National Innovation Centre for Ageing

Digital 1: A Digital Overview in relation to Older People

Michael Catt

11.20 – 11.35

I-care about frailty,

Tuesday 4th September, 9am-4.30pm, Newcastle Racecourse, Gosforth

Newcastle University

MRC Medical Research Council

National Innovation Centre for Ageing

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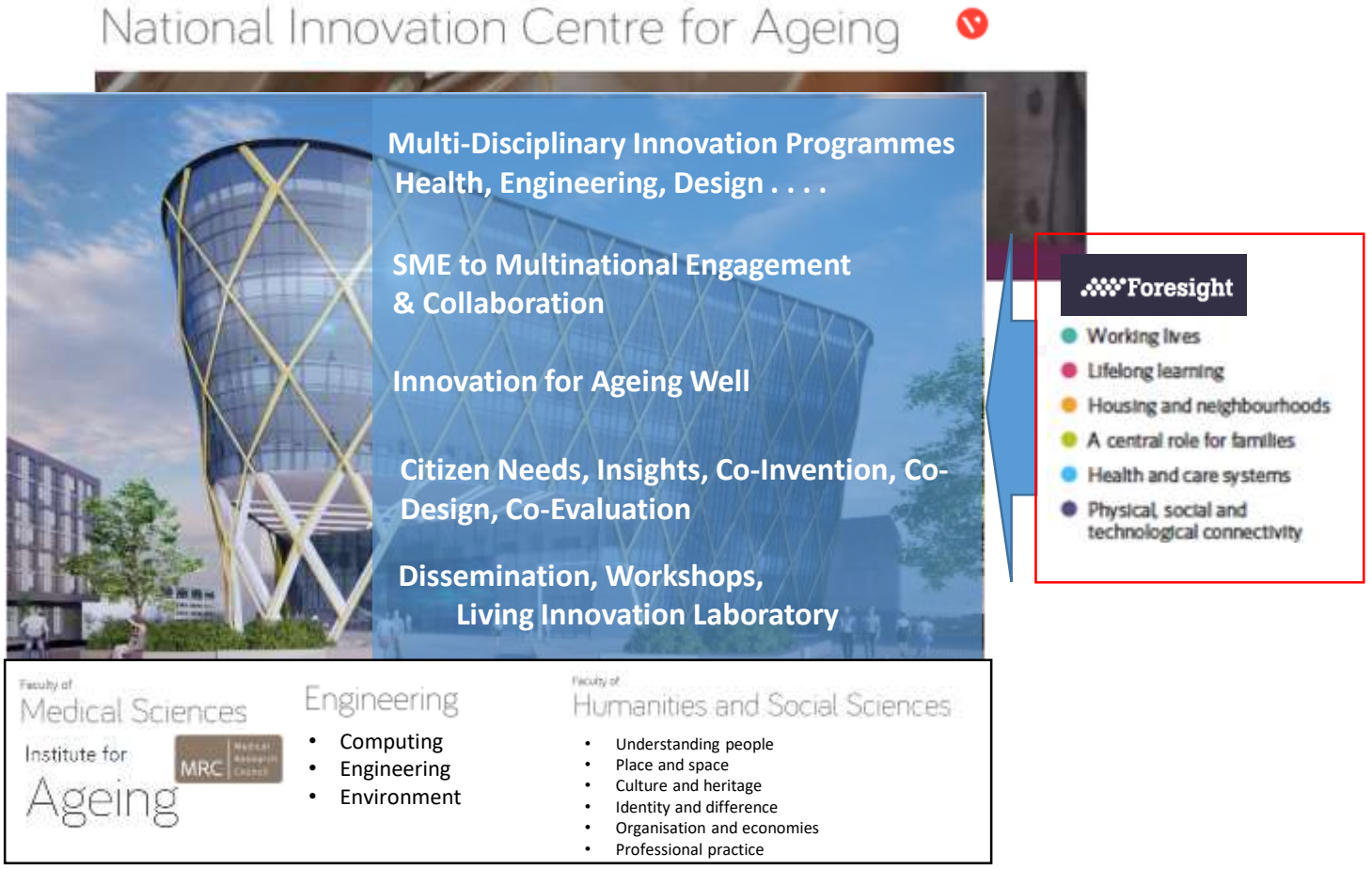
NICA

NIHRIO

NICD

Industry

Other Partners



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Multisector Interest

- Economics & Finance
- Housing & Home
- Employment & Work
- Government, Civics & Community
- Retail, Consumer Goods & Services
- Utilities
- Social & Community Services
- Third Sector
- Recreation
- Architecture, Planning & Landscape
- Environment & Pollution
- Transport
- Education & Learning
- Digital, Communication, Services & Media
- **Health & Wellbeing**

