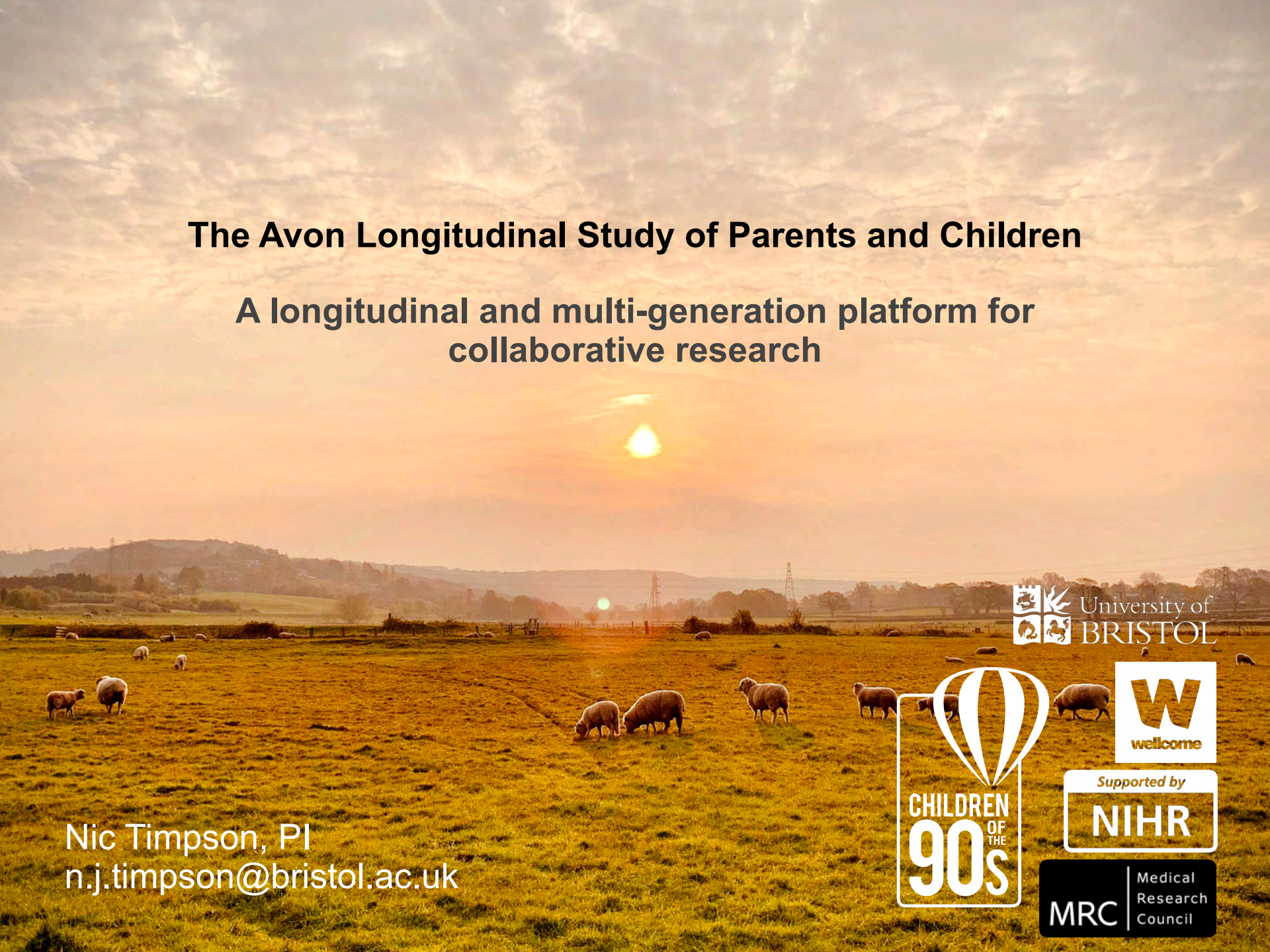
The Avon Longitudinal Study of Parents and Children

A longitudinal and multi-generation platform for collaborative research



Nic Timpson, PI
n.j.timpson@bristol.ac.uk

University of BRISTOL

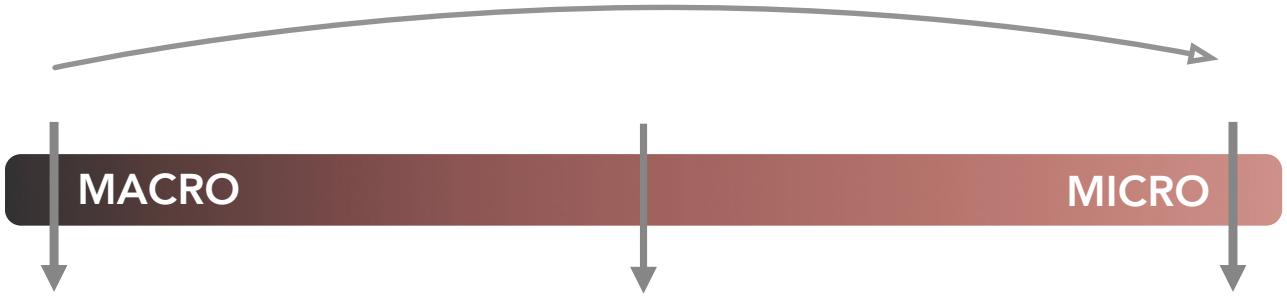
CHILDREN OF THE 90s

wellcome

Supported by NIHR

MRC Medical Research Council

How can we meet the demands of our science?



Country/region Record linkage-based Remote data collection	Very large population-based Record linkage Omic data screens/clinics	Cohorts & bespoke studies Exhaustive phenotyping (hypothesis driven)

Acknowledgements:

Wellcome Trust

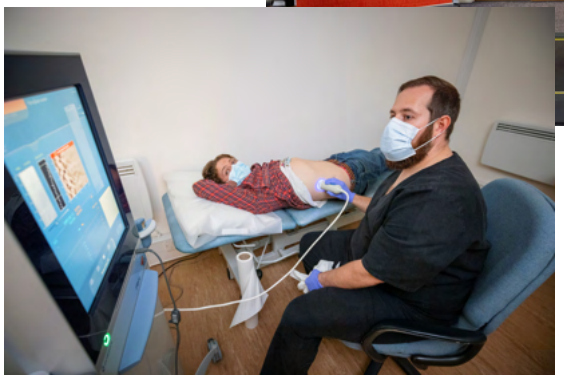
Medical Research Council

University of Bristol

Research community – our users

ALSPAC team

ALSPAC participants



ALSPAC / “Children of the 90s”

>30k participants, >1.2million bio-samples, >80k variables,
30 years of deep longitudinal study, just under 1,000 (979) researchers,
>2500 papers
18-20 proposals/month for data/samples

