

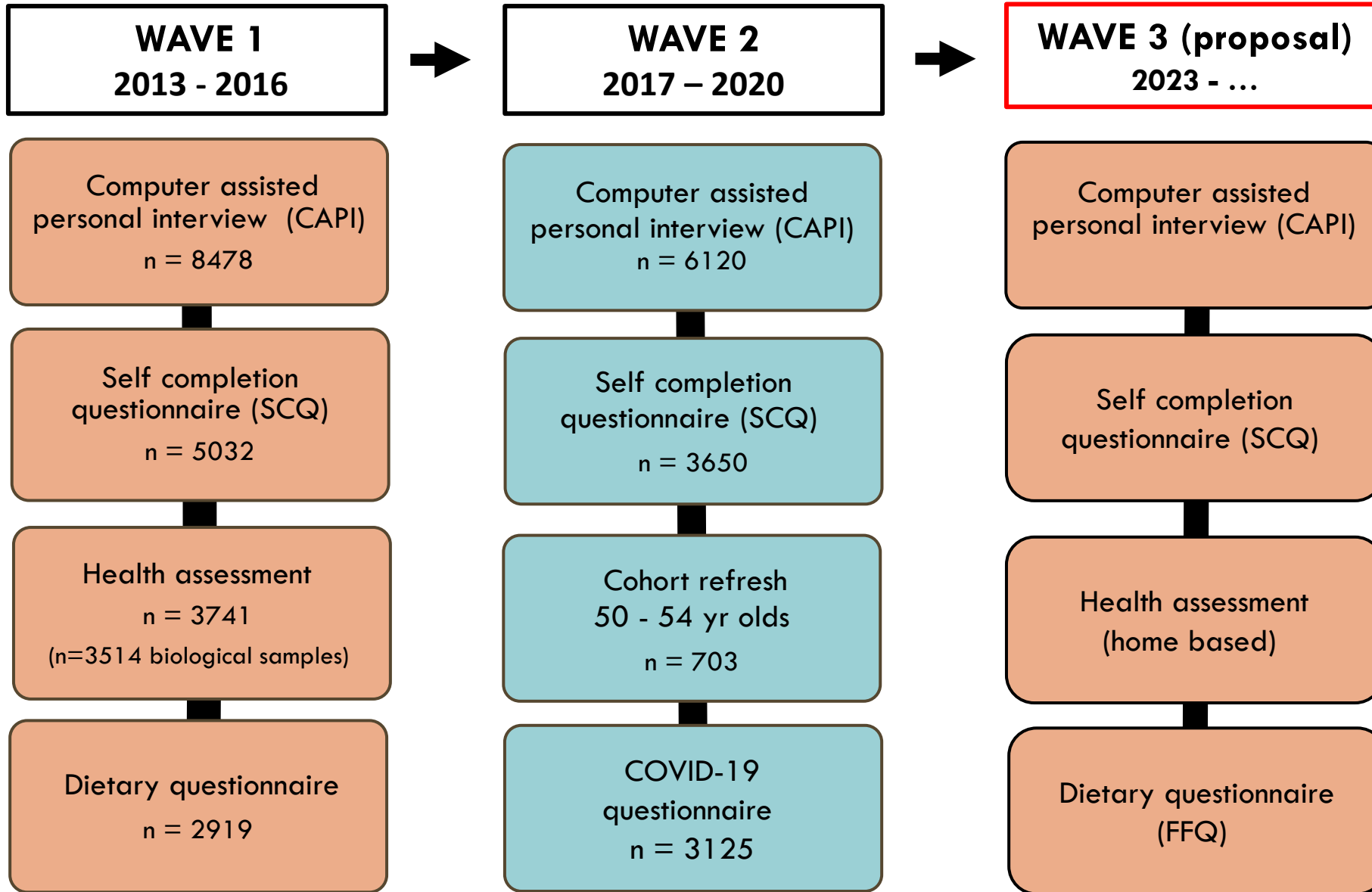
N I C O L A

The logo for NICOLA features the letters N, I, C, O, L, and A in a bold, dark brown, sans-serif font. The letter 'I' is replaced by a green circular graphic composed of numerous thin, radiating lines, resembling a fan or a sunburst.

