The Virtual Assessment in Lewy Body Dementia: Pandemic and Beyond

Understanding Current Research on Virtual Assessment

An LBDA Research Centers of Excellence Webinar

April 8, 2021

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Housekeeping Notes

- The activity is being recorded.

- All attendee mics are automatically muted.

- If you have questions during the presentations, please submit them via the Q&A function

Welcome

Today's event was organized by the Clinical Care and Professional Education Working Group for LBDA's Research Centers of Excellence (RCOE) Program

Co-Chairs/Course Directors

- Katherine Amodeo, MD, Westchester Medical Center, Poughkeepsie, NY

- Jennifer Goldman, MD, MS, Shirley Ryan AbilityLab and Northwestern University Feinberg School of Medicine, Chicago, IL

Support Acknowledgement

This activity was supported by an educational grant from

Acadia Pharmaceuticals Inc.

Accreditation Statement

In support of improving patient care, this activity has been planned and implemented by the Postgraduate Institute for Medicine and Lewy Body Dementia Association. Postgraduate Institute for Medicine is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

Designation Statement

Physicians

Postgraduate Institute for Medicine designates this internet live activity for a maximum of 1.0 *AMA PRA Category 1 credit™*. Physicians should claim only the credits commensurate with the extent of their participation in the activity.

Allied healthcare professionals

Participants will receive a Certificate of Attendance stating this program is designated for 1.0 *AMA PRA Category 1 Credit™*. This credit is accepted by the AANP and the AAPA.

- ABPN Approval for Neurologists and Psychiatrists The American Board of Psychiatry and Neurology has reviewed the webinar "Understanding Current Research on Virtual Assessment" and has approved this program as part of a comprehensive CME program, which is mandated by the ABMS as a necessary component of Maintenance of Certification.

Disclosures

Jennifer Goldman, MD, MS *Contracted research:* Acadia Pharmaceuticals Inc., Michael J. Fox Foundation, Parkinson's Foundation. *Honoraria:* International Parkinson and Movement Disorders Society, Medscape, Parkinson's Foundation

Katherine Amodeo, MD *Contracted research*: Genentech Roche Ltd., EIP Pharma Inc, Michael J. Fox Foundation, NINDS, Acadia Pharmaceuticals Inc, and Biogene through July 2020.

Dag Aarsland, MD *Contracted research*: Evonik, Sanofi. Roche, Astra-Zeneca, H. Lundbeck, Novartis Pharmaceuticals, Biogen, and GE Health. *Consultant:* H. Lundbeck, Eisai, Heptares, Mentis Cura

Andrew Owens, PhD No relevant relationships to disclose.

Agenda

- Followed by Panel Discussion with Questions and Answers

Educational Objectives

At the conclusion of the activity, learners should be able to:

- Review research (past and on-going) in the field of virtual assessment in LBD and related disorders.

- Discuss the application of these findings to clinical practice and future trials in LBD.

Prof Dag Aarsland, Professor of Old Age Psychiatry, consultant neuropsychiatrist & Head of Department of Old Age Psychiatry, Institute of Psychiatry, Psychology & Neuroscience, King's College London

Dr Andrew Owens, Postdoctoral Research Associate, Department of Old Age Psychiatry, Institute of Psychiatry, Psychology & Neuroscience, King's College London

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How can technology help us improve diagnosis & treatment of DLB?

- Dementia with Lewy bodies (DLB) is the second most common form of dementia after Alzheimer's disease (AD), accounting for 10-15% cases (McKeith et al, 2005)
  - Yet DLB remains a neglected area of study & is underdiagnosed
- DLB's core features include;
  - **cognitive decline**
  - **fluctuating cognition & alertness**
  - **recurrent visual hallucinations**
  - **REM sleep behaviour disorder (RBD)**
 - **parkinsonism**

