

Will M-health Technology Soon Play a Role in Treating Depression or Preventing Relapse?



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Queen's University School of Medicine

Research Interests: depression across a woman's lifecycle; depression and anxiety in cancer; digital technologies for wellness monitoring and relapse prevention in depression

Brain Health Wellness Tip: Stay connected with nature, leverage opportunities to be outdoor



M-Health and Depression

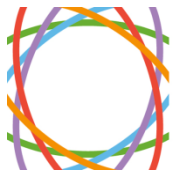
Will mobile health technology soon play a role in treating depression or preventing relapse?"

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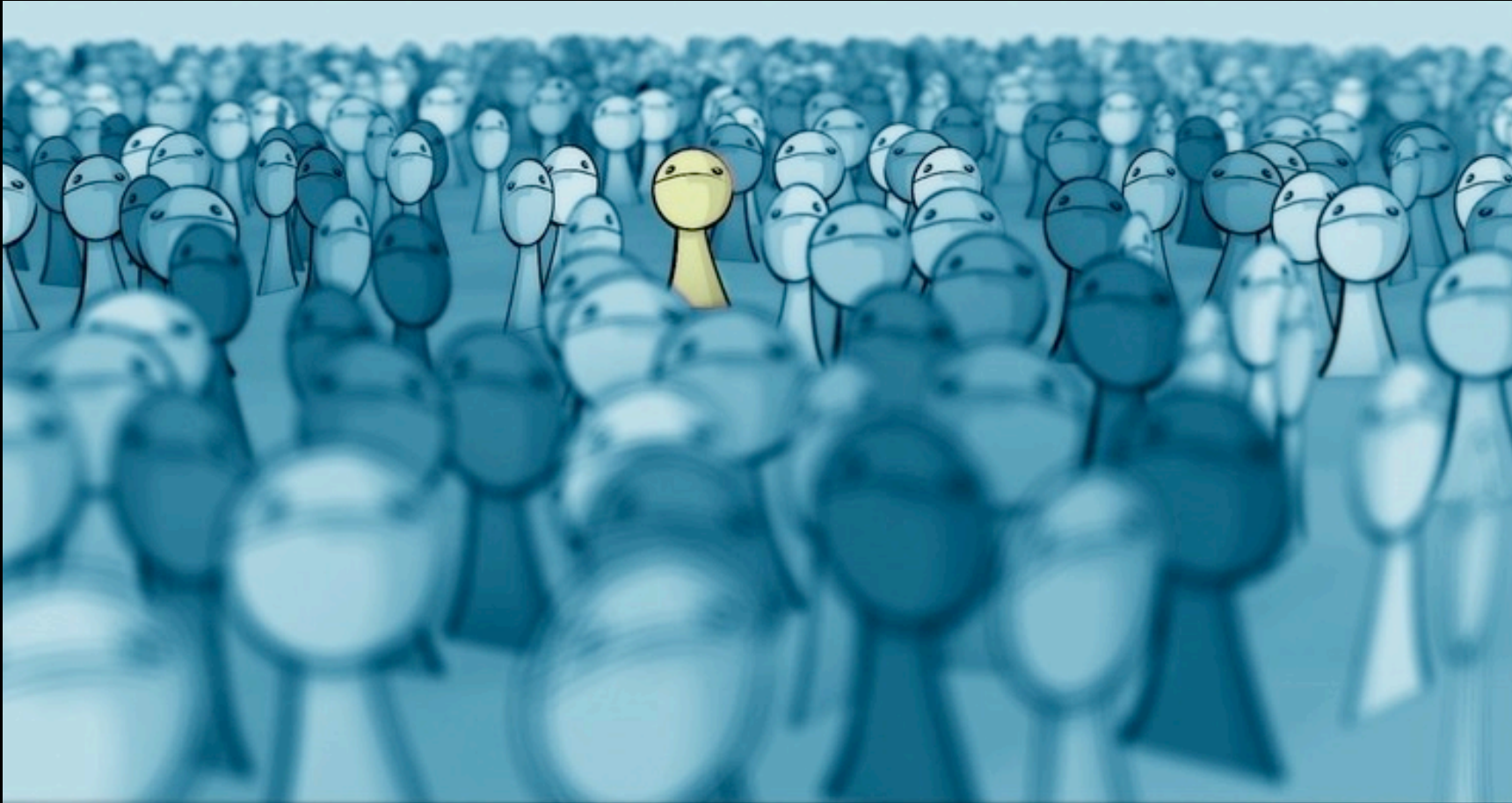
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WHAT MAKES DEPRESSION...YOUR OWN DEPRESSION?



