Defeating dementia: progress and challenges on the road to 2025

Technology panel

Moderator: Vivienne Parry
Science Journalist & Broadcaster

#DefeatingDementia
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Vaibhav Narayan
Vice-President, Research Technology, Janssen Pharmaceuticals

#DefeatingDementia
Technology Solutions in Dementia

Risk Assessment, Early Diagnosis

Apps and devices to promote independent living and reduce care-giver burden

Track and Improve Brain Health and Resilience

Passive measures to track impact on daily function: demonstrate individual benefit, and improve adherence to interventions
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Brad O’Connor
CEO, Cogstate

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Not all primary care physicians are trained and/or confident in diagnosing cognitive impairment.

Cognitive assessment is time intensive.

Lack of consensus on the appropriate tools to detect and diagnose cognitive impairment.

Lack of support by global health systems... Coverage & Payment.
Leveraging Technology to Realise Effective Cognitive Assessment Tools for Primary Care

High sensitivity and specificity in AD and prodromal disease

Standardised, rapid, self administration and/or non-expert administration, EHR integration

Available in all languages and appropriate for any level of education

Measure impairment on single assessment but also measure change over time

Adoption in primary care & research studies, allowing payers to measure treatment effect data in individuals
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Dr Iain Simpson
Principal, QL Consulting

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Adherence

Lifestyle

- Cumulative Probability of Remaining AD-Free

<table>
<thead>
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<th>Time from Baseline, y</th>
<th>High physical activity + high diet score (range 6-9)</th>
<th>Low physical activity + high diet score (range 6-9) or high physical activity + low diet score (range 0-3)</th>
<th>Low physical activity + low diet score (range 0-3)</th>
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Medication

Adherence and tolerability of Alzheimer’s disease medications, a randomised controlled trial

- #1 Reason for discontinuation: adverse events
  - 56% of non-adherent patients
- #2 Reason for discontinuation: cost
  - 29% of non-adherent patients
- Adherence did not differ by type of acetylcholinesterase inhibitors
  - Donepezil 39%
  - Galantamine 53%
  - Rivastigmine 59%


Causes of Non Adherence in Chronic Disease

- Patients’ personal connection with a pharmacist or pharmacy staff
- How easy it is for them to afford their medications
- The level of continuity they have in their health care
- How important patients feel it is to take their medication exactly as prescribed
- How well informed they feel about their health
- The extent to which their medication causes unpleasant side effects
Technology - Measure and Support

Smartphones/watches

- Smartphones/watches
- Wearables/ Connected Technology
- Pervasive/ Ubiquitous Computing

**Smartphones/watches**
- Smartphone
- Watch

**Wearables/ Connected Technology**
- Wearable devices
- Actigraphy devices
- Heart rate monitors
- Blood pressure monitors
- Sleep tracking

**Pervasive/ Ubiquitous Computing**
- Smart Pill Dispensers
- Data collection and feedback

**Reward and incentivisation**
- Smart Pill
- Smart Pill Dispensers

**Data collection and feedback**
- Phone sensors
- Localization sensors
- Walking sensors
- Door sensors
- Medication tracking device

**Healthy Prize**
- Mobile app
- Website

**https://www.actigraphcorp.com**

**https://www.withings.com**

**https://www.ohsu.edu/xd/research/centers-institutes/orcatech/**

**https://www.irc-sphere.ac.uk/research**

**https://healthprize.com/**

**https://en.wikipedia.org/wiki/Pill_reminder**

**https://www.proteus.com**

**https://www.umotif.com**

12/14/2018

Iain Simpson
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Maxine Mackintosh
Doctoral Student, Alan Turing Institute, UCL

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Dr Peter Peumans
Senior Vice President, Life Science Technologies, IMEC

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Research

- Spatial omics
- Invasive neuroprobes
- Brain-on-chip
- BMI

Commodity semiconductor manufacturing

Clinical/Care

- Point-of-Need Dx
- BMI
- Wristbands
- Patches

Commodity computing and data

Clinical Disease Stage

- Abnormal
- Amyloid (CSF/PET)
- Tau-mediated neuronal injury (CSF)
- T2-weighted structural (MRI)
- Cognition
- Clinical function

Stage:
- Normal
- Preclinical
- MCI
- Dementia
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Questions?

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