McKeith *et al*, 2020
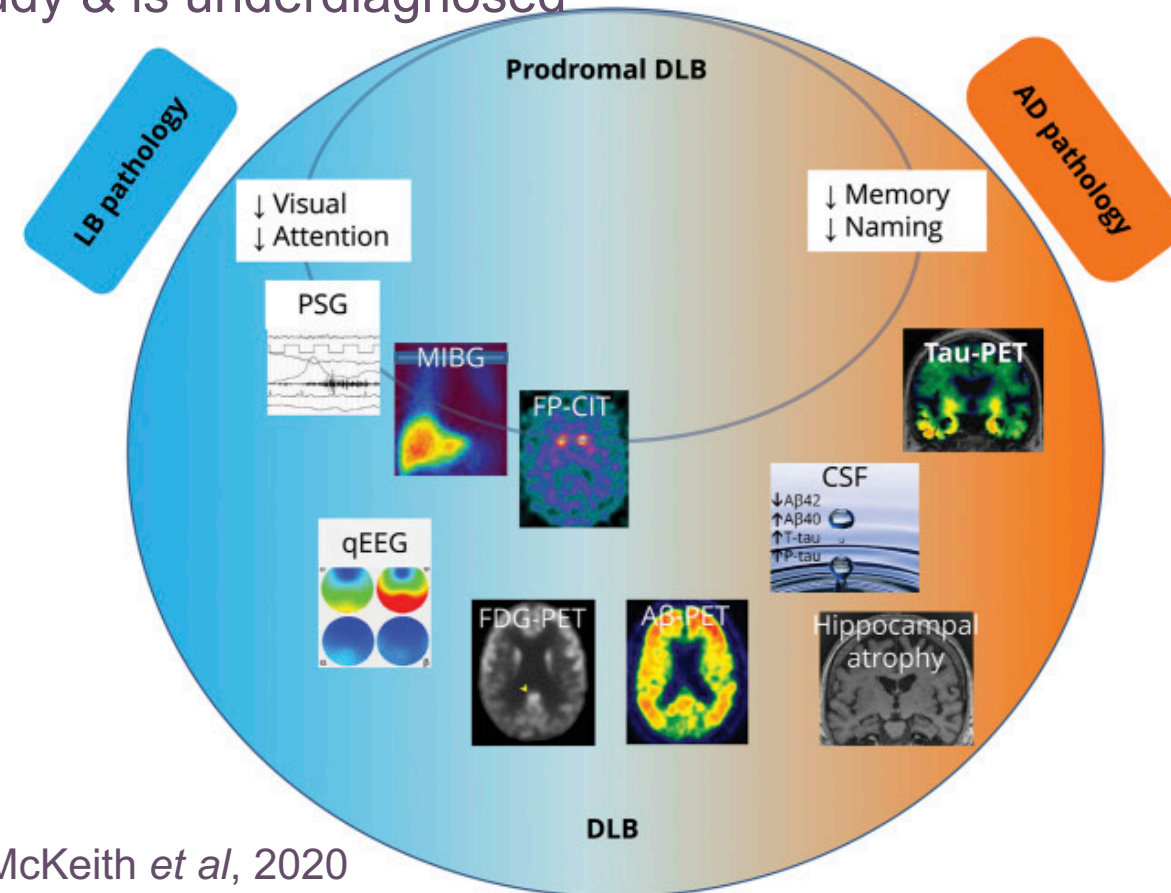
How can technology help us improve diagnosis & treatment of DLB?

- DLB has poor prognosis & diagnosis can be complicated by its initial similar presentation to AD

- There are diagnostic methods used for DLB, such as;
  - DAT scans, MIBG, PET or CSF to differentiate DLB from AD