CAN-BIND Integrated Platforms



Clinical Outcomes

- Clinician administered scales
- Patient-reported outcomes
- Electronic data capture



Molecular Profiling

- Gene expression
- SNP analysis
- GWAS
- SRM-MS
- Whole genome miRNA
- Redox, methylation



Preclinical

- Rodent anhedonia models
- Zebrafish high-throughput
- Pharmacology & electrophysiology



EEG

- Resting state, eyes open
- Resting state, eyes closed
- Various functional tasks



Neuroimaging

- T1-weighted anatomical scan
- DTI series
- T2-weighted BOLD EPI series
- BOLD EPI series during tasks



Data Science

- Statistical tools coupled with machine learning tools to create biomarker models



Knowledge Translation

- Public and provider education
- Patient Advisory Committee
- Social media strategy
- Implementation science

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M-Health

- Behavioural Sensing
- Ecological momentary assessments



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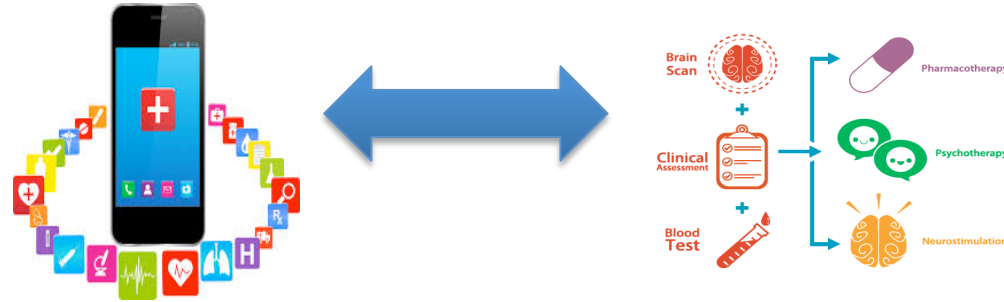
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The Story of Embrace...



What Can We Expect from M-Health?



- **Help us collect community and clinical health data**
 - EMR, clinical database
- **Help us deliver & manage health care**
 - Enhancement of measurement-based care
- **Help us generate real-time data**
 - Behavioral or context-sensing measurements
 - Digital Phenotyping



CAN-BIND

Digital Phenotyping

- **Definition** - “Moment-by-moment quantification of the individual-level human phenotype *in situ* using data from personal digital devices”

- **Rationale** Individuals might leave behind a footprint of their health status through technology

Social media

Forums

Online communities

Wearable technologies

Mobile devices



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Incorporating Digital Phenotyping into 'Traditional Research'

- **Goal** - To better capture the lived experiences of individuals with depression and their interactions with the surrounding world...
 - With minimal external interference
 - While registering what leads to/follows key events
 - With active and passive data