Understanding Today for a Healthier Tomorrow

Prof Bernadette McGuinness
Queen's University Belfast

Context - Stages of NICOLA Data Collection



EXISTING MEASURES (WAVES 1 AND 2)

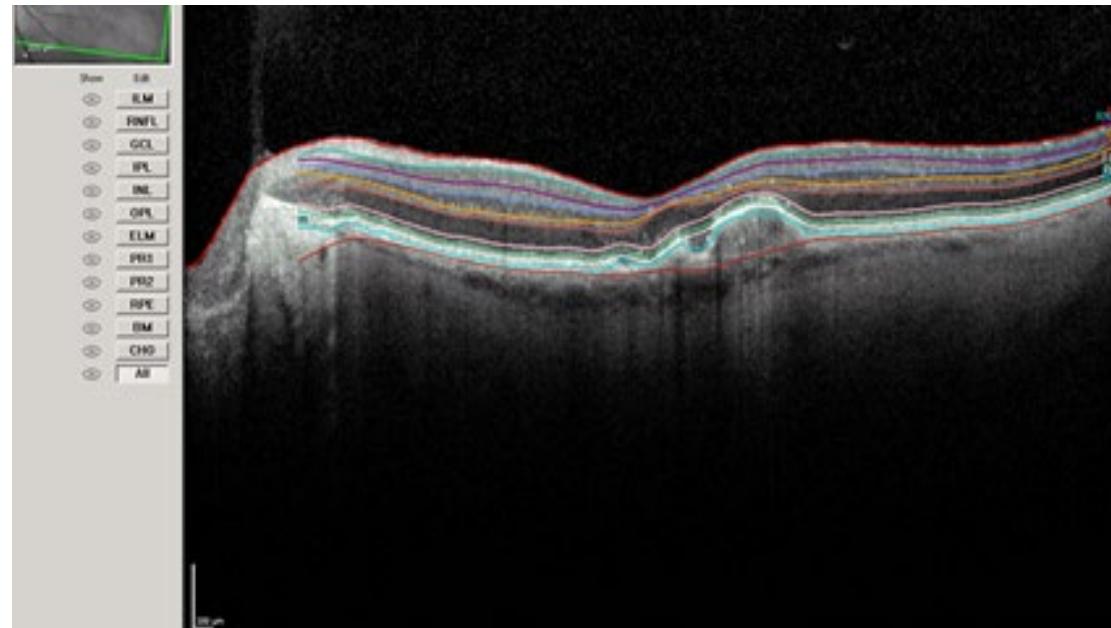
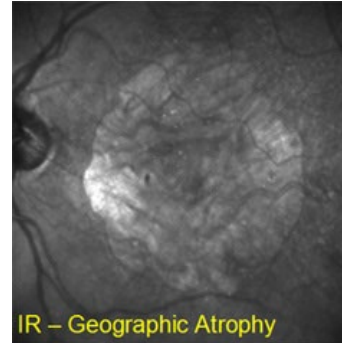
CORE TOPICS	Wave 1	Wave 2	New questions included within topic at Wave 2
Demographics	√	√	Parental status and history
Transfers to children	√	√	
Physical and cognitive health	√	√	Oral health, disability, HADS, CASP-19 and QOL-BREF
Life events, trauma, stress	√		
Personality	√		
Help and helpers	√	√	
Employment	√	√	Subsidiary work, job satisfaction
Healthcare utilisation	√	√	A&E visits, A&E outcomes, healthcare satisfaction
Health behaviours / lifestyle	√	√	Sexual/romantic intimacy
Medications	√	√	
Work and pensions	√	√	
Social connectedness	√	√	Culture and Arts activities
Income and assets	√	√	
Expectations	√	√	
Social participation	√	√	Housing and transport
Social capital	√	√	
COVID-19		√	