- But these are expensive & invasive

McKeith *et al*, 2020
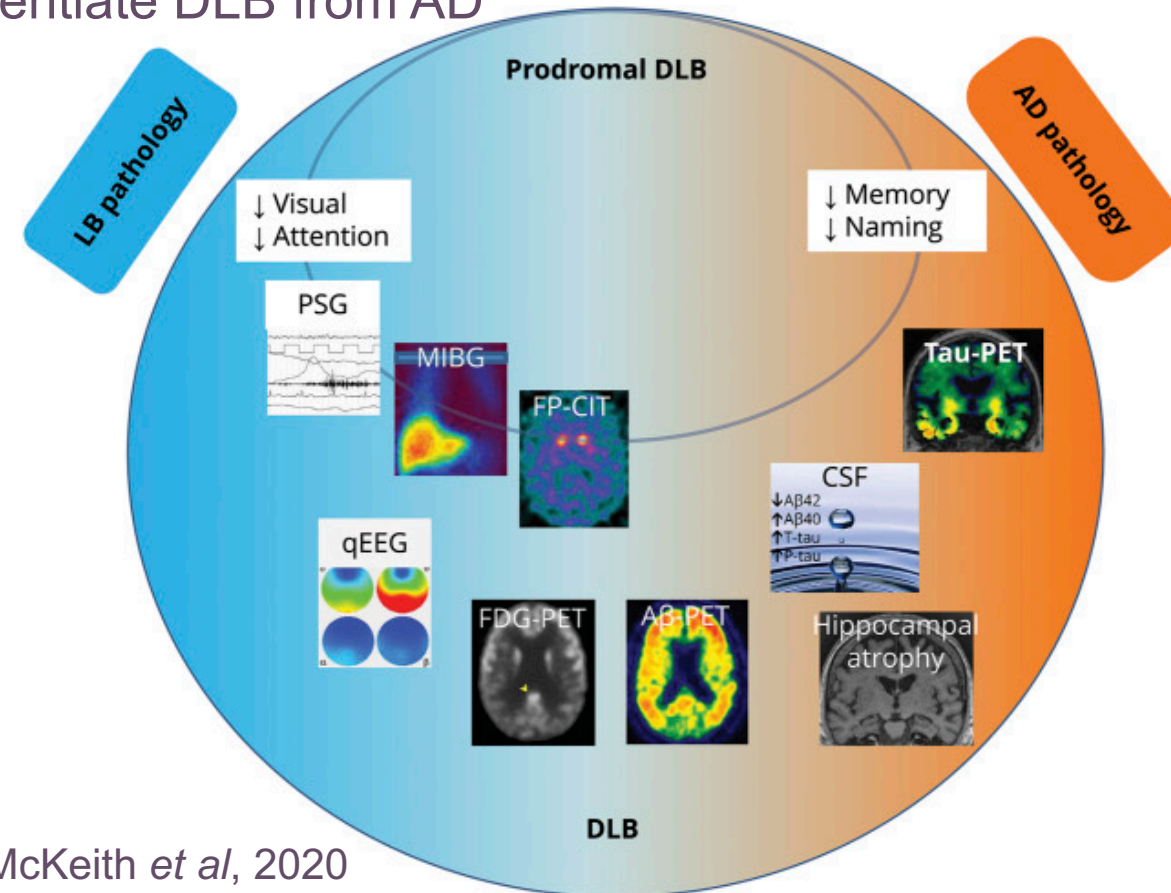
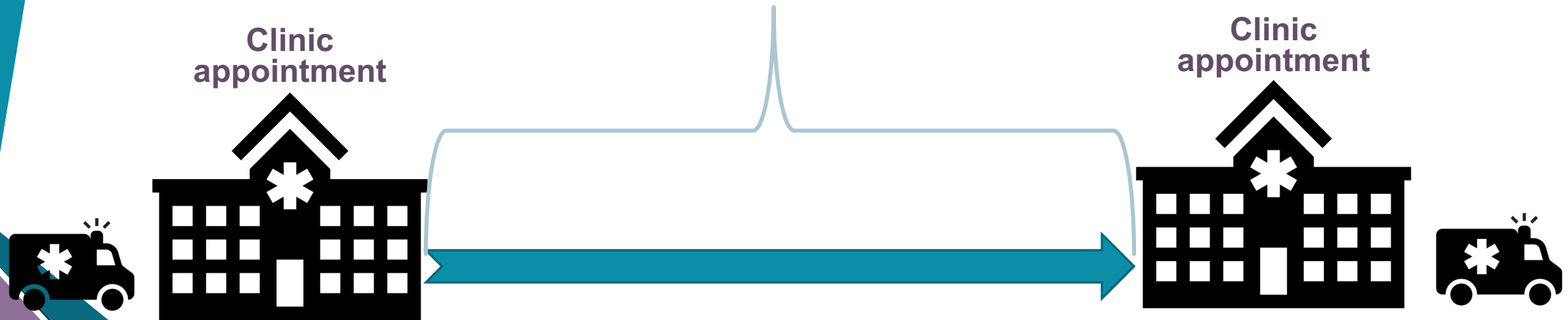# How can technology help us improve diagnosis & treatment of DLB?