Behavioral Sensing Measures



Number of steps



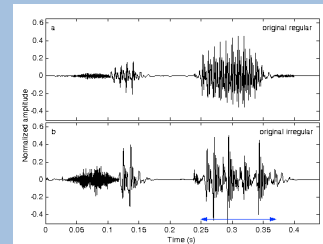
Number, type of communications

Google Plus Metrics: First Cut At Measuring Success

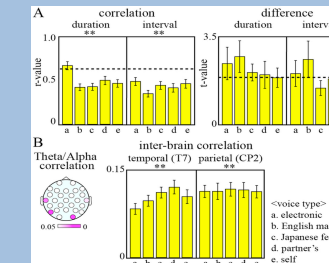
	Total	Own Posts	Reshared	
Posts	52	51	1	
Location	0	0	0	
Photos	18	18	0	
GIFs	1	1	0	
Videos	9	8	1	
Links	6	6	0	
Comments	1031	1028	3	
per post	12.57	12.69	3.00	Conversation Rate
likes	2381	2352	19	
per post	31.48	31.63	19.00	Applause Rate
Reshares	1461	1442	19	
per post	17.82	17.80	19.00	Amplification Rate

These metrics report activity and not outcomes. Look, ignore. Measure the KPIs below, understand what you do that improves them!