Newcastle University Vice-Chancellor and President, Professor Chris Day

MRC Medical Research Council

Department for Business, Energy & Industrial Strategy

Newcastle University UK | Malaysia | Singapore

Institute for Ageing

National Innovation Centre for Ageing

the IMAGINE series

- Future Thinking: Combining evidence synthesis/horizon scanning with patient & public insight to stimulate research and innovation into high priority areas - addressing key challenges and unmet needs

Horizon Scanning & Evidence Synthesis

Citizen Insight and Knowledge Exchange

Influence funding priorities and industry/business to stimulate further research & innovation

Newcastle University UK | Malaysia | Singapore

NHS National Institute for Health Research | Innovation Observatory

Voice™

Institute for Ageing

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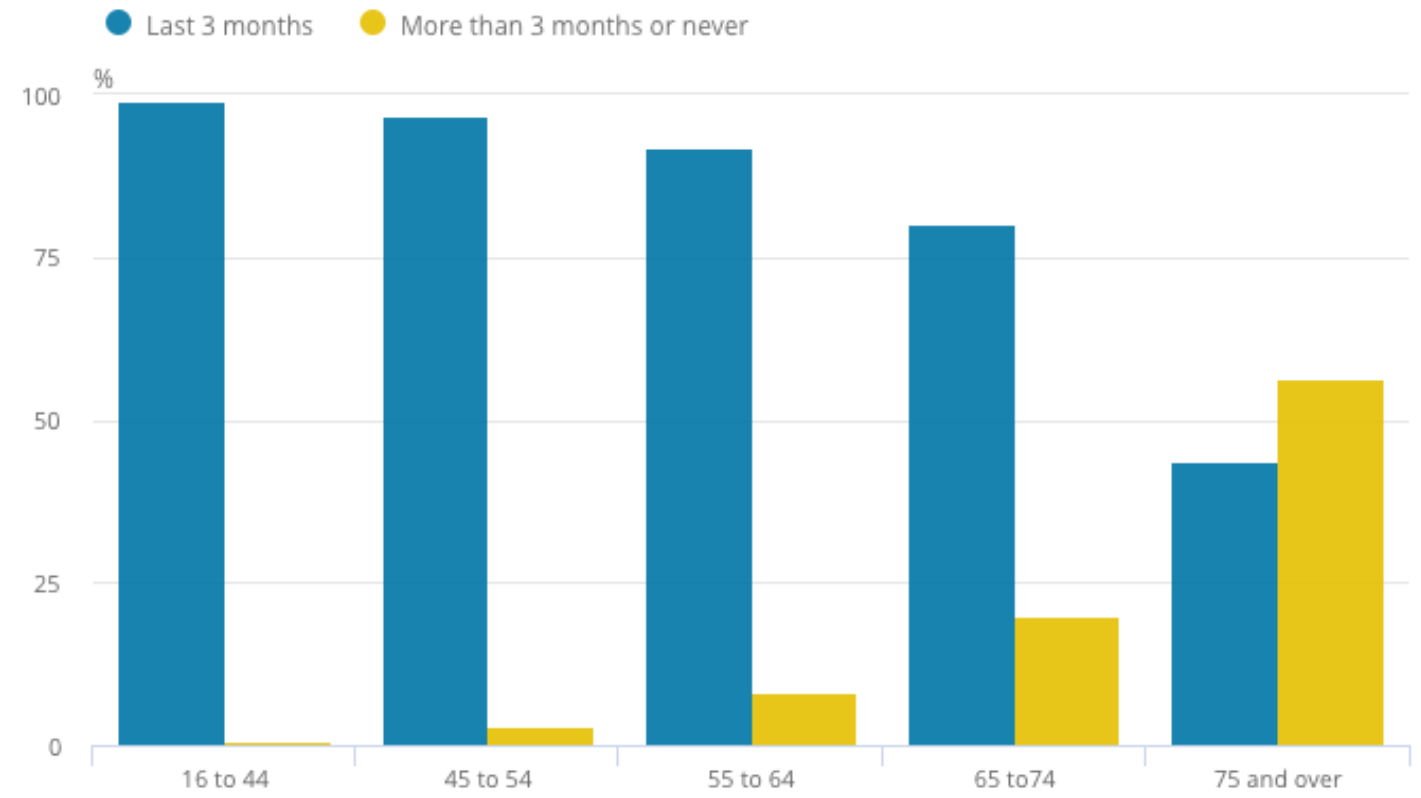
Figure 1: Internet users by age group, 2018, UK



Source: Office for National Statistics

https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2018
Release date: 31 May 2018