- **Remote measurement technologies** (RMTs), such as, **smartphones, wearable sensors, apps & home-based monitoring sensors**, can remotely & passively (i.e., requiring no effort from the patient) record changes in health parameters, such as;

  o mood, cognition, gait, function

- RMTs offer the opportunity of frequent & often continuous monitoring, which is particularly relevant to record symptoms of DLB that are difficult to capture in clinic, such as;

  o fluctuating cognition/alertness & visual hallucinations

- RMTs can also tell us where the user was & what they were doing (e.g., activities of daily living) during data-collection
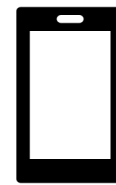
How can technology help us improve diagnosis & treatment of DLB?

- ✓ Remote & passively assessment of changes in health parameters

- ✓ Frequent & often continuous monitoring

- ✓ Where the user was & what they were doing during data-collection

RMTs can potentiate the currently dormant periods between clinic visits

Clinic appointment

Clinic appointment

How can technology help us improve diagnosis & treatment of DLB?

- RMTs allow us to measure health & disease status in the real-world

    - e.g., collecting large amounts of data over numerous time points VS clinic appointments that occur months apart

- This digital information can help us move away from a 'diagnose & treat' to a '**predict & pre-empt**' model of care

    - **allowing people to live independently for longer**

Selecting Remote Measurement Technologies to Optimize Assessment of Function in Early Alzheimer's Disease: A Case Study

Andrew P. Owens[1*†], Chris Hinds[2†], Nikolay V. Manyakov[3†], Thanos G. Stavropoulos[4†], Grace Lavelle[1†], Dianne Gove[5†], Ana Diaz-Ponce[5†] and Dag Aarsland[1†] on behalf of The RADAR-AD Consortium[†]

[1] Department of Old Age Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom, [2] Big Data Institute, University of Oxford, Oxford, United Kingdom, [3] Clinical Insights & Experience, Janssen Research & Development, Beerse, Belgium, [4] Centre for Research & Technology Hellas, Information Technologies Institute, Thessaloniki, Greece, [5] Alzheimer Europe, Luxembourg, Luxembourg

The Role of Heart Rate Variability in the Future of Remote Digital Biomarkers

Andrew P. Owens[1,2*] on behalf of the RADAR-AD Consortium

[1] Department of Old Age Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom, [2] The Remote Assessment of Disease and Relapse – Alzheimer's Disease (RADAR-AD) Consortium, London, United Kingdom