Retinal Imaging

- Colour fundus Photographs
- Wide field colour images (TX200)
- **OCT:** Infra-red retinal image
Multi-Colour image
Blue-autofluorescence
Dual wavelength AF movie
OCT

Multimodal imaging

- enables more accurate phenotyping for earliest stages of age-related macular degeneration
- enables prevalence data of new phenotypes and associated risk factor analysis



Biochemical biorepository



Lab 1: Total Chol, HDL, LDL, triglycerides, blood glucose, HBA1c, vitamins (A,C,E)

Lab 2: Core UK Biobank panel including for example:

- Cholesterol
- Direct LDL
- HDL-cholesterol
- Triglyceride
- Apolipoprotein A
- Apolipoprotein B
- C-reactive protein
- Lipoprotein (a)

- Vitamin D
- Rheumatoid factor
- Alkaline phosphatase
- Calcium
- SHBG
- Testosterone
- Oestradiol

- Glucose
- Cystatin C
- Creatinine
- Total protein
- Urea
- Phosphate
- Urate
- Albumin

Lab 3: Genetic, epigenetic and transcriptomic data (Infinium CoreExome-24 Array) incl. Apolipoprotein E (APOE) genotyping and genome-wide association summary statistics for ~30 phenotypes

Genetic repository

- ❖ 3,266 unique samples genotyped at 551,839 single nucleotide polymorphisms (SNPs) using Infinium CoreExome-24 Array
- ❖ 551,839 directly genotyped and 18,148,478 imputed from 1kGP3 and HRC reference panels
- ❖ Apolipoprotein E (APOE) genotyping
- ❖ Individual Genome-Wide Association summary statistics for ~30 phenotypes
- ❖ RNA sequencing planned



Ampliseq S5
prime sequencer



EDTA tubes



Lab
processing
and assaying



DNA storage
aliquots -80°C

NICOLA associated research

“Alone we can do so little; together we can do so much.”

Helen Keller

LifePath Consortium (2015 – 2019)



Horizon 2020
European Union Funding
for Research & Innovation

- Aim of LIFEPAH: To investigate the biological pathways underlying social differences in healthy ageing
- Meta-analysis of epigenome-wide association data
- Analysis of NICOLA methylation data

Other genomic collaborations:

- Genetic Investigation of Anthropometric Traits (GIANT)
- Global Lipids Genetic Consortium (GLGC)

www.aging-us.com

AGING 2019, Vol. 11, No. 7

Research Paper

Socioeconomic position, lifestyle habits and biomarkers of epigenetic aging: a multi-cohort analysis



Journals of Gerontology: Biological Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2022, Vol. 77, No. 8, 1750–1759
<https://doi.org/10.1093/geronj/gnac041>
Advance Access publication February 17, 2022



Original Article

The Role of Epigenetic Clocks in Explaining Educational Inequalities in Mortality: A Multicohort Study and Meta-analysis

Kidney Disease Genetics Consortium

- With increasing incidence and a prevalence of >10 % among adults worldwide, chronic kidney disease (CKD) represents a major public health issue
- A better understanding of the genetic basis of kidney function may provide important insights into the disease
- NICOLA is one of several population based cohorts coordinating EWAS for kidney disease
- Part of worldwide consortia for genome-wide genotype data (CKDGen)
- GEnetics of Nephropathy: an International Effort (GENIE) consortium



Harmonizing Cognitive Assessment Protocol (NICOLA-HCAP)



- Aims to investigate dementia risk using a harmonised cognitive assessment protocol as part of a larger NIA funded study
- NICOLA, TILDA, Health & Retirement Study (HRS), ELSA
- 1000 NICOLA participants aged 65 yrs and over
- Cognitive and neuropsychological assessments to discriminate between normal cognitive performance, cognitive impairment and dementia
- This work will:
 - generate an extensive global dementia bioresource
 - produce internationally comparable data



N I C O L A

SPACE: Supportive environments for Physical and social Activity, healthy ageing and Cognitive E health.