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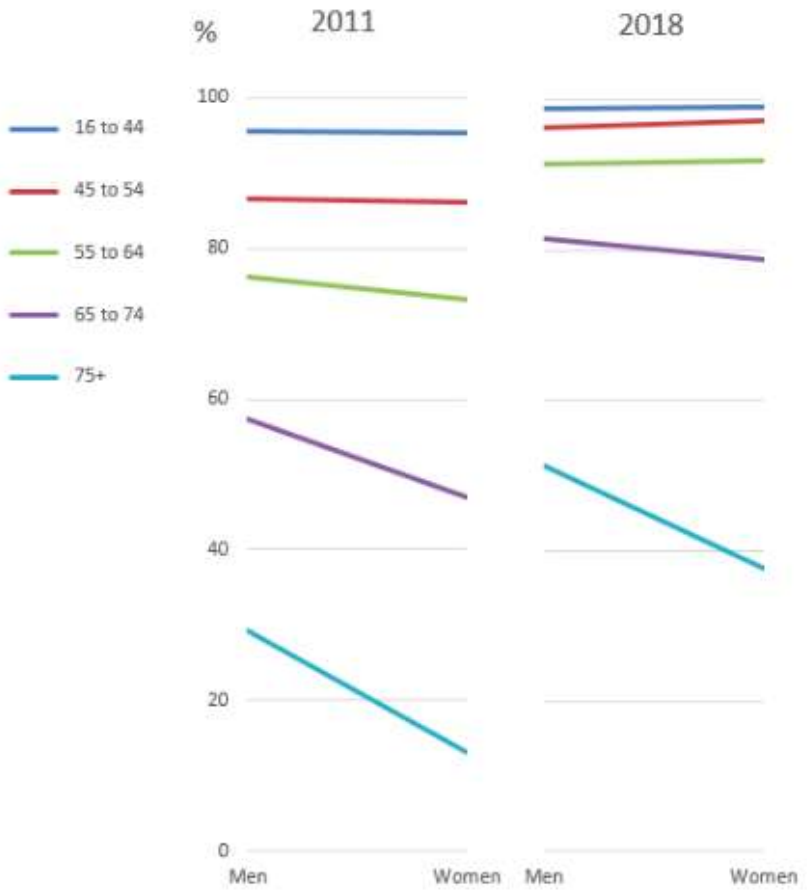

Source: Office for National Statistics

https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2018
Release date: 31 May 2018

Recent internet use by disabled adults increases across all ages

- In 2018, there was little difference in recent internet use for disabled and non-disabled adults in the 16 to 24 age group; 98% of disabled adults and 99% of non-disabled adults in this age group were recent internet users.
- There was a larger difference in recent internet use for adults aged 75 years and over; 39% of disabled adults in this age group were recent internet users, compared with 49% of non-disabled adults.
- Since 2014, the number of disabled adults who had used the internet recently increased by 11.7 percentage points to just over 9.5 million in 2018.
- Overall, the proportion of recent internet users was lower for adults who were disabled compared with those who were not.
- Of the 0.85 million adults who had last used the internet over three months ago 0.45 million were disabled.

https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2018
Release date: 31 May 2018

- “The latest **internet usage statistics from ONS** show a welcome increase in the number of people accessing the internet in later life. Households with one adult aged 65 years and over saw the largest growth in internet access, up 23 percentage points since 2012.
- “However, these households still have the lowest proportion of internet access at 59%, and we know that people over the age of 65 make up large majority of people who are not online.
- Despite significant growth, many people do not have internet access, putting them at risk of missing out on online-only services, as well as discounts and deals only available via the web.
- People over the age of 65 who are online are still much less likely (48%) to do their shopping online compared to the national average (78%), look for health information (30% vs 54%) or access online banking (35% vs 69%)”.

CENTRE FOR AGEING BETTER

“Frailty is a progressive age-related decline in physiological systems that results in decreased reserves of intrinsic capacity, which confers extreme vulnerability to stressors and increases the risk of a range of adverse health outcomes.” (WHO, 2015).

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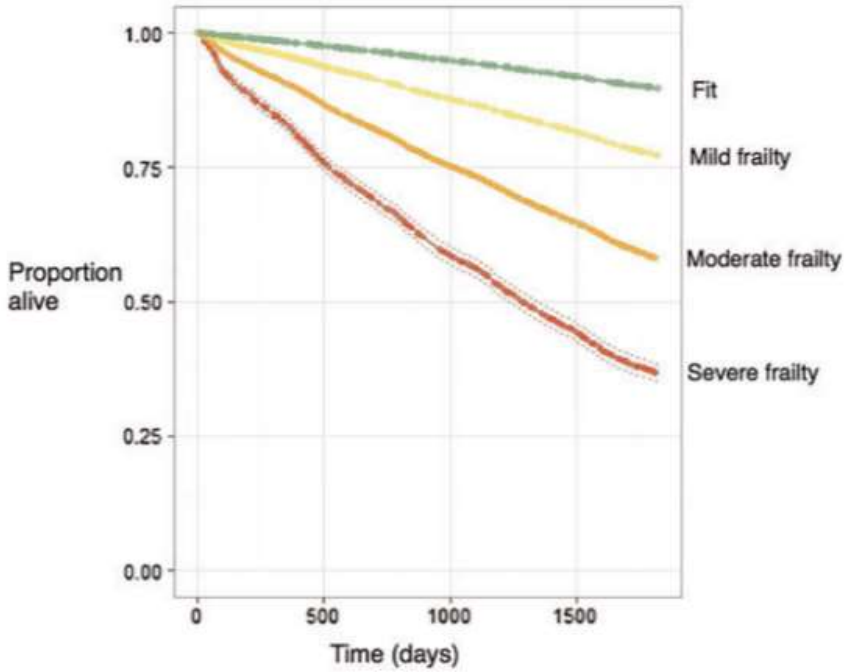


Figure 1. Five-year Kaplan–Meier survival curve for the outcome of mortality for categories of fit, mild frailty, moderate frailty and severe frailty (internal validation cohort).