Remote Brain Health Clinic

Remote Brain Health Clinic

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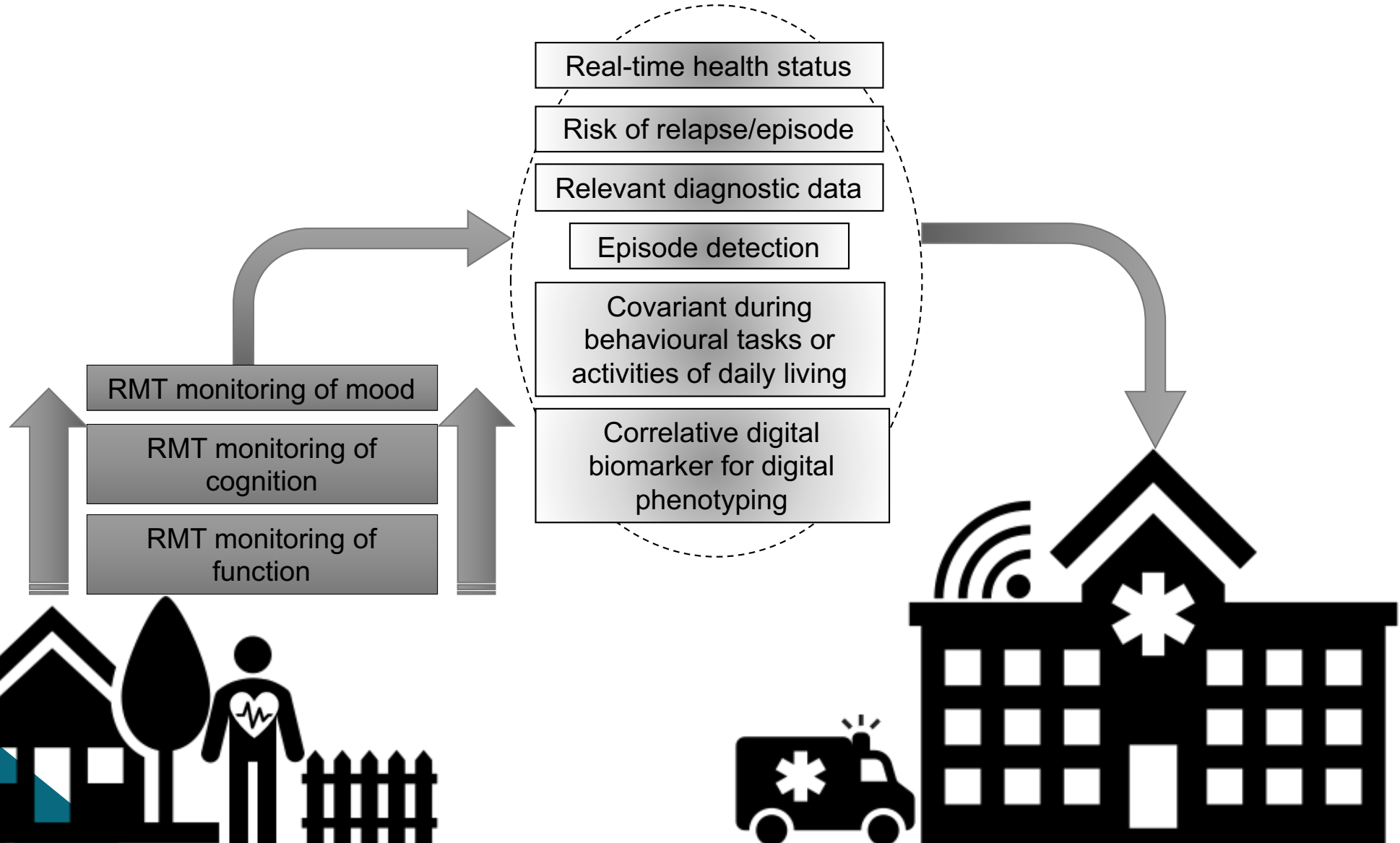
- COVID-19 has heighted the need for remote cognitive assessment because older people are at higher risk from COVID-19, due to;

  - existing physical & mental health conditions

  - smaller social networks, on whom they may be reliant

- Therefore, older adults are particularly recommended to minimize infection risk by using social distancing measures

- **Yet the importance of a timely diagnosis of dementia remains unchanged, or has arguably _increased_ due to the association between COVID-19 & dementia** (Kuo et al, 2020)

Check for updates

Implementing Remote Memory Clinics to Enhance Clinical Care During and After COVID-19

Andrew P. Owens[1]*, Clive Ballard[2], Mazda Beigi[3], Chris Kalafatis[1,3], Helen Brooker[2,4], Grace Lavelle[1], Kolbjørn K. Brønnick[5,6], Justin Sauer[1,3], Steve Boddington[3], Latha Velayudhan[1] and Dag Aarsland[1,3,5]