- ❑ Where we live may influence brain health and vulnerability to cognitive impairment
- ❑ Research questions:
 - Are there specific factors which make urban environments a problem for brain health ?
 - What are the best policies and interventions for promoting healthy ageing and brain health for our poorest communities ?
- ❑ SPACE research package included:
 - collecting physical activity data using Actigraph accelerometers
 - monitoring location and travel via GPS devices
 - analysis of environmental factors in relation to brain health



SPACE factsheets / videos



Noise and Light Pollution

[Noise Pollution Factsheet](#)

[Light Pollution Factsheet](#)



Green and Blue Space

[Green and Blue Space Factsheet](#)



Urban Planning

[Urban Planning Factsheet](#)



Air and Soil Pollution



Planetary Health and Climate Change

Link to videos and fact sheets: <https://www.qub.ac.uk/sites/space/VideosandFactsheets/>

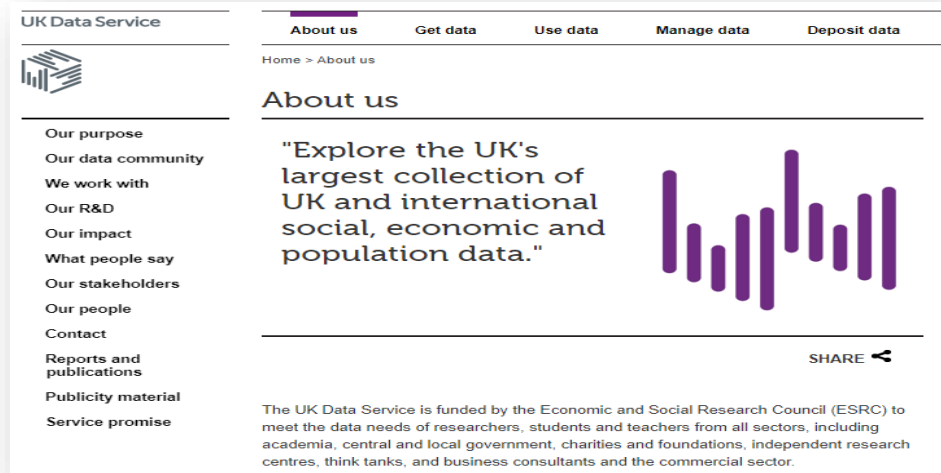
Publications from NICOLA

- **Scientific evidence:** publication of over 100 papers in scientific journals
- **Reports:** Wave 1 report, Health assessment report
- **Evidence for policy makers and stakeholders** e.g. Belfast Healthy Cities, Local Councils, AgeNI, Department of Health
- **Newsletters:** feedback of study findings to participants



NICOLA DATA REPOSITORIES

1. UK Data Service (www.ukdataservice.ac.uk)



UK Data Service

About us Get data Use data Manage data Deposit data

Home > About us

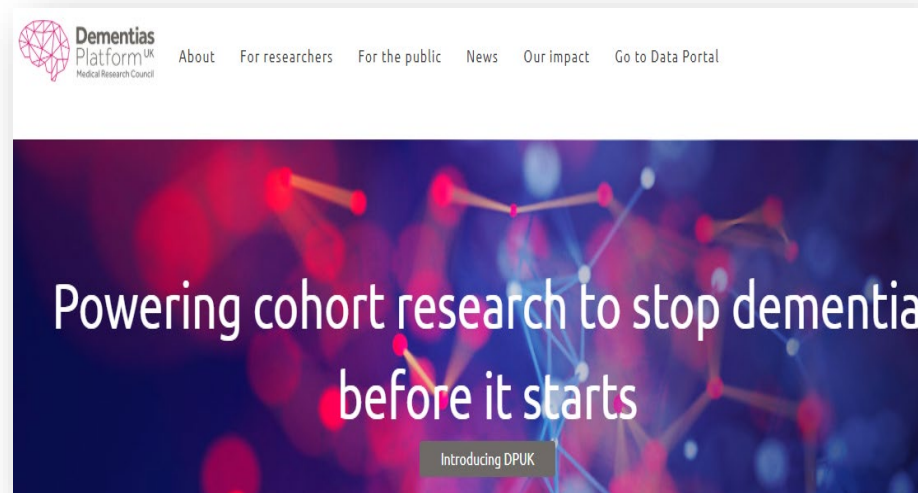
About us

"Explore the UK's largest collection of UK and international social, economic and population data."