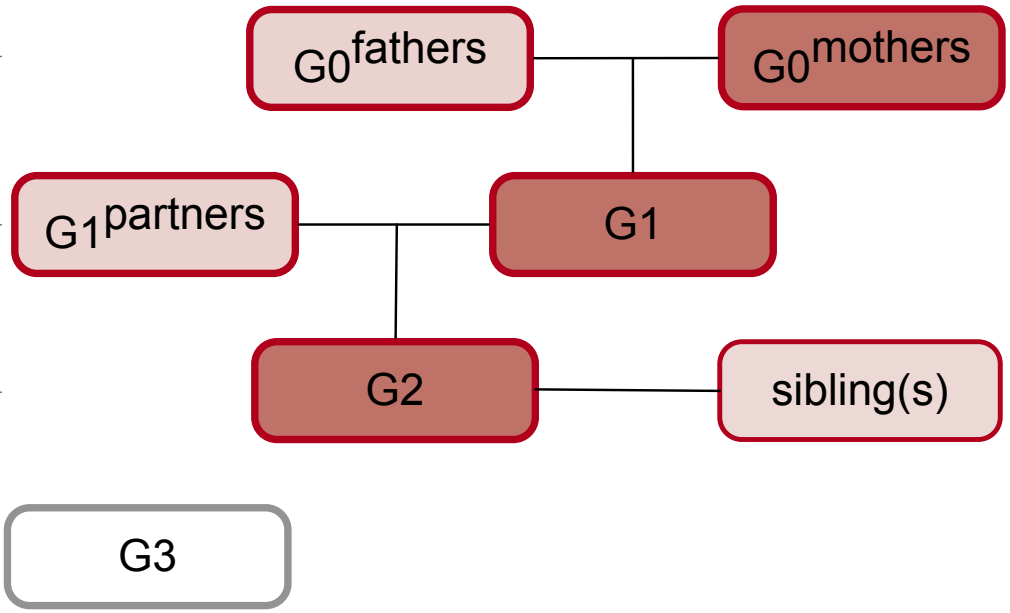
Grand parents

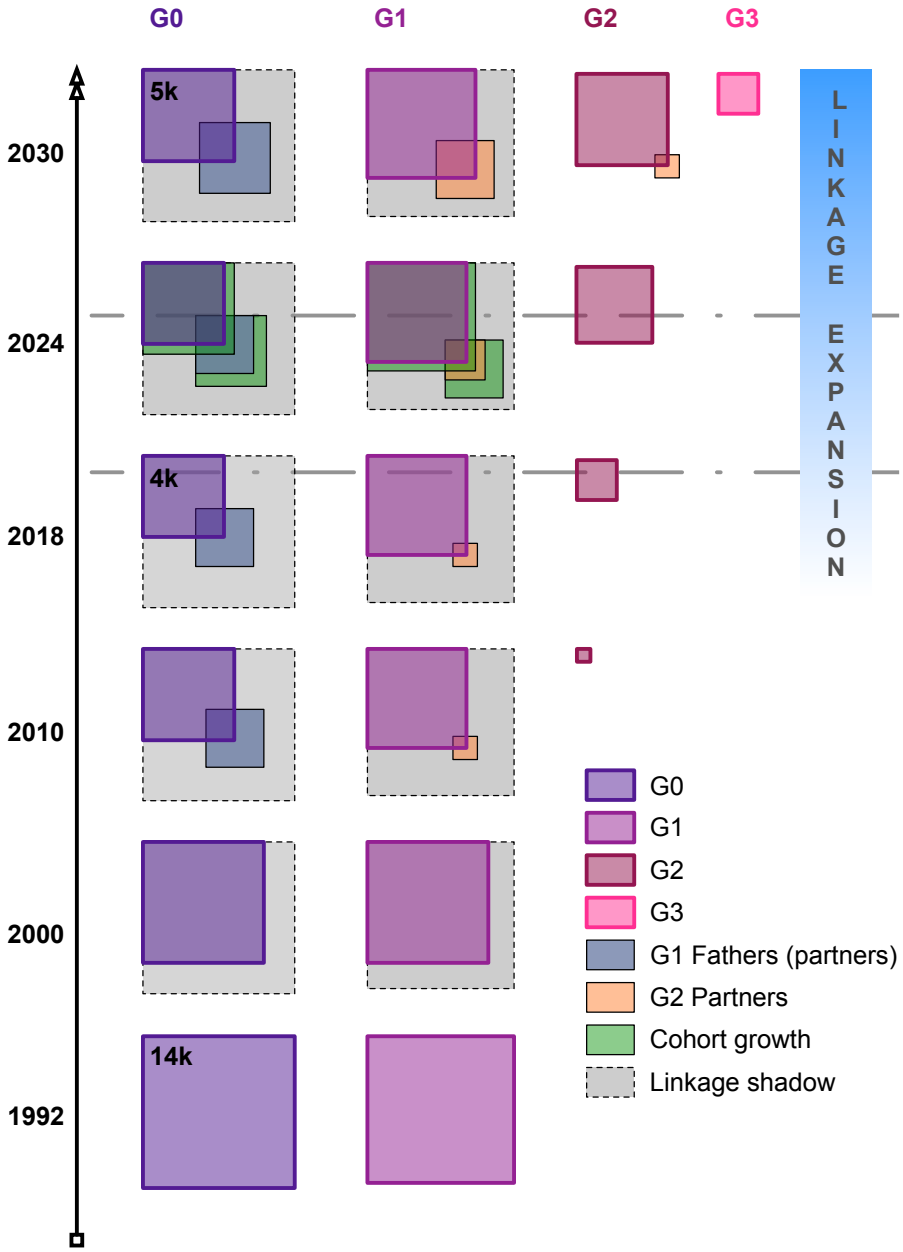
>14541 pregnancies, 75% of all
Linkage consented and >8000 active

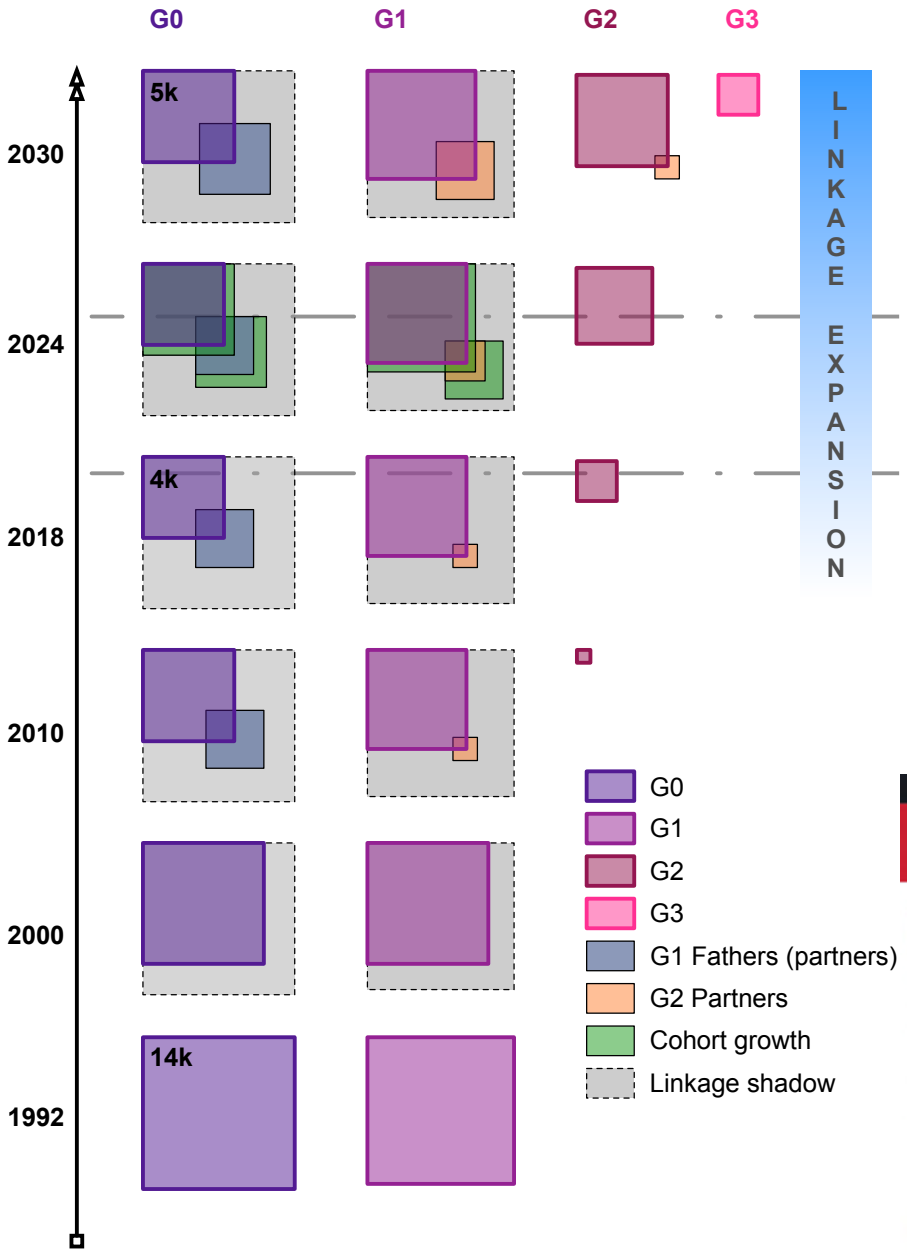
>9k at 8yrs, >6k at 18yr, 4.5k stable
>80% linked and 6500 active

>1200 new pregnancies
3300 pregnancies over next 5 years
Linkage consented

(Eldest G2 already 12
G3 likely over the next 5 years)




G0
G1
G2
G3
2030
2024
2018
2010
2000
1992
5k
4k
14k
LINKAGE EXPANSION
G0
G1
G2
G3
G1 Fathers (partners)
G2 Partners
Cohort growth
Linkage shadow



COHORT PROFILE

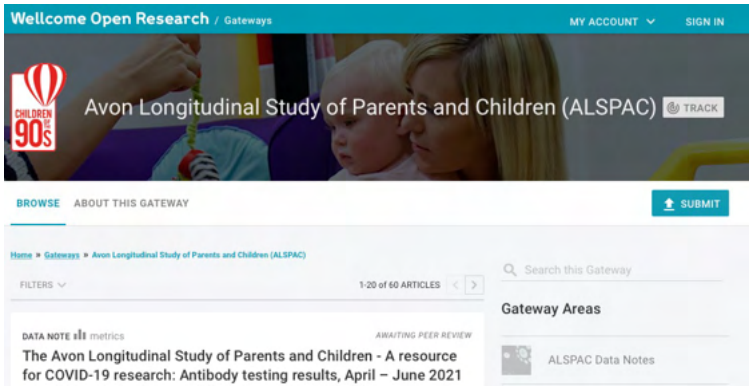
Cohort Profile: The Avon Longitudinal Study of Parents and Children: ALSPAC mothers cohort