Development and validation of an electronic frailty index using routine primary care electronic health record data

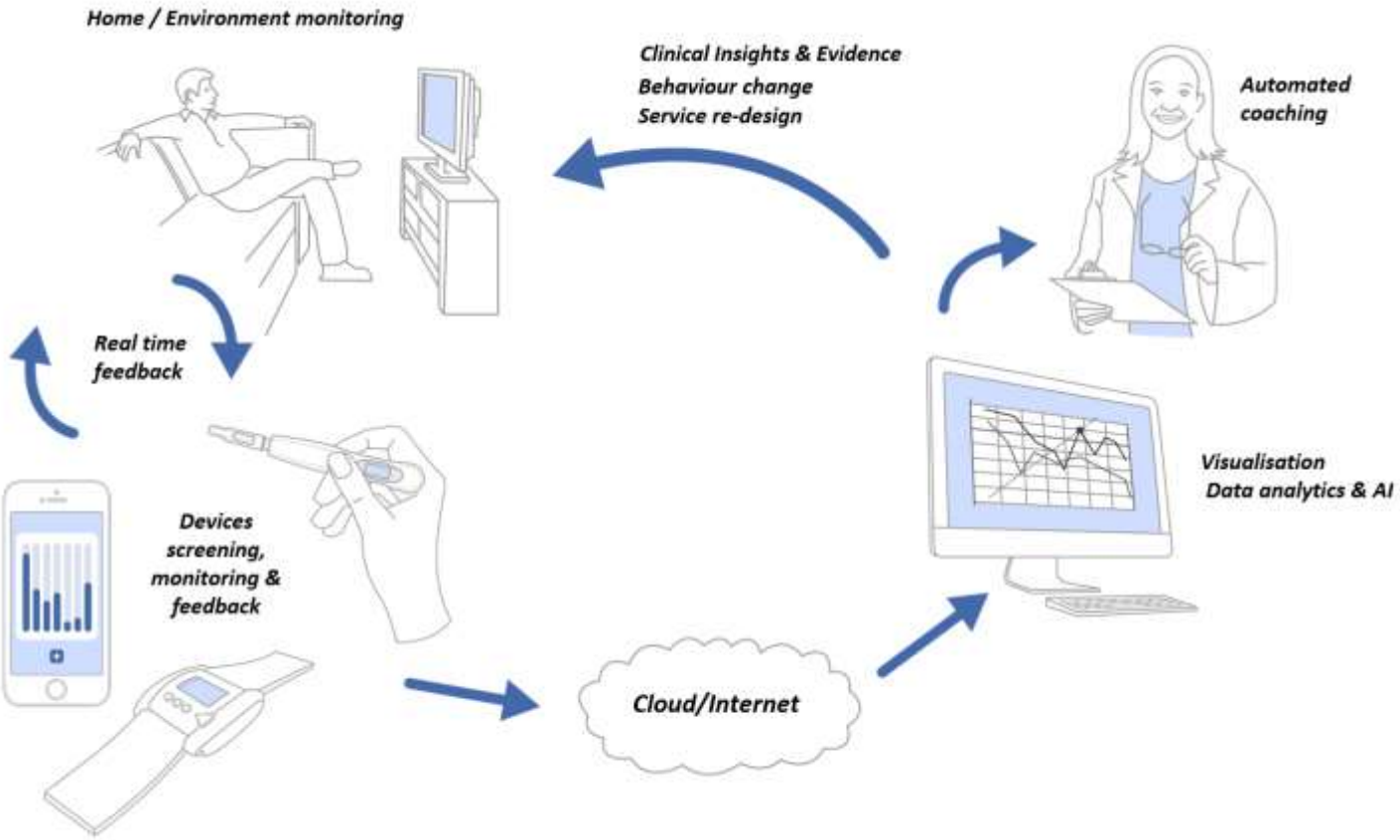
Andrew Clegg[1*], Chris Bates[2], John Young[1], Ronan Ryan[3], Linda Nichols[3], Elizabeth Ann Teale[1], Mohammed A. Mohammed[4], John Parry[5], Tom Marshall[3]

Box 1. List of 36 deficits contained in the eFI.