[1] Department of Old Age Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom, [2] The University of Exeter Medical School, The University of Exeter, Exeter, United Kingdom, [3] Psychological Medicine and Older Adults, South London & Maudsley NHS Foundation Trust, London, United Kingdom, [4] Ecog Pro Ltd, Bristol, United Kingdom, [5] SESAM—Centre for Age-Related Medicine, Stavanger University Hospital, Stavanger, Norway, [6] Department of Public Health, Faculty of Health Sciences, University of Stavanger, Stavanger, Norway

Remote Brain Health Clinic

- Unintended consequences of social distancing are;

  ○ reduced physical activity & social interaction

  ○ increased loneliness & depression

    ➤ *all* factors associated with more rapid cognitive & functional decline - compounding the burden on individuals & healthcare services (Steinman et al, 2020)

- There is also the dilemma faced by many patients;

  ○ concerns about their memory & wanting to see a clinician **VS** concerns of exposing themselves to risk of contracting COVID-19 (Wang et al, 2020)

Check for updates

Implementing Remote Memory Clinics to Enhance Clinical Care During and After COVID-19

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[1] Department of Old Age Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom, [2] The University of Exeter Medical School, The University of Exeter, Exeter, United Kingdom, [3] Psychological Medicine and Older Adults, South London & Maudsley NHS Foundation Trust, London, United Kingdom, [4] Ecog Pro Ltd, Bristol, United Kingdom, [5] SESAM—Centre for Age-Related Medicine, Stavanger University Hospital, Stavanger, Norway, [6] Department of Public Health, Faculty of Health Sciences, University of Stavanger, Stavanger, Norway

Remote Brain Health Clinic

- **Remote assessments can potentially resolve this dilemma**
  - & provide an opportunity to re-evaluate how current methods can be adapted for remote assessment

- Notwithstanding several challenges;
  - internet access
  - computer skills
  - limited evidence base
  - regulatory & data protection issues

Our Initial Remote Brain Health Clinic Model in Response to COVID-19

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Video interview

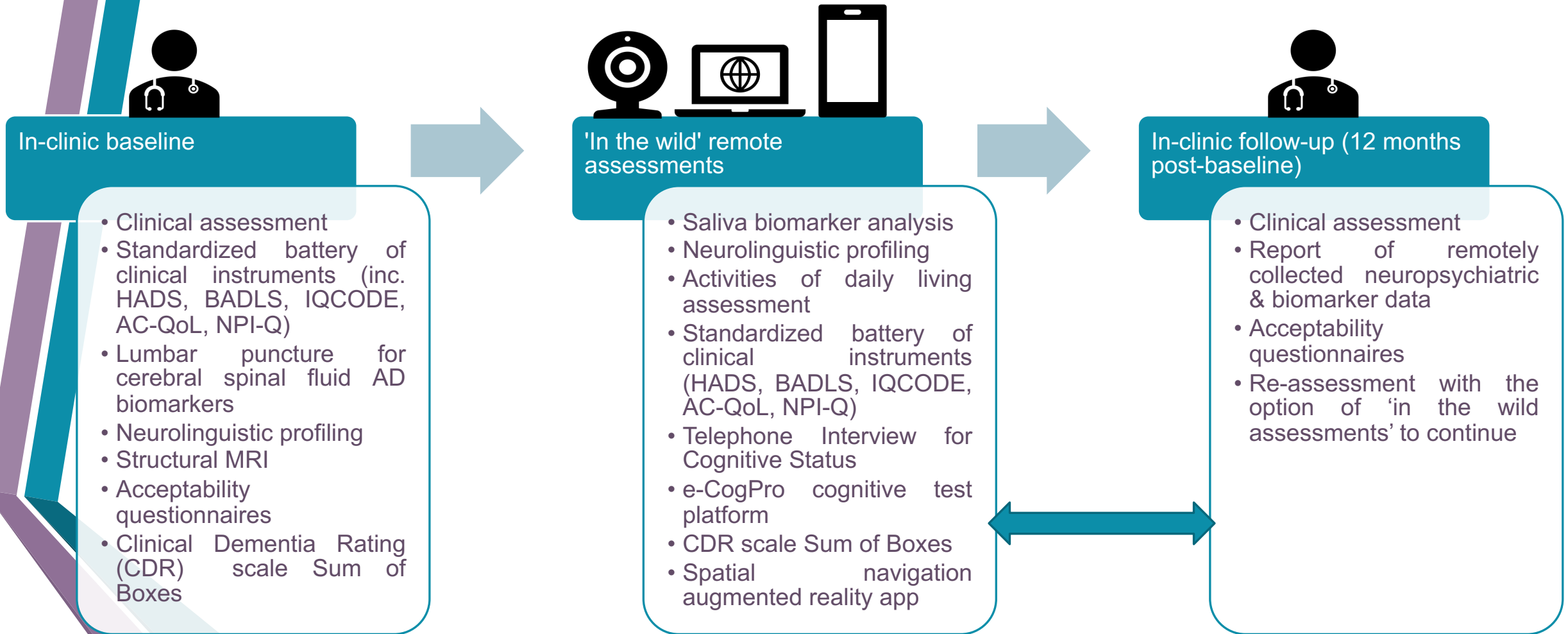- Via teleconference platform to get acquainted with patient/carer & establish rapport.