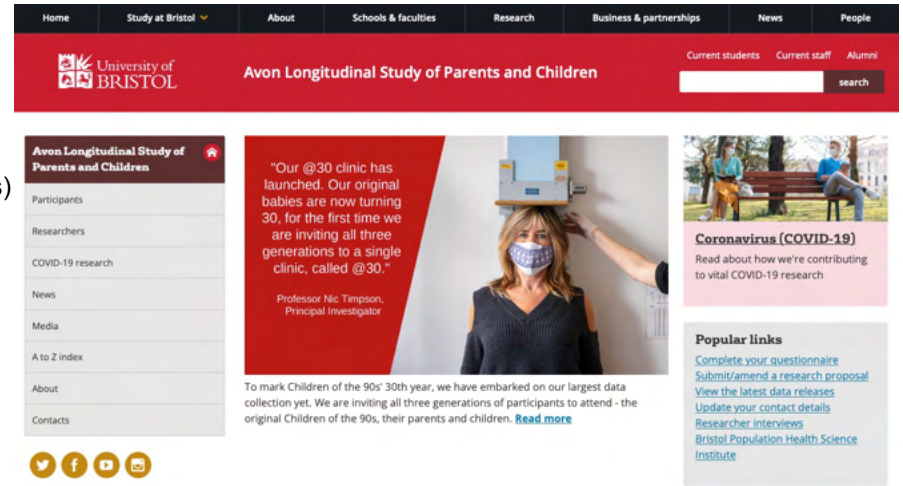
Abigail Fraser,[1,2] Corrie Macdonald-Wallis,[1,2] Kate Tilling,[2] Andy Boyd,[2] Jean Golding,[2] George Davey Smith,[1,2] John Henderson,[2] John Macleod,[2] Lynn Molloy,[2] Andy Ness,[3] Susan Ring,[2] Scott M Nelson[4] and Debbie A Lawlor[1,2]*

COHORT PROFILE

Cohort Profile: The 'Children of the 90s'—the index offspring of the Avon Longitudinal Study of Parents and Children

Andy Boyd,[1]* Jean Golding,[2] John Macleod,[1] Debbie A Lawlor,[3] Abigail Fraser,[3] John Henderson,[1] Lynn Molloy,[1] Andy Ness,[4] Susan Ring[1] and George Davey Smith[3]





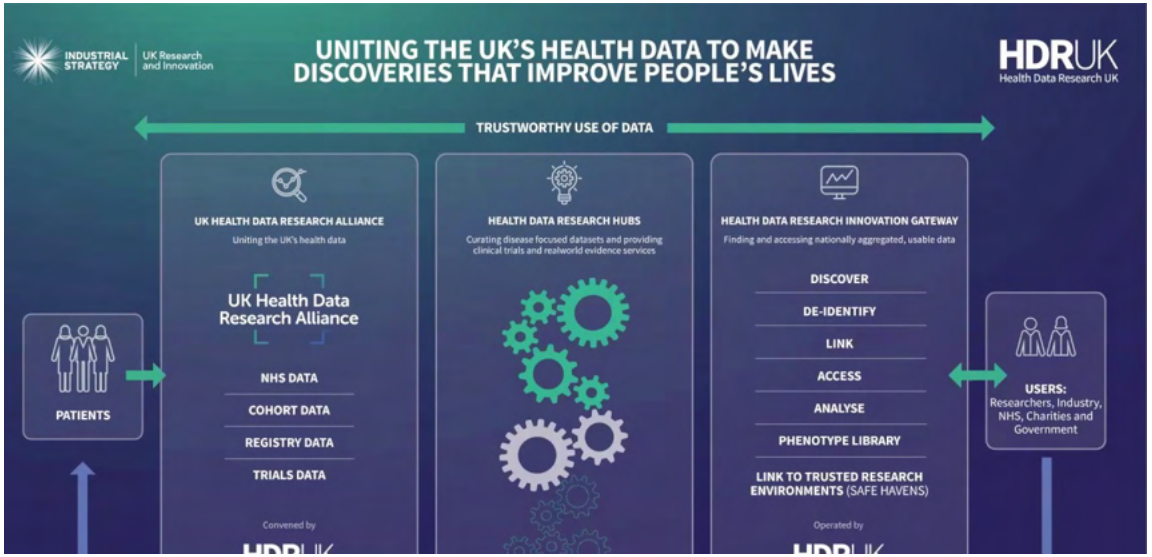
Visibility and Access

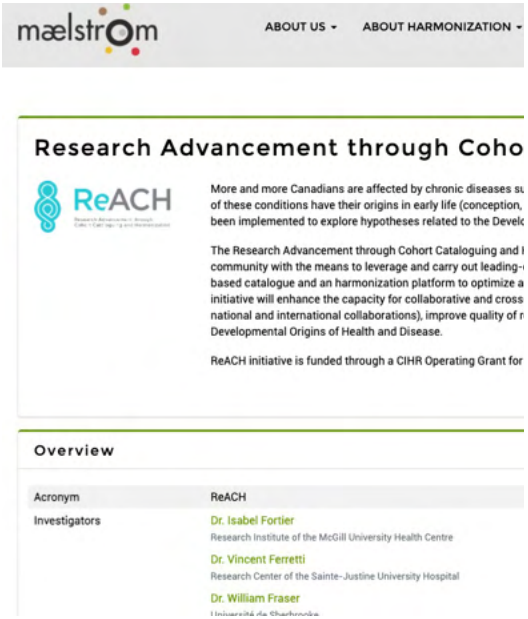
ALSPAC AVON LONGITUDINAL STUDY OF PARENTS