Activity limitation	Memory and cognitive problems
Anaemia and haematinic deficiency	Mobility and transfer problems
Arthritis	Osteoporosis
Atrial fibrillation	Parkinsonism and tremor
Cerebrovascular disease	Peptic ulcer
Chronic kidney disease	Peripheral vascular disease
Diabetes	Polypharmacy
Dizziness	Requirement for care
Dyspnoea	Respiratory disease
Falls	Skin ulcer
Foot problems	Sleep disturbance
Fragility fracture	Social vulnerability
Hearing impairment	Thyroid disease
Heart failure	Urinary incontinence
Heart valve disease	Urinary system disease
Housebound	Visual impairment
Hypertension	Weight loss and anorexia
Hypotension/syncope	
Ischaemic heart disease	

Age and Ageing 2016; **0:** 1–8
doi: 10.1093/ageing/afw039

Role of Environmental & Personal Monitoring?



https://www.eithealth.eu/vitality

Large scale population assessment of physical activity using wrist worn accelerometers: The ukbiobank study

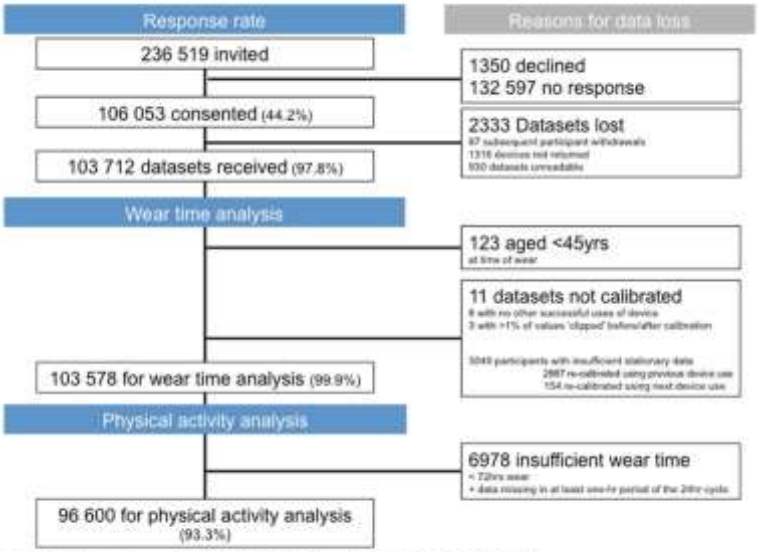


Fig 2. Participant flow chart; the UK Biobank study 2013–2015 (n = 103,712).

doi:10.1371/journal.pone.0169649.g002

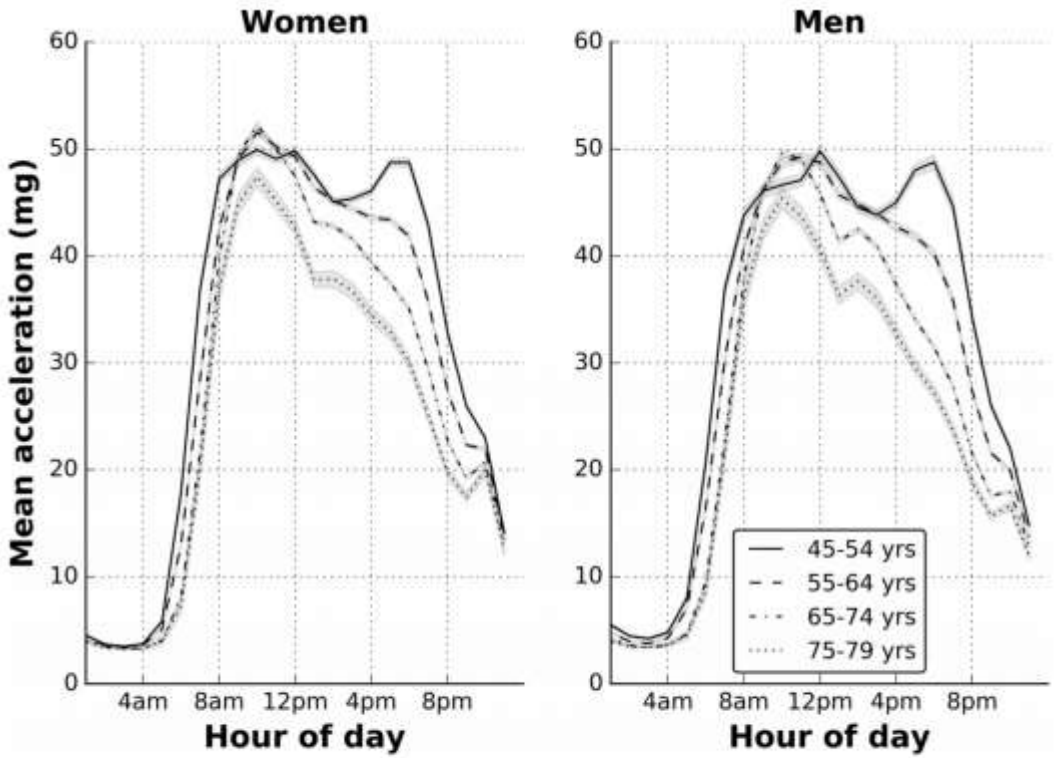


Fig 5. Variation in mean acceleration across the day by age and sex: the UK Biobank study 2013–2015 (n = 96,600). Shading bounds represent two standard errors.