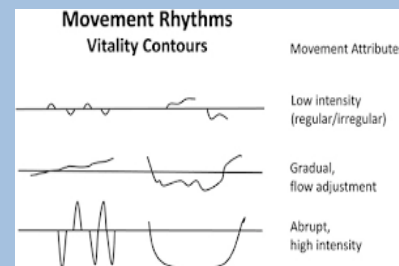
Duration of Speech



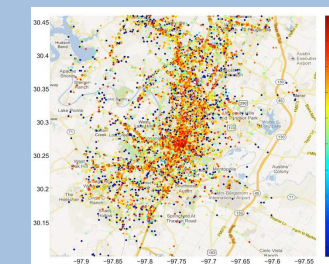
Rhythms of voice

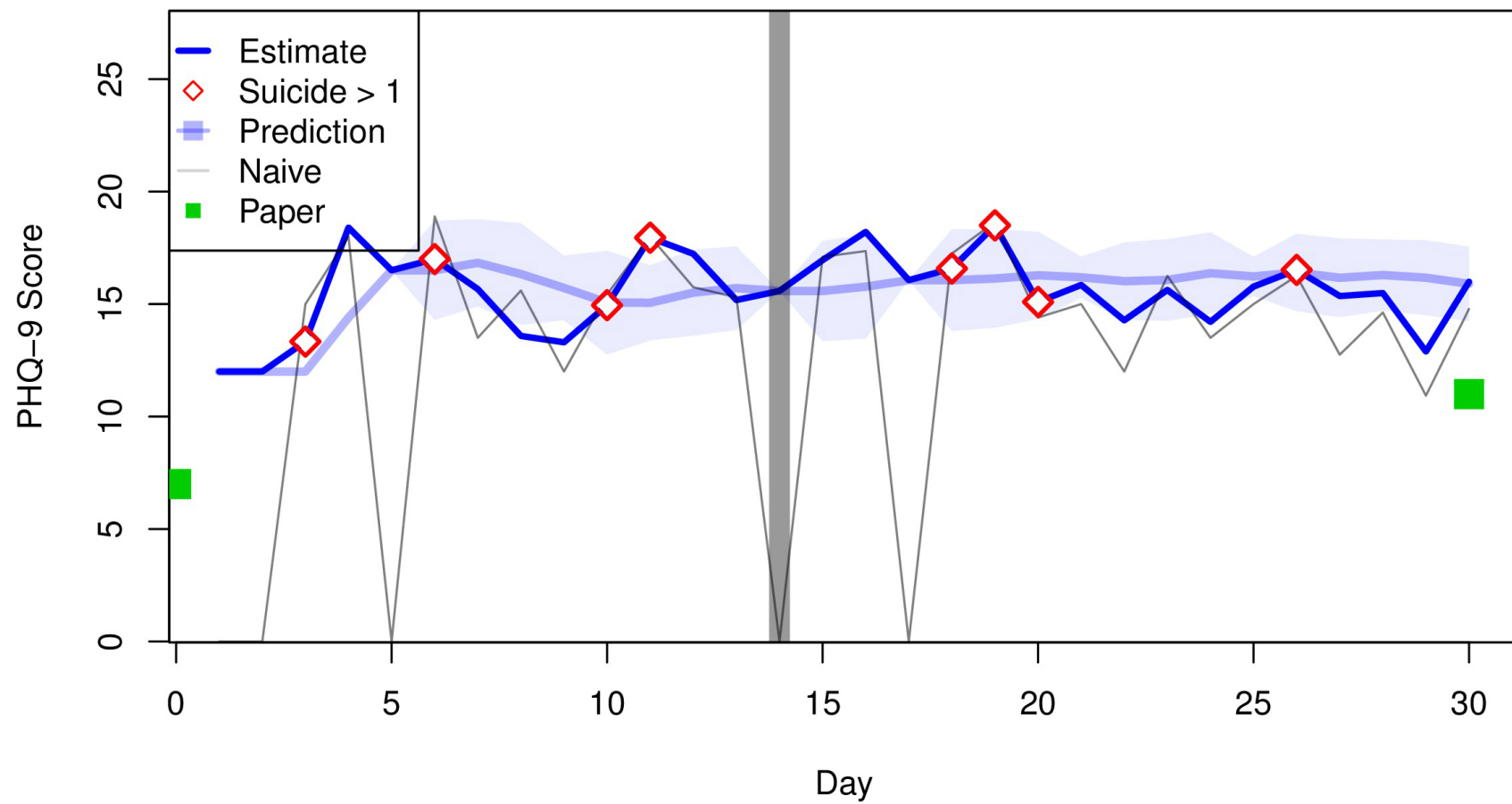


Rhythms of Movement



Location Entropy







Is M-Health Just a Hype?

Why M-Health still faces skepticism, challenges

- Health care providers, researchers are laggards.... not 'early adopters'
- Concerns surrounding privacy and confidentiality
- What are the appropriate metrics? Novel endpoints?
- Credibility and reliability issues - most mobile apps currently available in the market are NOT patient-centered or academic-oriented.

What is coming next?

- **Analyze data from the CAN-BIND Wellness study**
 - Digital phenotypes of sustained wellness or relapse over time
 - Look for variabilities within the same individual that could inform care and contribute to relapse prevention
 - **Develop and implement the M-Health strategy for the CAN-BIND validation study**
- **Partnerships with M-Health researchers beyond CAN-BIND**
 - Queen's Mobile Health Technology Consortium
 - EMBED Canada-China EMBC and KT/IS study
 - Digital Psychiatry Researchers
 - **Industry Partnerships**
 - Pharma interested in M-Health, Digital Health
 - App developers, start ups

Universities

- Dalhousie University
- McGill University
- McMaster University
- Queen's University
- Simon Fraser University
- University of British Columbia
- University of Calgary
- University of Guelph
- University of Ottawa
- University of Michigan
- University of Toronto

Health Science Centres

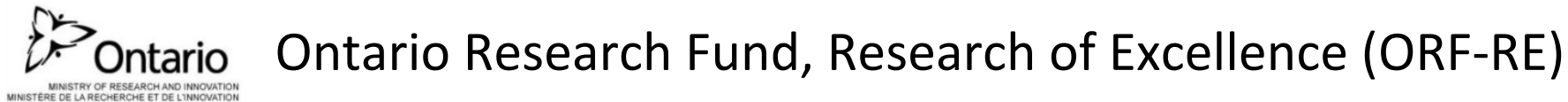
- Centre for Addiction and Mental Health
- Douglas Mental Health University Institute
- Hotchkiss Brain Institute & Mathison Centre for Mental Health Research and Education
- Providence Care & Kingston Health Sciences Centre
- Queen Elizabeth II Health Sciences Centre
- Rotman Research Institute, Baycrest
- Royal Ottawa Institute of Mental Health Research
- St. Michael's Hospital & Li Ka Shing Knowledge Institute
- St. Joseph's Healthcare Hamilton
- Sunnybrook Research Institute
- University Health Network & Krembil Research Institute
- Vancouver Coastal Health Research Institute

Partners

This CAN-BIND study is carried out in partnership with



Major Granting Agencies and Industry Partners



Additional Partners and Support