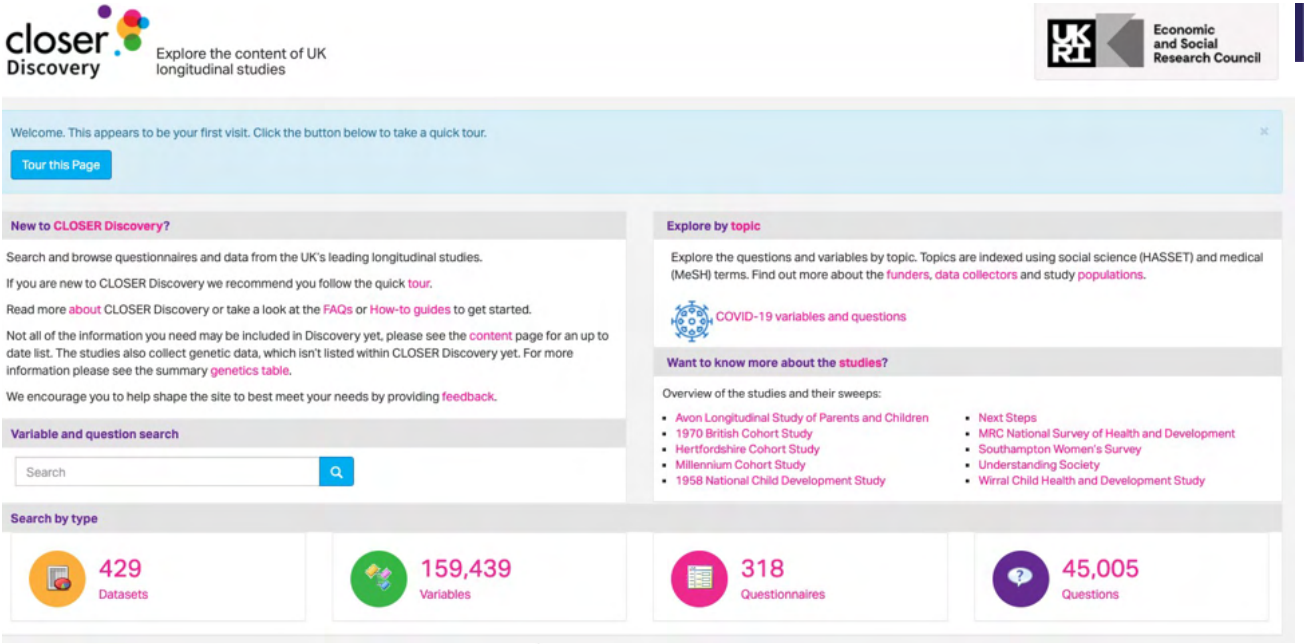
Access Policy

v. 13.0

February 2021



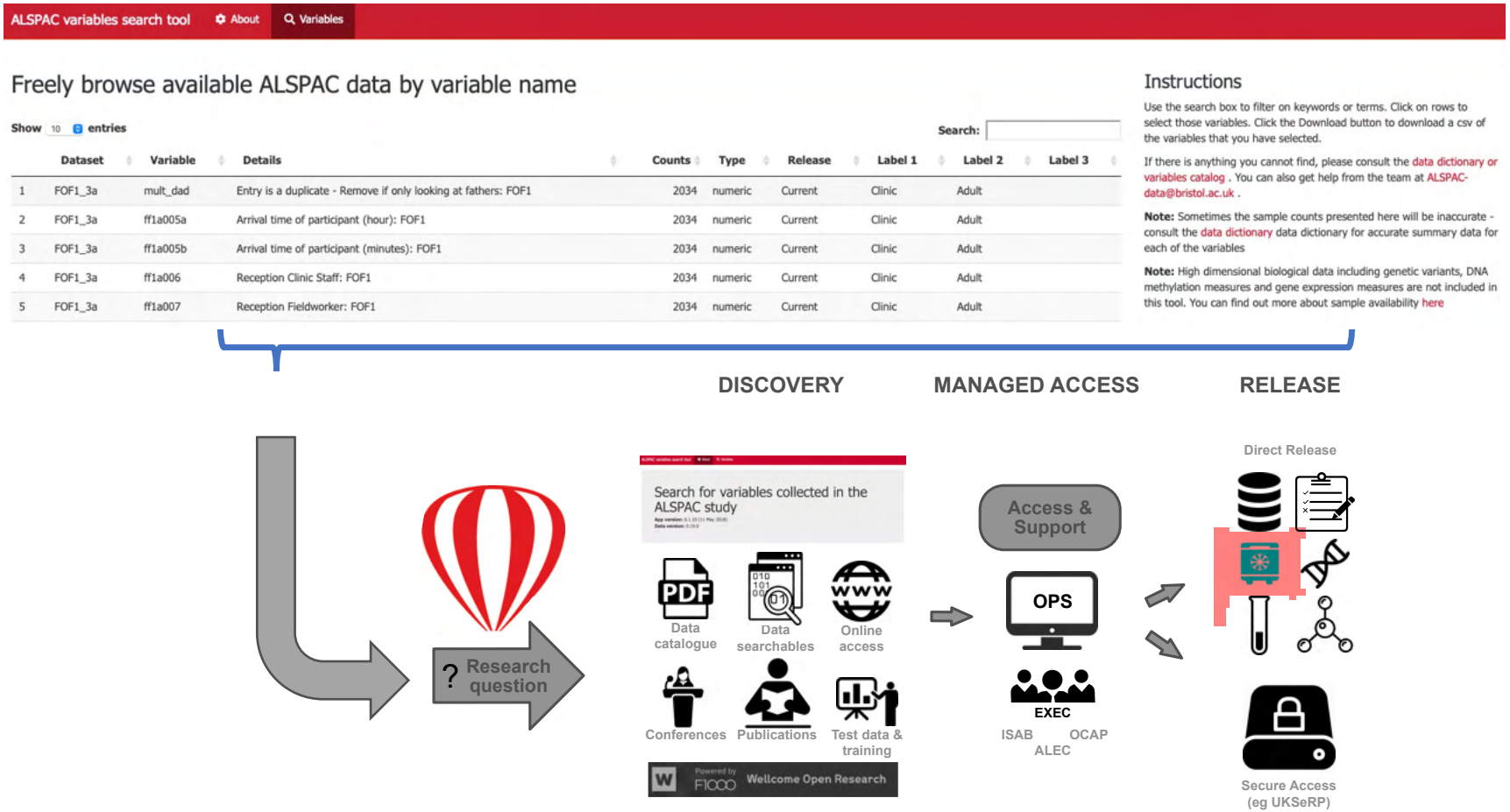




Visibility and Access

http://www.bristol.ac.uk/alspac/researchers/our-data/

http://variables.alspac.bris.ac.uk/

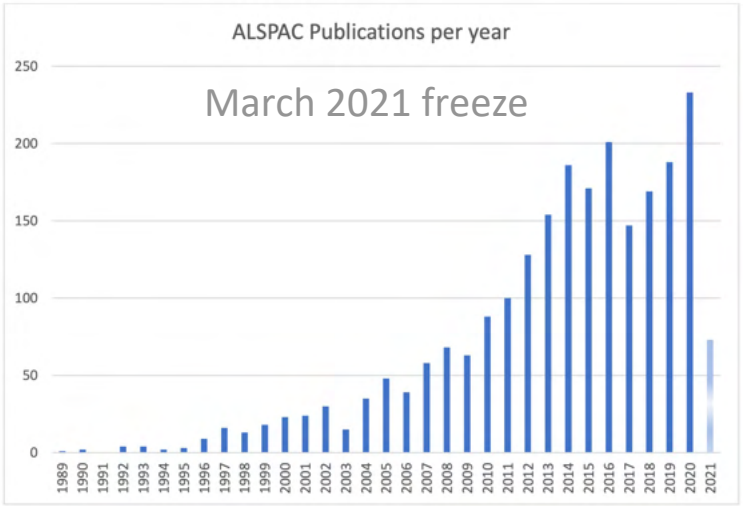


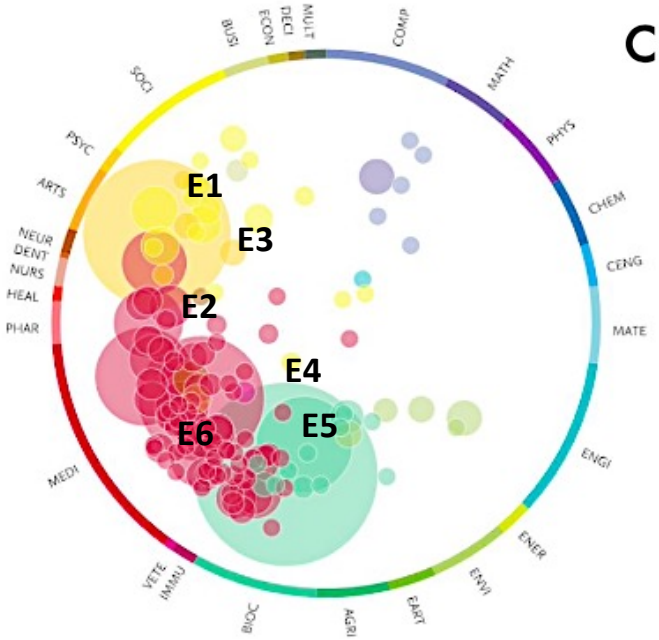
Current output from ALSPAC

Medicine/molecular epidemiology contribution, but there are other major areas of activity.

Metrics are useful to illustrate this and guide activity – for example, we work to promote ALSPAC use with social scientists and to engage with methods and approaches aligned to social science studies.

Good overlap between social and medical sciences.





COMP	Computer Science	PHAR	Pharmacology, Toxicology and Pharmaceutics
MATH	Mathematics	HEAL	Health Professions
PHYS	Physics and Astronomy	NURS	Nursing
CHEM	Chemistry	DENT	Dentistry
CENG	Chemical Engineering	NEUR	Neuroscience
MATE	Materials Science	ARTS	Arts and Humanities
ENGI	Engineering	PSYC	Psychology
ENER	Energy	SOCI	Social Sciences
ENVI	Environmental Science	BUSI	Business, Management and Accounting
EART	Earth and Planetary Sciences	ECON	Economics, Econometrics and Finance
AGRI	Agricultural and Biological Sciences	DECI	Decision Sciences
BIOC	Biochemistry, Genetics and Molecular Biology	MULT	Multidisciplinary
IMMU	Immunology and Microbiology		
VETE	Veterinary		
MEDI	Medicine		

https://service.elsevier.com/app/answers/detail/a_id/12007/supporthub/scopus/

Exemplar 1. The anthropology of cohorts themselves – ethnography and participation

Sahra Gibbon
UCL

Why do Families Participate in Cohort Research:

- Pilot study research examining multi-generational birth cohort participation
- Method: ethnographic interview with 'paired participants' (G0 parent and G1 adult child who had own child(ren)enrolled in G2)
- 'Becoming Intergenerational in Birth Cohorts: kinship and the remaking of participation' Sahra Gibbon and Rosie Mathers (2021) *Somatosphere* March 18th

Biosocial Lives of Birth Cohorts (2021-2025):

- 4-year Investigator Award examining Biosocial research in 4 birth cohorts (ALSPAC, Generation R-Rotterdam, Generation 21-Porto, Pelotas Birth Cohort Study – Brazil) as knowledge, social practice and **participation**
- Using ethnographic and participatory research methods to examine the experience and meaning of birth cohort participation
- All arguably "biomedical", but where new data may illuminate other fields and help the interpretation of data collected within studies.