SHARE

The UK Data Service is funded by the Economic and Social Research Council (ESRC) to meet the data needs of researchers, students and teachers from all sectors, including academia, central and local government, charities and foundations, independent research centres, think tanks, and business consultants and the commercial sector.

2. Dementias Platform UK (www.dementiasplatform.uk)



Dementias Platform UK Medical Research Council

About For researchers For the public News Our impact Go to Data Portal

Powering cohort research to stop dementia before it starts

Introducing DPUK

3. UK Longitudinal Linkage Collaboration (UK LLC) (<https://ukllc.ac.uk/>)



UK Longitudinal Linkage Collaboration

HOME ABOUT US THE PUBLIC FOR RESEARCHERS FOR STUDY PARTICIPANTS PARTNER STUDIES NEWS

Linking Data for Future Research Discoveries

The UK Longitudinal Linkage Collaboration (UK LLC) has been set up to bring together information from longitudinal study volunteers with their routine records. This is being done in a secure way to help researchers work to improve health and wellbeing throughout and beyond the COVID-19 pandemic.

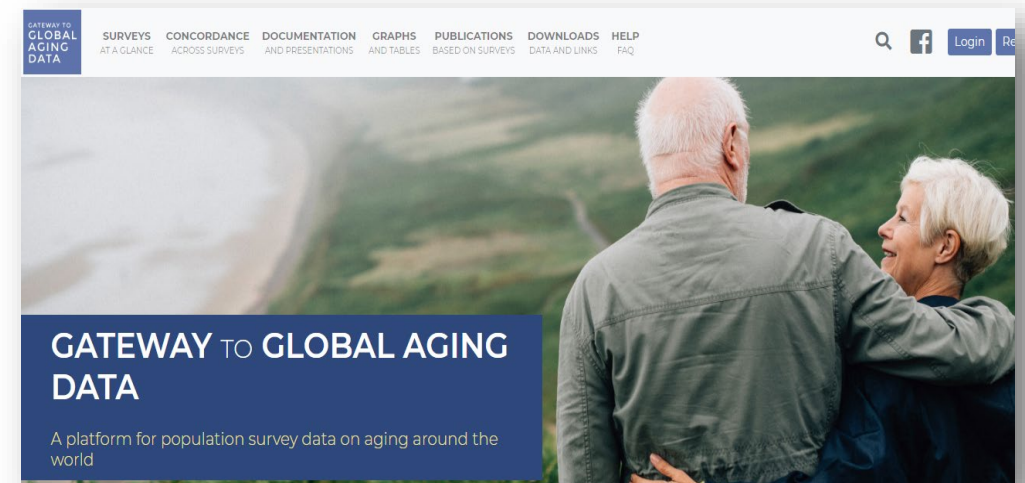
A new collaboration for public benefit

Six National Core Studies have been set up for COVID-19 research, funded by the UK Government. These studies aim to answer pressing COVID-19 questions through accelerating progress in establishing a pioneering health data and research infrastructure for the future.

The UK LLC is operated by the University of Bristol and the University of Edinburgh. It is embedded within the COVID-19 Longitudinal Health and Wellbeing National Core Study.

This work uses data provided by study participants and patients collected through longitudinal studies, or as part of their care and support.

4. Gateway to Global Aging (www.g2aging.org)



GATEWAY TO GLOBAL AGING DATA

SURVEYS AT A GLANCE CONCORDANCE ACROSS SURVEYS DOCUMENTATION AND PRESENTATIONS GRAPHS AND TABLES PUBLICATIONS BASED ON SURVEYS DOWNLOADS DATA AND LINKS HELP FAQ