doi:10.1371/journal.pone.0169649.g005

PLOS ONE

RESEARCH ARTICLE

Large Scale Population Assessment of Physical Activity Using Wrist Worn Accelerometers: The UK Biobank Study

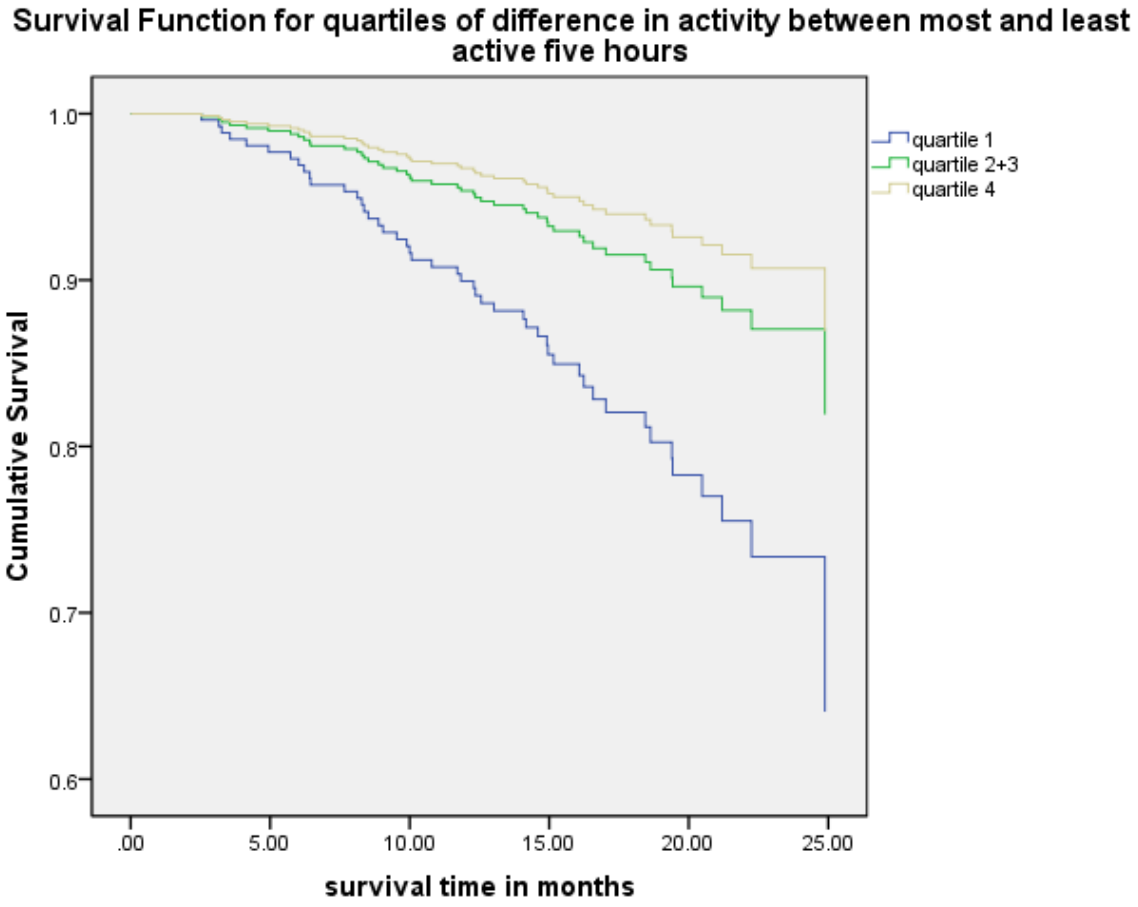
Aiden Doherty, Dan Jackson, Nils Hammerla, Thomas Plötz, Patrick Olivier, Malcolm H. Granat, Tom White, Vincent T. van Hees, Michael I. Trenell, Christoper G. Owen, Stephen J. Preece, Rob Gillions, Simon Sheard, Tim Peakman, Soren Brage, Nicholas J. Wareham

Post-noon activity levels fall with age in over 55s

biobank UK

Survival following wrist accelerometer monitoring period

(mean follow up 24 months), adjusted for sex, disability, cognitive function, disease count and BMI



Assessment of Sleep and Circadian Rhythm Disorders in the very old: the Newcastle 85+ Cohort Study
Kirstie N Anderson, Michael Catt, Joanna Collerton, Karen Davies, Thomas von Zglinicki, Thomas BL Kirkwood, Carol Jagger

https://academic.oup.com/ageing/article/43/1/57/24018

Predicting disability levels of community dwelling older individuals using single wrist mounted accelerometer.