- Interview includes, unstructured history

Level 1

- Patients can complete cognitive tests (e.g., MMSE, MOCA; ACE) & other questionnaires (e.g., IQCODE, HADS) via teleconference platform.

- The 'share screen' option can be used for visual tests with high definition

- Level 1 can also use remote neuropsychological assessments

Level 2

- Alternatively, using level 2 technologies, i.e., digitized versions of these tests/questionnaires are available

- Level 1 & 2 strategies will usually be sufficient to make a diagnosis of dementia

Level 3

- Level 3 technology is required for pre-dementia stages, i.e., MCI & SCD.

- More sophisticated devices that accurately measure cognition & function are used

Our Second Remote Brain Health Clinic Model

In-clinic baseline
- Clinical assessment
- Standardized battery of clinical instruments (inc. HADS, BADLS, IQCODE, AC-QoL, NPI-Q)
- Lumbar puncture for cerebral spinal fluid AD biomarkers
- Neurolinguistic profiling
- Structural MRI
- Acceptability questionnaires
- Clinical Dementia Rating (CDR) scale Sum of Boxes

'In the wild' remote assessments
- Saliva biomarker analysis
- Neurolinguistic profiling
- Activities of daily living assessment
- Standardized battery of clinical instruments (HADS, BADLS, IQCODE, AC-QoL, NPI-Q)
- Telephone Interview for Cognitive Status
- e-CogPro cognitive test platform
- CDR scale Sum of Boxes
- Spatial navigation augmented reality app

In-clinic follow-up (12 months post-baseline)
- Clinical assessment
- Report of remotely collected neuropsychiatric & biomarker data
- Acceptability questionnaires
- Re-assessment with the option of 'in the wild assessments' to continue
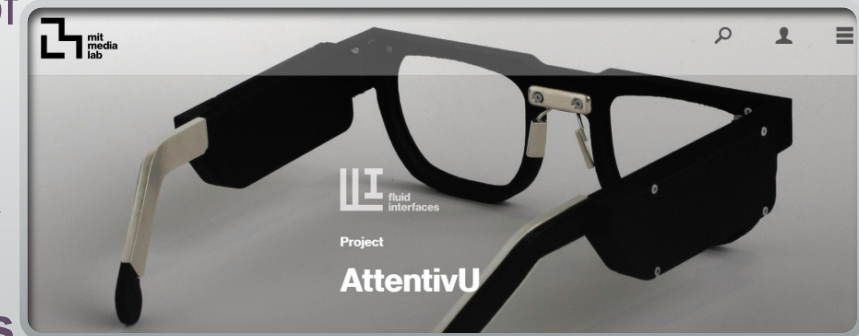
Our Second Remote Brain Health Clinic Model