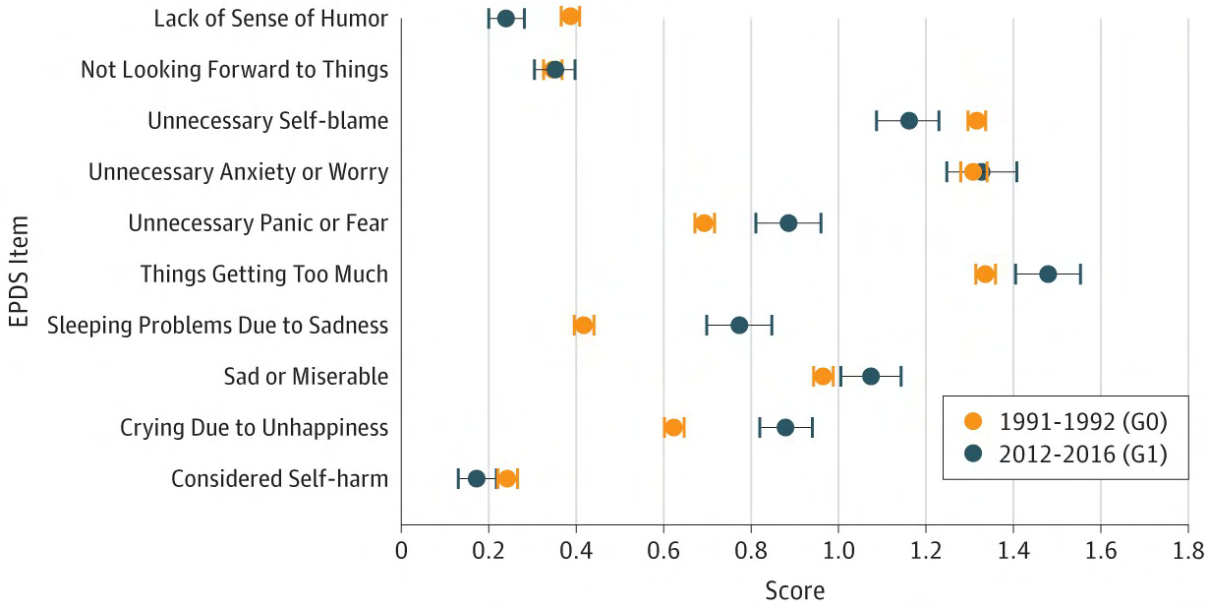
Exemplar 2. Mental health and longitudinal population study data

Mental health is receiving great attention and is measured in great detail in longitudinal studies like ALSPAC – this also bridges organic and social domains and there is an opportunity to bring together data and researchers around this.

JAMA Network Open - Psychology 2018

Prevalence of Prenatal Depression Symptoms Among 2 Generations of Pregnant Mothers

The Avon Longitudinal Study of Parents and Children



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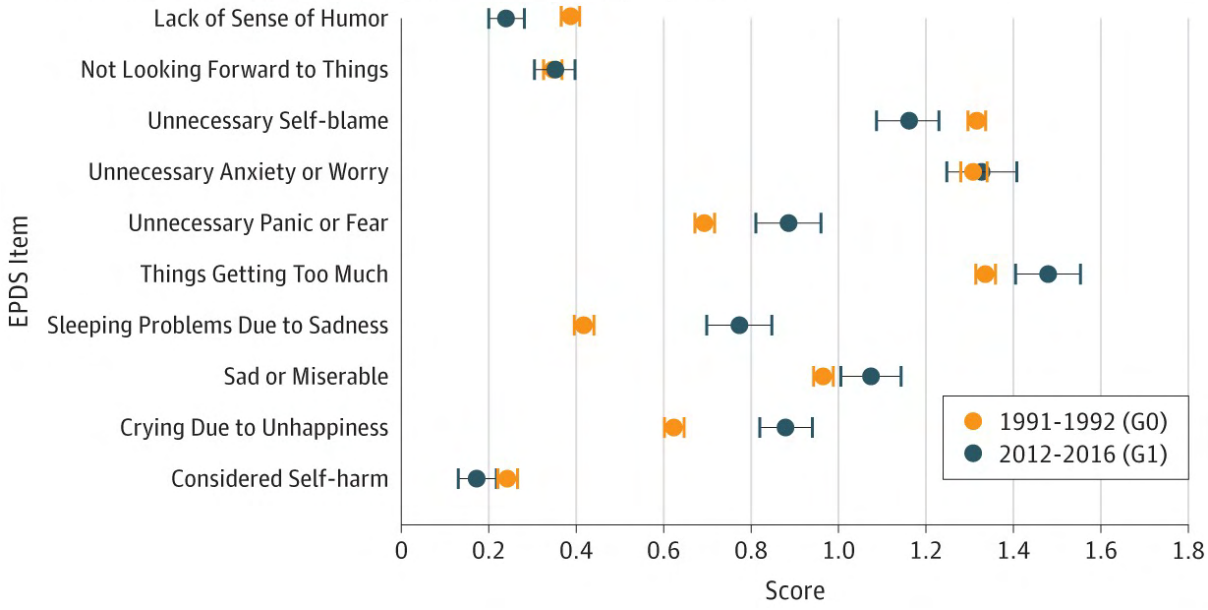
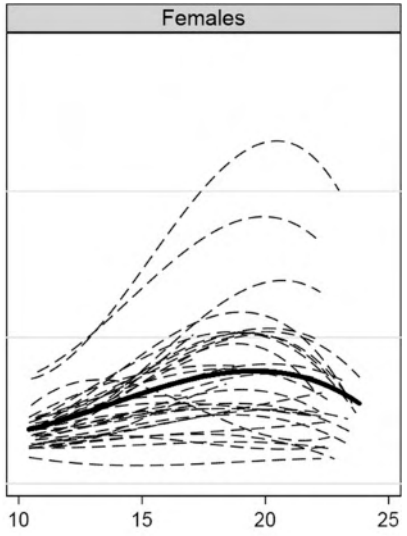
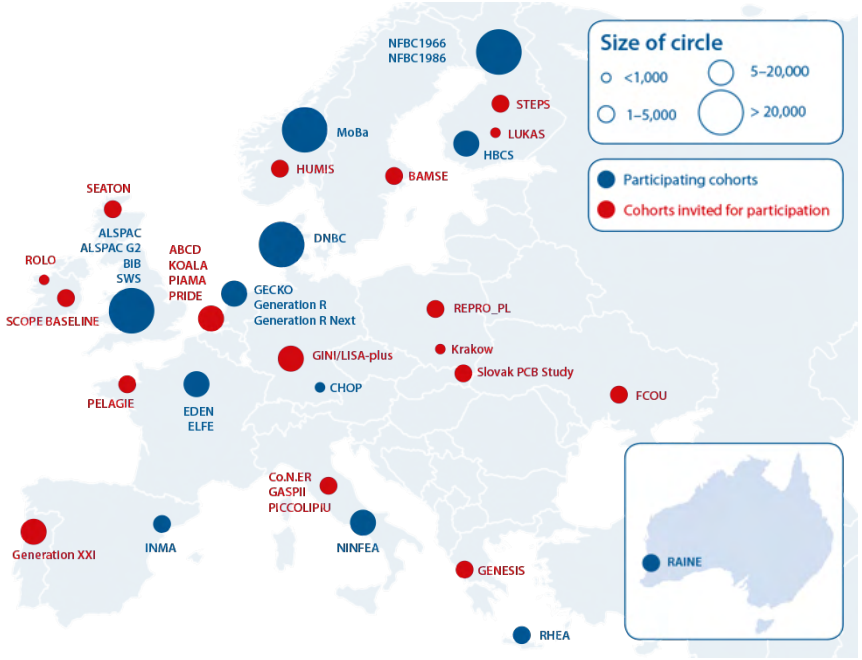




Alex Kwong
University of Edinburgh

Key point in the frequency and granularity of standardized data

Exemplar 3. Social inequality – measurement and implications



LifeCycle

Tim Cadman
University of Bristol

Harmonised data on childhood for >250,000 children.