The Timed Up and Go (TUG) test is widely used for assessing mobility and falls risk of elderly individuals. In this study, utilize TUG test to estimate disability level of community dwelling elderly participants. Forty features are extracted from single wrist mounted accelerometer signals which are recorded in home environment from the 321 participants performing TUG test. As an initial exploratory analysis, linear discriminant classifier is used to estimate the disability levels. The study compares models built using features extracted from accelerometer signals with the standard measure which is the time taken to complete the test. The developed accelerometer model has yielded a mean accuracy of 62.16% outperforming the standard measure with a mean accuracy of 39.10%. The obtained results show that TUG test has an ability to classify disability levels and accelerometer has an added value in evaluations and monitoring progression of disability levels.

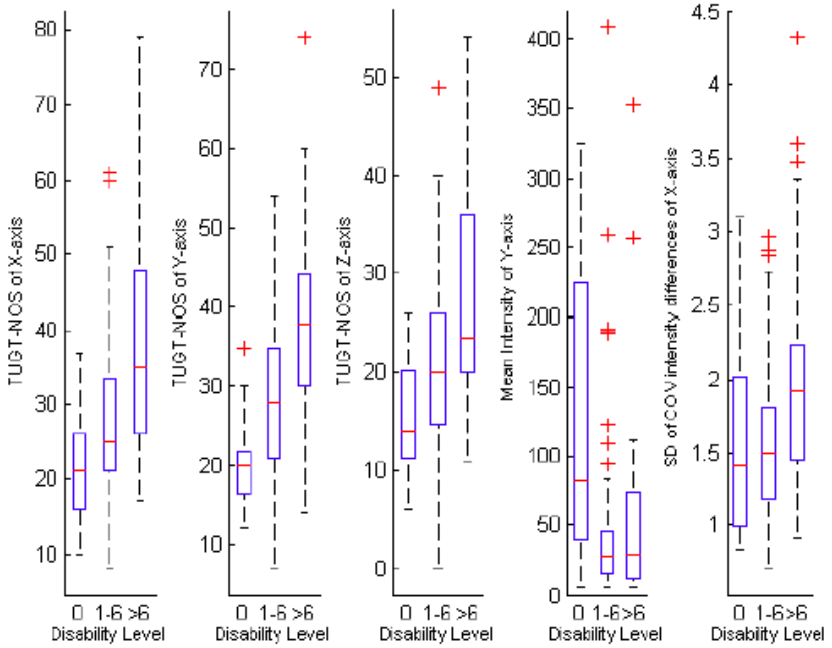


Fig. 2. Box plot of final selected features showing its ability to classify disability levels of the participants

K SankarPandi, Sathish & Dlay, S.s & Woo, W.L. & Catt, Michael. (2014). Predicting disability levels of community dwelling older individuals using single wrist mounted accelerometer. 2014 IEEE-EMBS International Conference on Biomedical and Health Informatics, BHI 2014. 720-723. 10.1109/BHI.2014.6864465.

Everyday Stepping Quantity and Quality Among Older Adult Fallers With and Without Mild Cognitive Impairment: Initial Evidence for New Motor Markers of Cognitive Deficits?

Older adults with MCI walk less and with a more variable within-bout and less variable across-bout walking pattern, as compared to cognitively-intact subjects matched with respect to age and gender.

These findings extend previous clinical work and suggest that MCI affects both the quantity and quality of community ambulation.

