The Potential of “Big Data” in Personalized Mental Healthcare

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Mental Health among Youth in Switzerland

Abbildung 1: Anteil Personen mit schweren depressiven Symptomen im 2020

Abbildung 2: Anteil Personen mit schweren depressiven Symptomen im 2020 in Abhängigkeit des Alters

De Quervain et al. Universität Basel 2020
Personalized Mental Healthcare

• **Personalized Healthcare**
  Diagnostic, preventive or therapeutic interventions that are specifically and optimally to a particular individual

• **Big Data („health-related data“)**
  All data from a variety of sources that potentially describe the health status of an individual

• **Phenotype**
  Set of observable characteristics of an individual resulting from the interaction of its biology with the environment
Data-Driven Phenotypes in Mental Illness

Prediction of:
- Course of illness
- Poor outcomes/ risks
- Treatment response

Identification of:
- Mechanisms of disease
- Treatment targets
Example „Early Psychosis“

- Premorbid
- Prodromal: Clinical High Risk
- Psychotic
- Remitted
- Psychotic

Onset of illness | Onset first episode | Onset second episode

Conversation rate of 25-35%

Fusar-Poli et al. *JAMA Psychiatry* 2016
Biological Phenotyping to Predict Psychosis Onset

Example „Suicidal Behaviour“

Mean frequency of suicide attempts at age 15: 4-5%

Mean suicide rate at age 15: 0.004-0.005%

Data-Driven Suicide Prediction in Adult Veterans

**Predictors:** Socio-demographics, Army career, characteristics of the index visit, prior clinical factors, crime codes (victimization and perpetration), and contextual factors (e.g., unit-level characteristics, registered weapons).
Prediction Models for Suicide Attempts and Deaths
A Systematic Review and Simulation

Figure 2. Illustration of Implementing a Suicide Prediction Model

Belsher et al. JAMA Psychiatry 2019
Most psychiatric symptoms show remarkable instability over time.

Within a mental disorder, the prediction of acute crisis is one of the most important tasks.

**Example: Suicidal thoughts!**
Ecological Momentary Assessment of Affect and Suicidal Thoughts

Strong intraindividual variability in both adolescents’ affective and suicidal states!
SMART – Suicidality Monitoring in At-Risk Teens

Current Study at UPD Bern

EARS: Effortless Assessment of Risk States
- Keyboard Logger
- Geolocation
- Phone Usage
Potential of Passive Mobile Sensing for Prevention and Intervention

Tost et al. Nature Neuroscience 2019
Thank you for Your Attention! Questions?

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