- EEG is very useful for clinical & research purposes in DLB, particularly for defining distinct neurophysiological signatures

- However, these studies are typically lab-based & for short epochs

  - neglecting the opportunity to collect better-powered & contextualised data using RMT-based EEG

- In collaboration with MIT, we are running feasibility study in our remote brain health clinics examining the deployment of the *AttentivU* remote EEG & electrooculogram in MCI patients

  - with a view to **early differentiation of DLB from AD & capturing high resolution EEG signatures of DLB-related fluctuation cognition & visual hallucinations**

Our Second Remote Brain Health Clinic Model

- Idiopathic REM sleep behaviour disorder (iRBD) is a strong early indication of subsequent phenoconversion to Parkinson's disease (PD) or DLB

- **RBD occurs in ~76% of DLB cases** (Ferman et al, 2011)

- The **DREEM headband** is a **remote polysomnography** device & features embedded deep learning automatic sleep-staging algorithms & physiological signal acquisition

- In collaboration with DREEM, we are using the DREEM headband in early-to-moderate dementia to capture remote sleep data
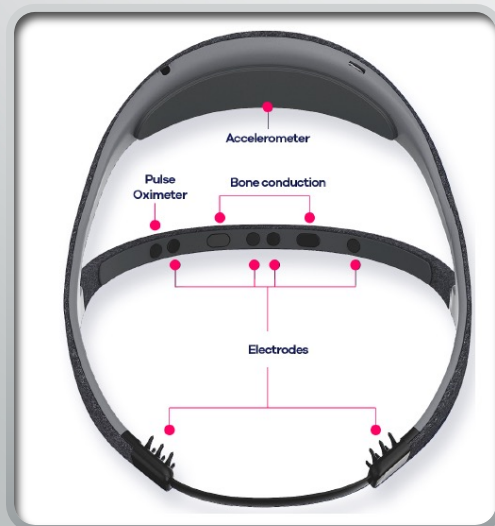
RMTs can gather central & peripheral digital biomarkers relevant to DLB

EEG/PSG: RBD, visual hallucinations, resting state, cognitive fluctuation, fatigue

ECG: orthostatic intolerance, HRV, fatigue

Sweat rate: anhidrosis, hyperhidrosis

Blood pressure: orthostatic hypotension, postprandial hypotension, nocturnal blood pressure profile

Gait/posture: delineate if falls are due to motor impairment or orthostatic intolerance

EGG: examine vagal & enteric involvement in GI symptoms

Conclusions/Discussion Points

Remote measurement technologies;

- ✓ Can enhance current clinical practice that relies on face-to-face, subjective self-reporting

- ✓ Negate patients & carers commuting to clinics as often

- ✓ Can potentially help diagnosis & symptom management

- ✓ Collect clinically relevant data in-between clinic appointments

- ✓ Offer valuable insights into disease progression & treatment responses over time

- ✓ Can range from standardised low-cost telephone interviews, to consumer grade wearables & bespoke apps or sensors

- ✓ Aid the evolution of current "diagnose & treat" care models to a "predict & pre-empt" approach

Panel Discussion and Q&A

Moderator:

Katherine Amodeo, MD

Panelists:

Dag Aarsland, MD

Andrew Owens, PhD

Thank you!

- A follow up email will be sent to you at the end of this activity.

- Please complete the evaluation using the instructions in that email.

- After you complete the evaluation, you may download and print the CME credit/Certificate of Participation or save it to your computer in your files.

CME Activities

- Webinar Series:
  - The Virtual Assessment in Lewy Body Dementia: Pandemic and Beyond
    - May 27, 2021: Impact of COVID-19 in those with LBD
- Medscape and LBDA collaboration
  - On demand: An Introduction to Lewy body dementia
  - More Medscape partnerships in development

Watch your inbox for more information about these activities!

LBDA's Mission

Through outreach, education and research, we support those affected by Lewy body dementias, their families and caregivers.

We are dedicated to raising awareness and promoting scientific advances.

www.lbda.org