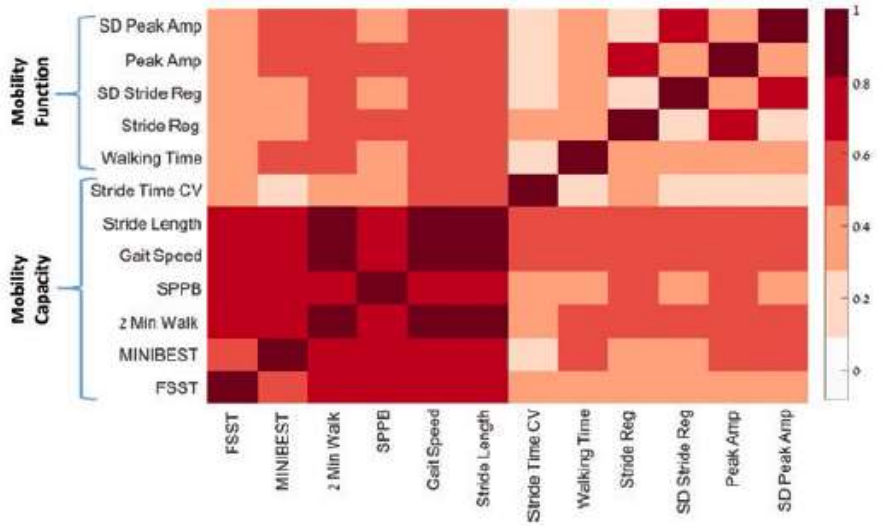


Figure 2. Heat map showing the Spearman correlation coefficients between measures of mobility capacity (ie, those measured in the lab) and mobility function (metrics derived from the 7-day recordings). Darker pixels reflect higher correlation values. Note that while the mobility capacity measures tended to be moderate to highly correlated with each other, they were not strongly correlated with the mobility function measures (see, for example, the top left quadrant of the map). Stride reg = Stride regularity; amp = Amplitude. Please see the online version for a color figure.

Jeffrey M. Hausdorff, Inbar Hillel, Shiran Shustak, Silvia Del Din, Esther M. J. Bekkers, Elisa Pelosin, Freek Nieuwhof, Lynn Rochester and Anat Mirelman

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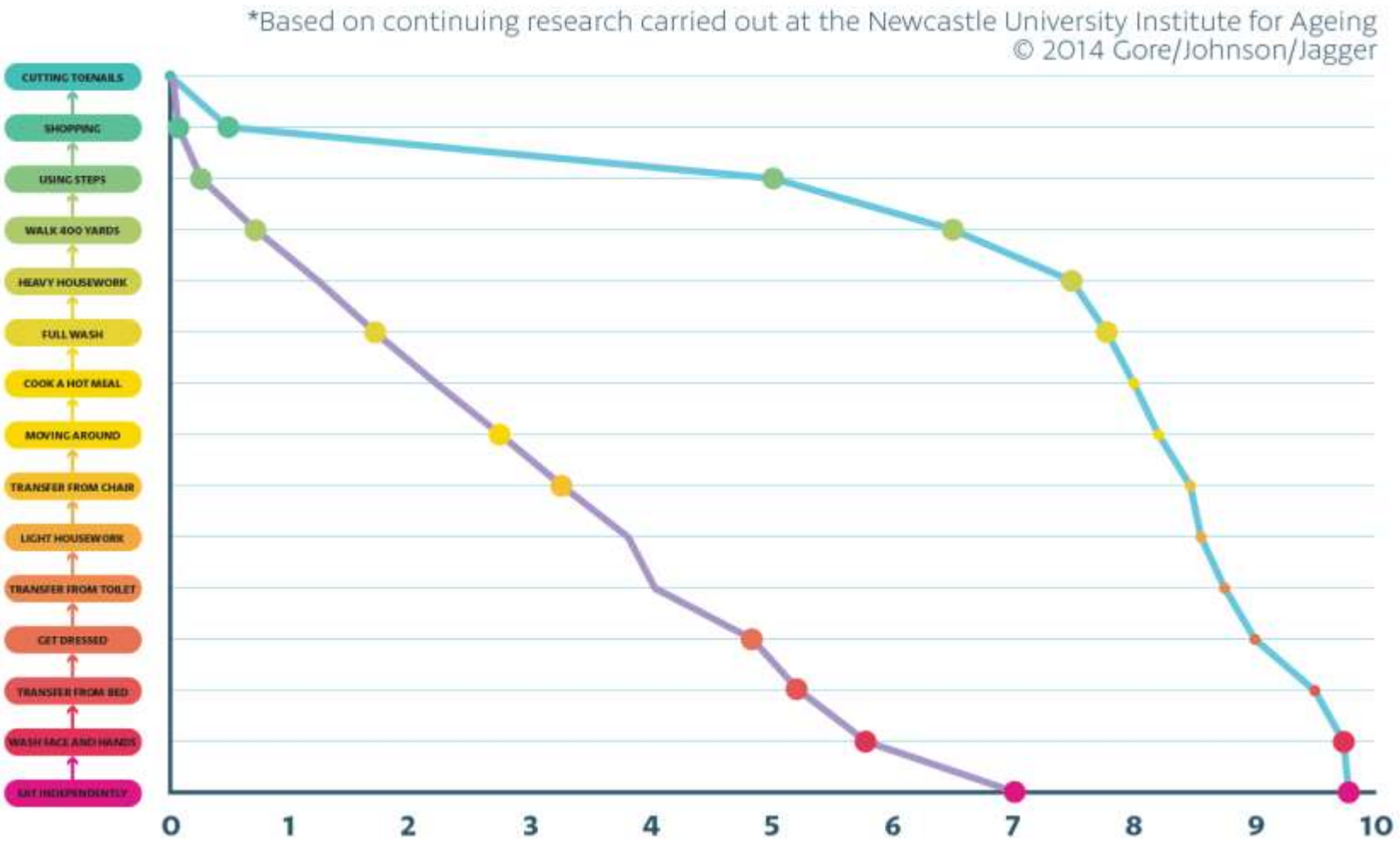

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