- Mental health outcomes at least 2 time points
- Data available for analysis via DataSHIELD

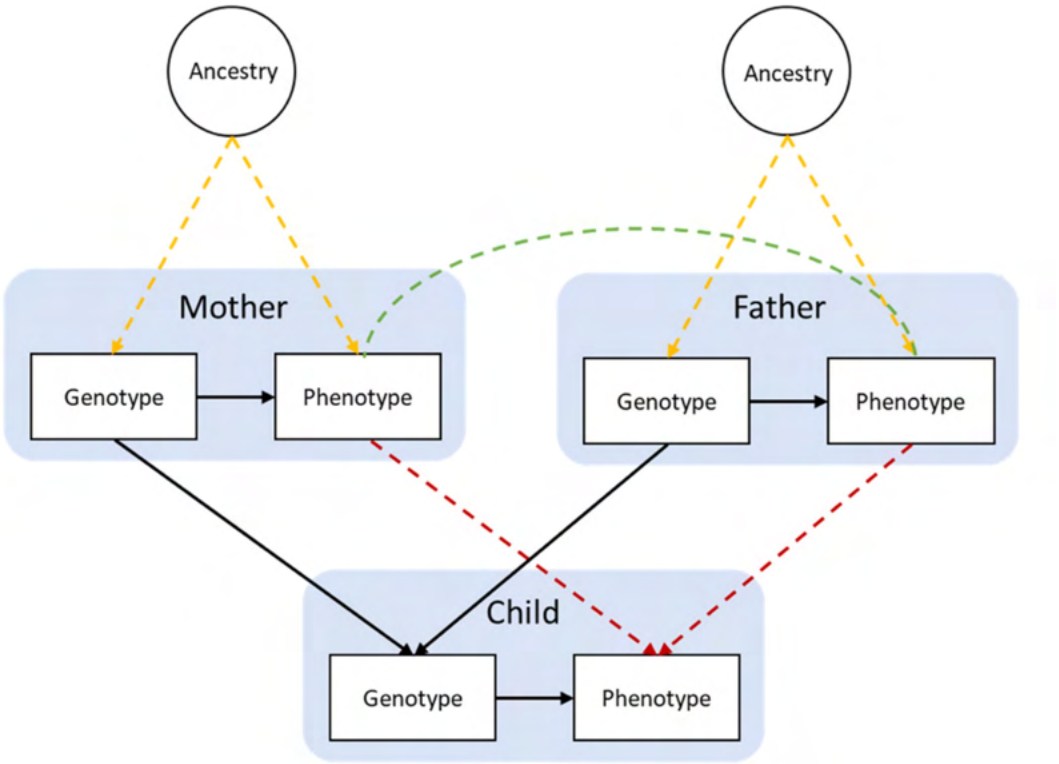
Consistent evidence that ***social inequalities in mental health*** are present from a young age for all cohorts

Inequalities reduce over time, but evidence that the rate of decrease slows and inequalities persist into middle childhood

Demonstrates ***meta-analysis of mental health trajectories*** across birth cohorts is possible:

a) Pros: making use of measurement at different times points across cohorts to model complete trajectories
b) Cons: non-equivalence of maternal education and mental health measurement.

Exemplar 4. The interplay between social and biomedical research – Certainly not only one direction



Tim Morris
University of Bristol

Population stratification - yellow

Dynastic effects - red

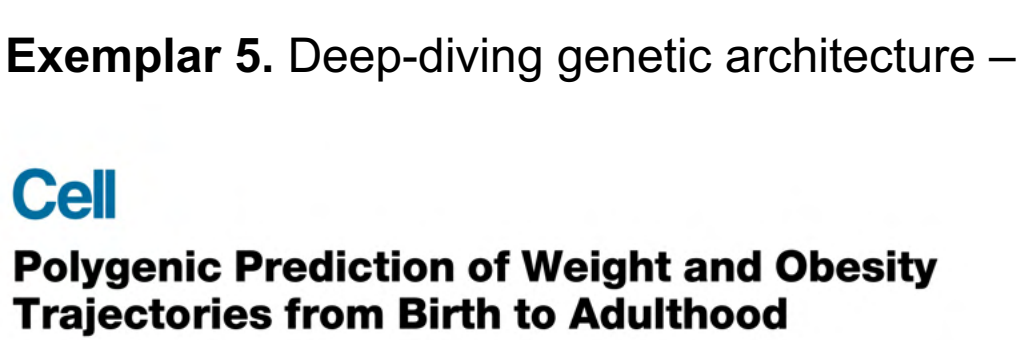
Assortative mating - green

(+ assortative mating by phenotype will lead to genotypic correlation!!)

"… population phenomena can bias estimates of genetic contributions to complex social phenotypes from samples of unrelated individuals. The presence of genetic association … may reflect confounding by underlying population phenomena including population stratification, assortative mating, and dynastic effects"

Morris et al Sci Adv. 2020

Exemplar 5. Deep-diving genetic architecture – common<->rare variants in cohorts


Cell

Polygenic Prediction of Weight and Obesity Trajectories from Birth to Adulthood

Kaitlin Wade
University of Bristol


ARTICLES
https://doi.org/10.1038/s41591-021-01349-y

nature medicine

Check for updates

Loss-of-function mutations in the melanocortin 4 receptor in a UK birth cohort

Ana Goncalves Soares
University of Bristol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MC3R links nutritional state to childhood growth and the timing of puberty

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Citation

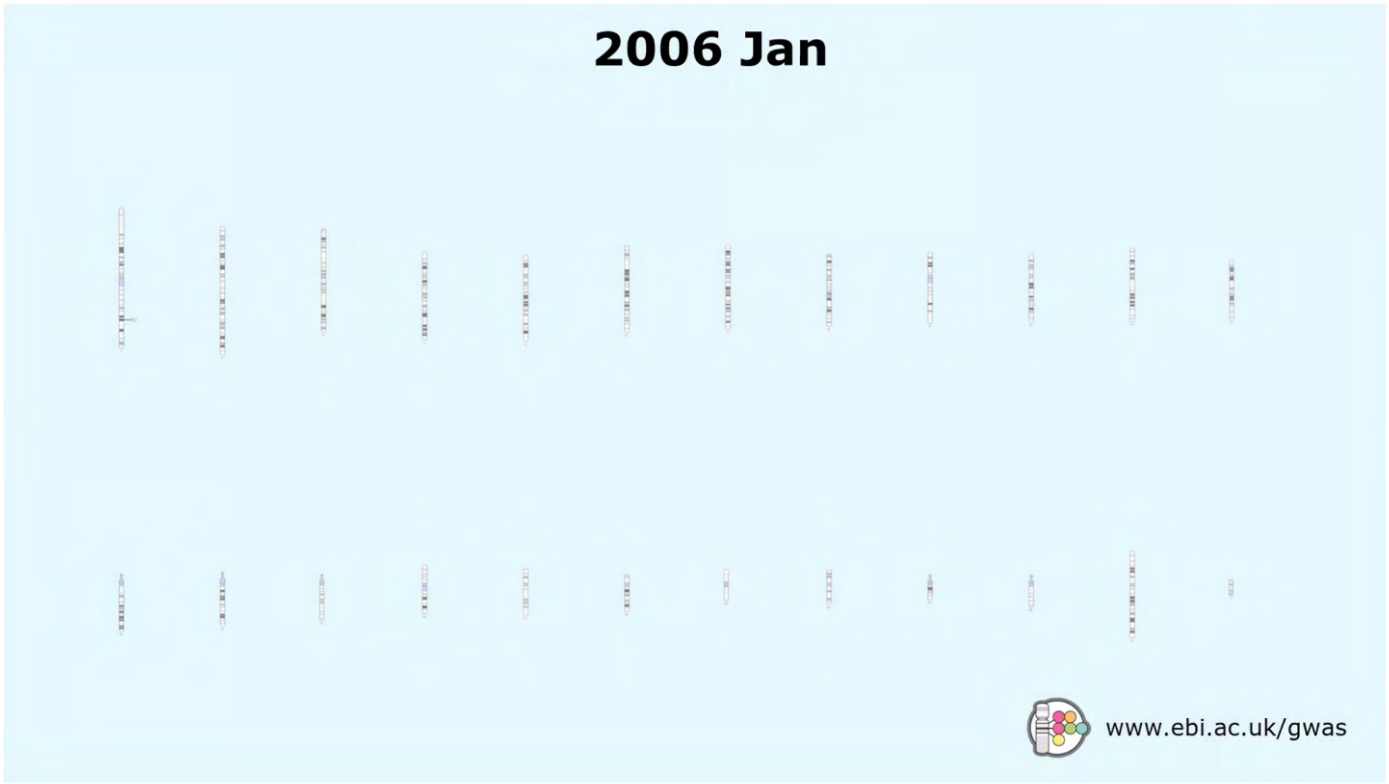
Lam, B., Williamson, A., Finer, S., Day, F., Tadross, J. A., Goncalves Soares, A., Wade, K., et al. MC3R links nutritional state to childhood growth and the timing of puberty. *Nature* https://doi.org/10.17863/CAM.77325

Abstract

The state of somatic energy stores in metazoans is communicated to the brain, which regulates key aspects of behaviour, growth, nutrient partitioning and development1. The