GATEWAY TO GLOBAL AGING DATA

A platform for population survey data on aging around the world

NICOLA Website

<https://www.qub.ac.uk/sites/NICOLA/Informationforresearchers/>

The screenshot shows the top navigation bar of the Queen's University Belfast website. On the left is the university's crest and logo. On the right are links for 'Queen's Students', 'Staff', 'Alumni', 'News', and 'Staff Directory'. Below these are main menu items: 'STUDY', 'RESEARCH', 'INTERNATIONAL', 'BUSINESS', and 'ABOUT', each with a dropdown arrow, and a search icon. The page title is 'Information For Researchers'. Below the title is a breadcrumb trail: 'UNIVERSITY SITES > NICOLA > INFORMATION FOR RESEARCHERS'. A dark grey navigation bar contains links for 'About NICOLA', 'Participant Information', 'Information for Researchers' (which is highlighted), 'Research Themes', 'News', 'Where are we now?', 'Contact Us', and 'More options'. The main content area features four expandable sections, each with a plus sign on the right: 'Requesting Access to NICOLA Data or Biological Samples', 'Research Proposals Approved', 'NICOLA Related Publications and Outputs', and 'Publishing / Presenting your NICOLA Research'.

QUEEN'S UNIVERSITY BELFAST

Queen's Students Staff Alumni News Staff Directory

STUDY RESEARCH INTERNATIONAL BUSINESS ABOUT Q

Information For Researchers

UNIVERSITY SITES > NICOLA > INFORMATION FOR RESEARCHERS

About NICOLA Participant Information **Information for Researchers** Research Themes News Where are we now? Contact Us More options

- Requesting Access to NICOLA Data or Biological Samples +
- Research Proposals Approved +
- NICOLA Related Publications and Outputs +
- Publishing / Presenting your NICOLA Research +

NICOLA – What next ??

Proposed plan for Wave 3

Objectives:

- To carry out a home-based health assessment and interview on current cohort maintaining some core content and compatibility with Waves 1 and 2.
- Inclusion of new data and measures: COVID related data, COVID antibodies, microbiome analysis, food insecurity, fuel poverty
- To administer a repeat HCAP to a subsample of 1000 participants
- To archive data and metadata with data repositories e.g. UK LLC, UK Data Service, DPUK, Catalogue of Mental Health Measures, Gateway to Global Ageing
- Extend data linkage to include routine HSC data and data from the NI Cancer Registry
- Maintain data management support to facilitate access to the NICOLA resource
- Provide national/internationally comparable data and metadata to improve policy and services for older adults
- Generate new insights into pathways underlying and trajectories of healthy ageing
- Provide enhanced infrastructure for future policy relevant research on ageing

Wave 3: Proposed Study Design

- Participants: invite to be sent to current cohort of NICOLA participants (Wave 2 including cohort refresh)
- Home based CAPI interview and health assessment (approx. 70-90 mins)
- Core repeat topics for inclusion:
 - Social circumstances
 - Cognitive health
 - Mental health
 - Eye health
 - Health services utilisation

New topics for inclusion:

COVID follow-up questions

Fuel poverty

Food insecurity tool

Financial wellbeing/insecurity

Digital technology

Microbiome

Covid-19 antibodies

Environment

Other topics e.g. views on ageing, ageism etc

Acknowledgements / Funders

NICOLA Core Team

Prof Frank Kee - Scientific Director
Prof Dermot O'Reilly - Operations Director
Prof Bernadette McGuinness - Clinical Lead
Mrs Amanda Coulter - Project Manager
Dr Charlotte Neville - Scientific Officer
Angela Scott - Data Manager
Prof Amy Jayne McKnight - Biorepository

Research Leads

Prof Jayne Woodside - Nutrition
Prof Michael Donnelly – Health services
Dr Ruth Hogg - Ophthalmology
Prof Bernadette McGuinness-Cognition
Dr Paula Devine – Sociology
Prof AJ McKnight – Multiomics, CKD
Prof Ruth Hunter – Environment
Prof Mark Tully – Physical activity
Dr Noleen McCorry – Mental health
Prof Jose Bengoechea – Microbiome
Dr Chris Watson - Cardiovascular

Website: <https://www.qub.ac.uk/sites/NICOLA/Informationforresearchers/>





Thank You

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