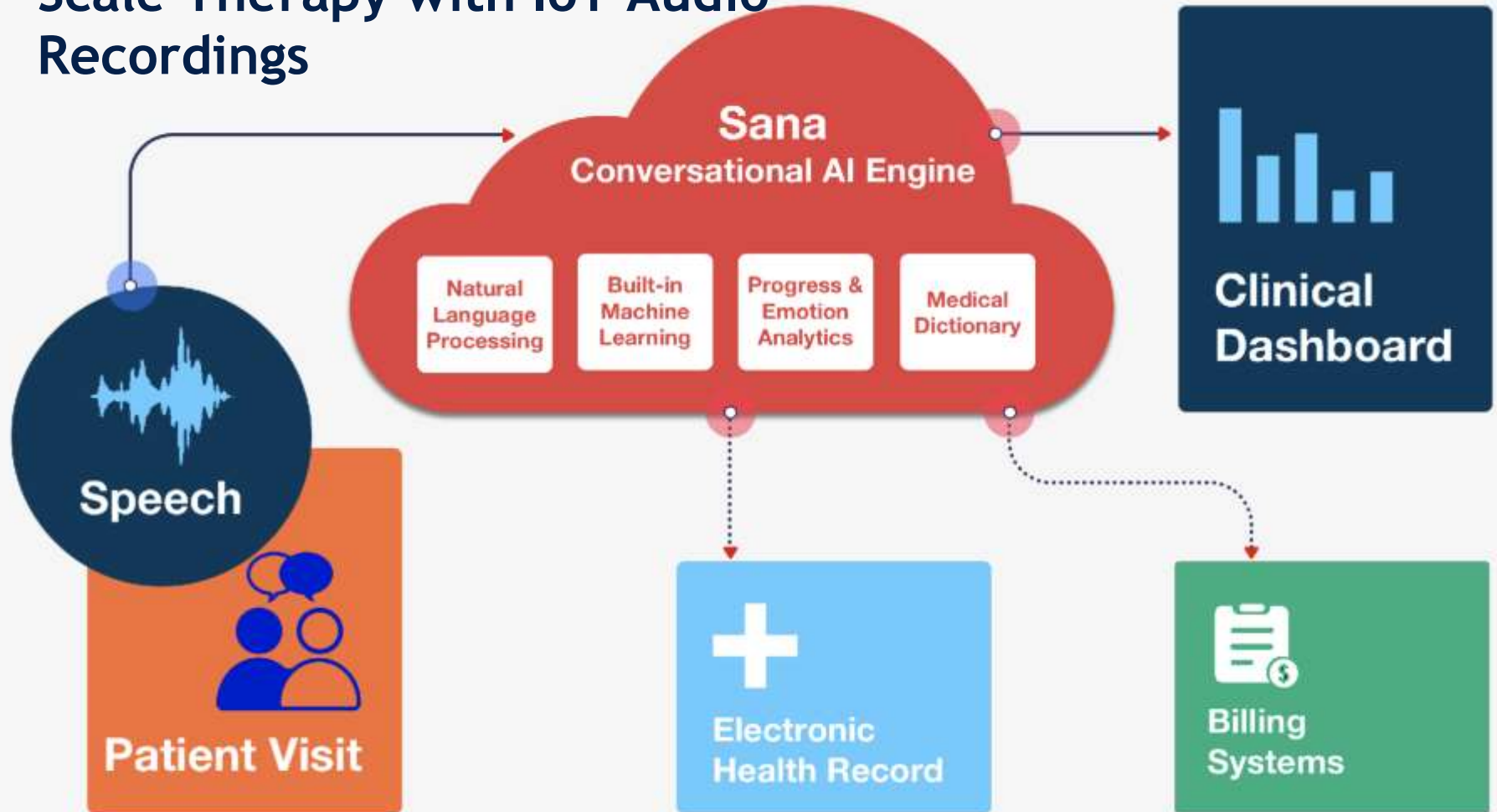
Mental Health Research Measures

Measure	Description of Protocol
1. Current Age	The respondent is asked for his/her date of birth in MM/DD/YYYY format. If the respondent does not know his/her date of birth, there is an alternative question to determine his/her age.
2. Race	The respondent is asked to indicate one or more categories that describe what race he or she considers himself or herself to be. The question meets the Office of Management and Budget standards for capturing data on race.
3. Ethnicity	The respondent is asked whether they consider themselves to be Hispanic or Latino. An additional question captures the specific Hispanic origin. The question meets the Office of Management and Budget standards for capturing data on ethnicity.
4. Gender	The respondent is asked for his/her self-conception of being male or female.
5. Current Marital Status	The respondent is asked for his/her current marital status.
6. Current Educational Attainment	The respondent is asked for his/her highest educational attainment at the current time.
7. Annual Family Income	The respondent is asked their family's total income from all sources in the last calendar year. Respondents who don't know or refuse to answer the first annual family income question are asked a series of bracketing questions to obtain the approximate amount.
8. Child-Reported Parental Educational Attainment	The respondent is asked to report on the highest level of education achieved by his/her residential parents (i.e., while growing up).
9. Impairment	<p>Adults: The World Health Organization Disability Assessment Schedule 2.0 12-question self-administered questionnaire is a generic assessment instrument for health and disability that covers six domains: cognition, mobility, self-care, getting along, life activities, and participation. Items are rated from none, mild, moderate, severe, to extreme or cannot do, indicating difficulty over the past month.</p> <p>Children and Adolescents: The Columbia Impairment Scale is a 13-item self- or parent-reported instrument that measures four areas of functioning: interpersonal relations, broad psychopathological domains, functioning in job or schoolwork, and use of leisure time. Items are rated on a Likert scale ranging from 0 (no problem) to 4 (very big problem) indicating behavior at the present time.</p>
10. Broad Psychopathology (proposed new measure)	<p>Adults: The DSM-5 Level 1 Cross-Cutting Symptom Measure is a 23-item self-report or informant-rated questionnaire that assesses 13 domains that are important across psychiatric diagnoses. Each item inquires about how much (or how often) the individual has been bothered by the specific symptom during the past 2 weeks.</p> <p>Children and Adolescents: The Strengths and Difficulties Questionnaire is a parent or teacher report instrument that consists of 25 Likert-style questions that screen children for positive and negative attributes.</p>

Data Collection for Behavioral Healthcare

- Cameras
- Smart watches
- Smart home devices
- Smart phones
- Social media
- Other IoT Devices

Scale Therapy with IoT Audio Recordings



Conclusion

Scalable Therapeutics



Internet of Things

Future of Behavioral Healthcare

**UCSF Department of Psychiatry:
401 Parnassus Avenue
San Francisco, CA 94143**

**Michael Godoy:
(415) 235-9319
Michael.Godoy@ucsf.edu**