Amit Khera
Mass Gen, Boston

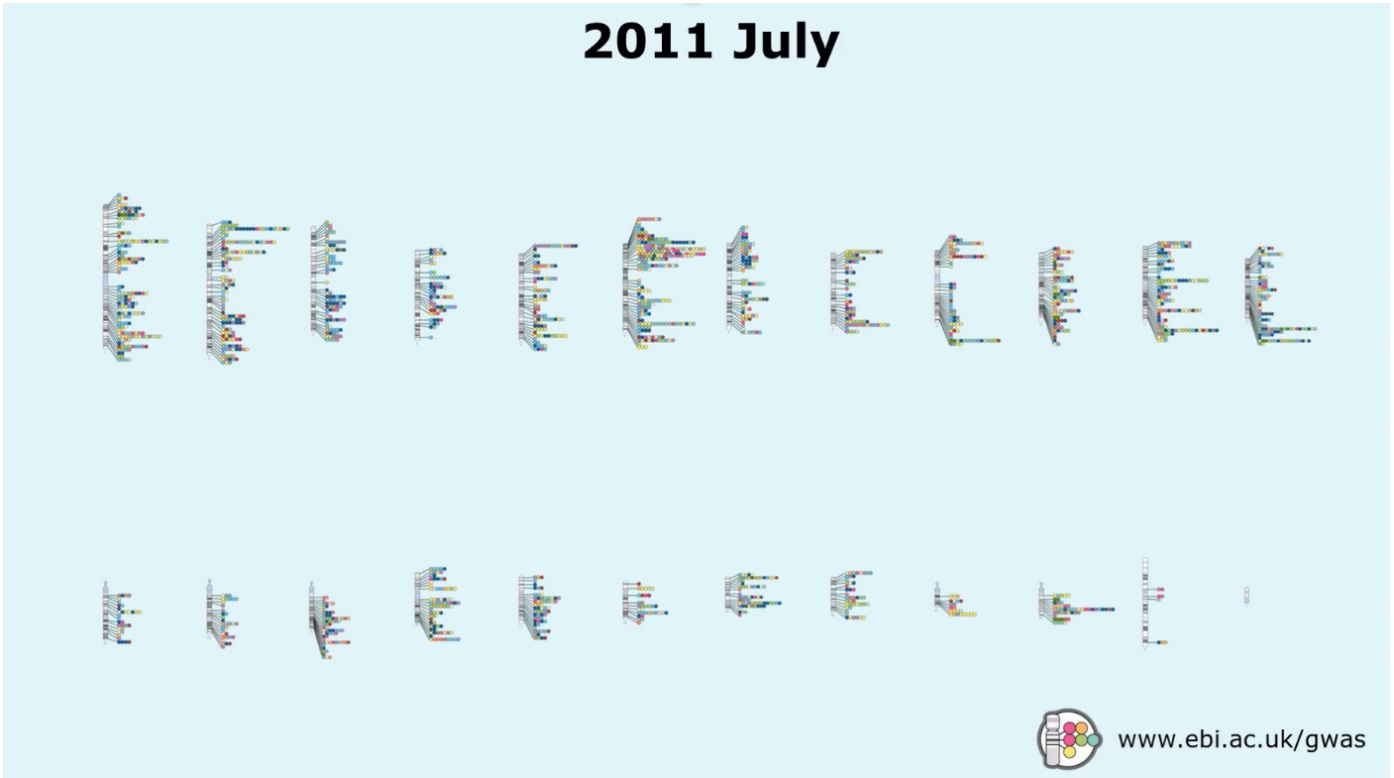
Brian Lam
Metabolic Research Labs, University of Cambridge



The National Human Genome Research Institute / European Bioinformatics Institute "Catalog of human genome-wide association studies"

Data from the end of 2005 -2019… what has been changing?

www.ebi.ac.uk/gwas



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Human Molecular Genetics, 2018, Vol. 27, No. 20 3641–3649

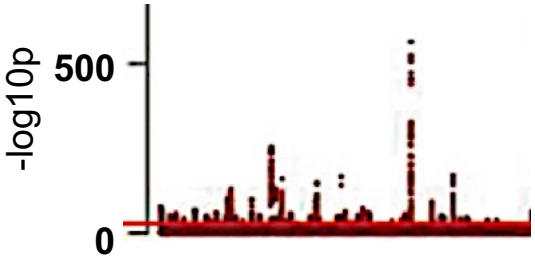
doi: 10.1093/hmg/ddy271
Advance Access Publication Date: 16 August 2018
Association Studies Article

ASSOCIATION STUDIES ARTICLE

Meta-analysis of genome-wide association studies for height and body mass index in ~700 000 individuals of European ancestry

Loic Yengo[1,*], Julia Sidorenko[1,2], Kathryn E. Kemper[1], Zhili Zheng[1], Andrew R. Wood[3], Michael N. Weedon[3], Timothy M. Frayling[3], Joel Hirschhorn[4], Jian Yang[1,5], Peter M. Visscher[1,5] and the GIANT Consortium

* Combined GWAS meta-analysis reaches N ~700 000 individuals



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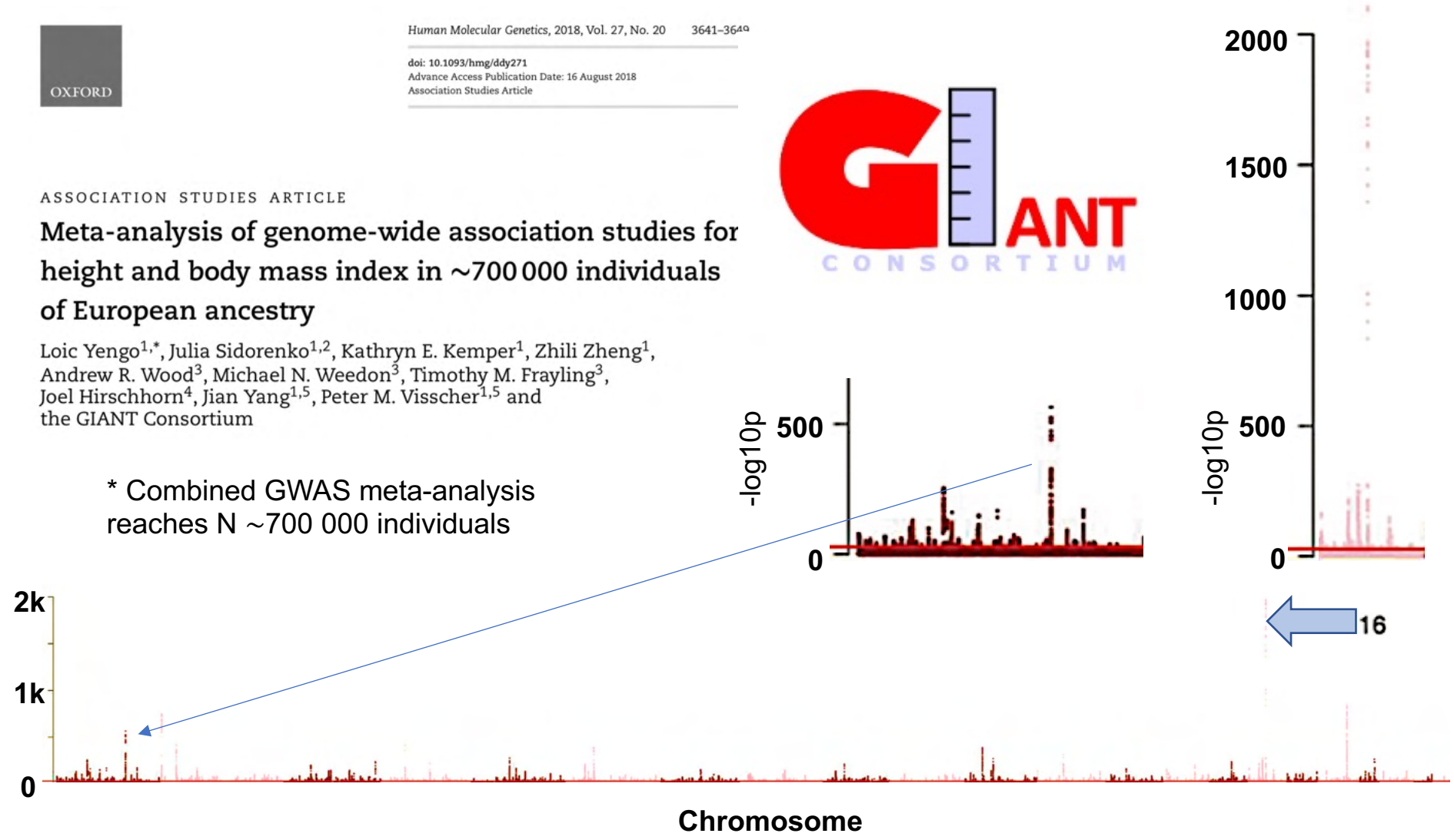
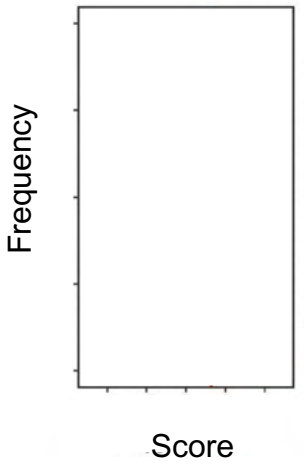


* >900 independent SNPs associated with BMI
* Genome-wide significant SNPs explain ~6.0% of the variance of BMI

Application of genetic risk scores in full form…



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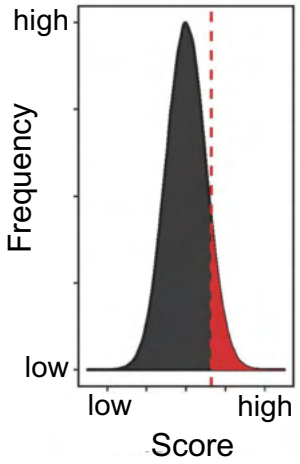

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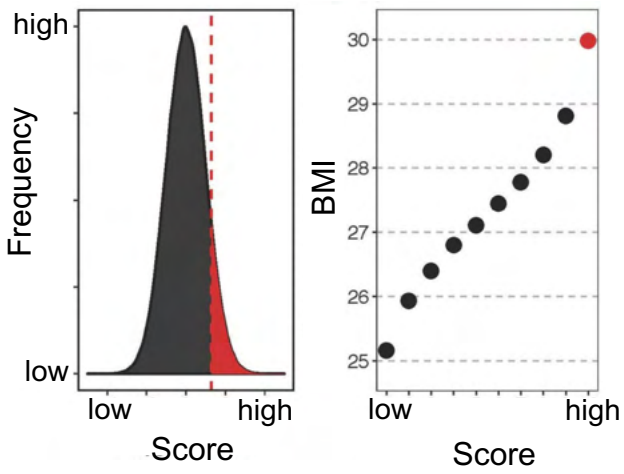

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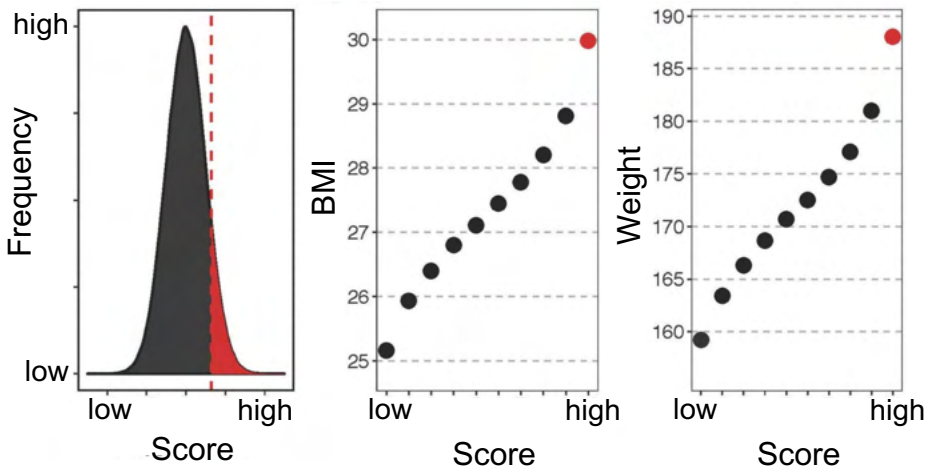

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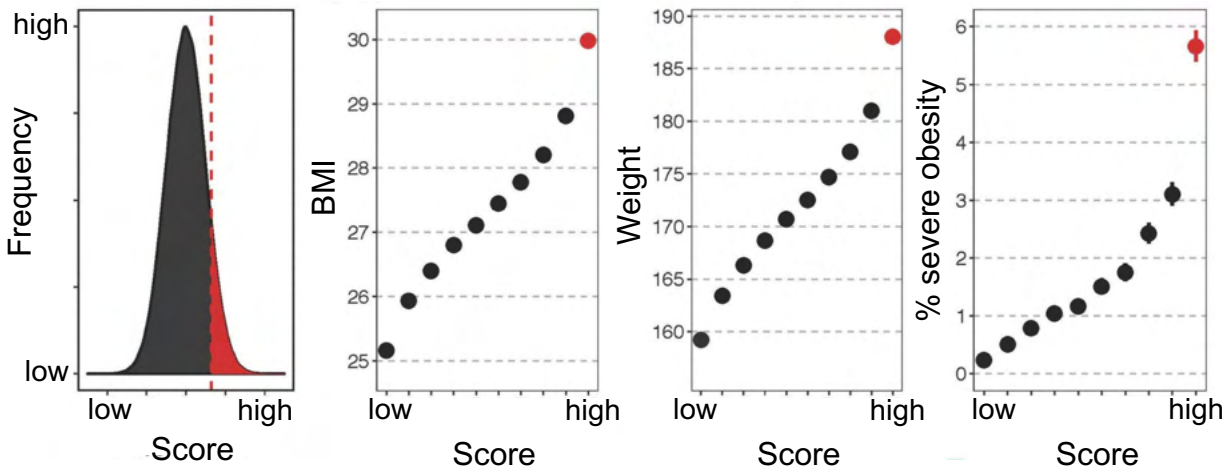


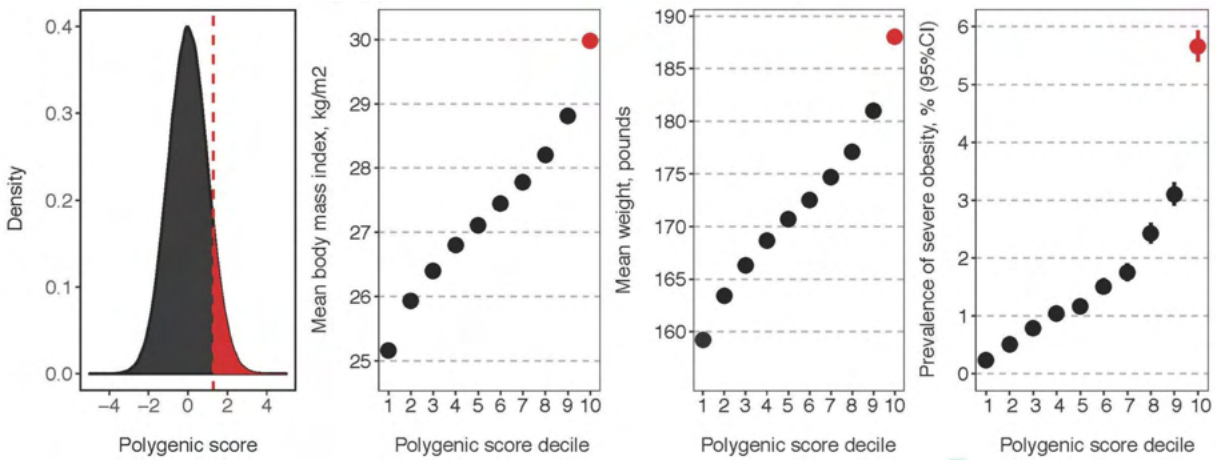
Polygenic score for body-mass index (BMI)

2,100,302 genetic variants

Tested in 119,951 UK Biobank participants

Validated it in 288,018 participants

Application of genetic risk scores in full form…



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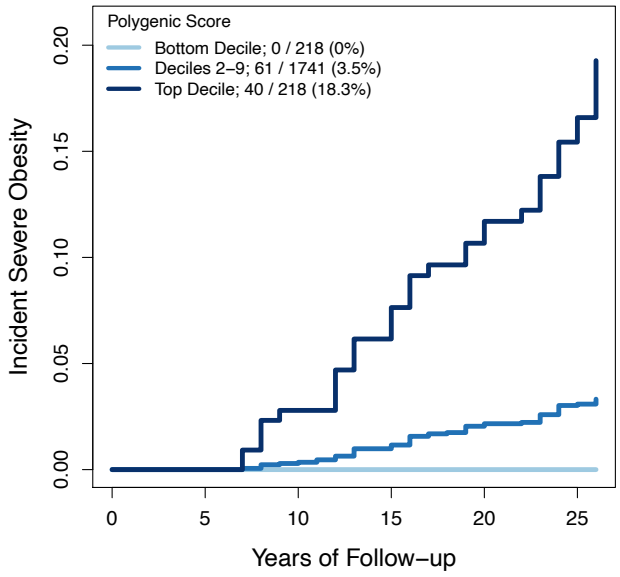
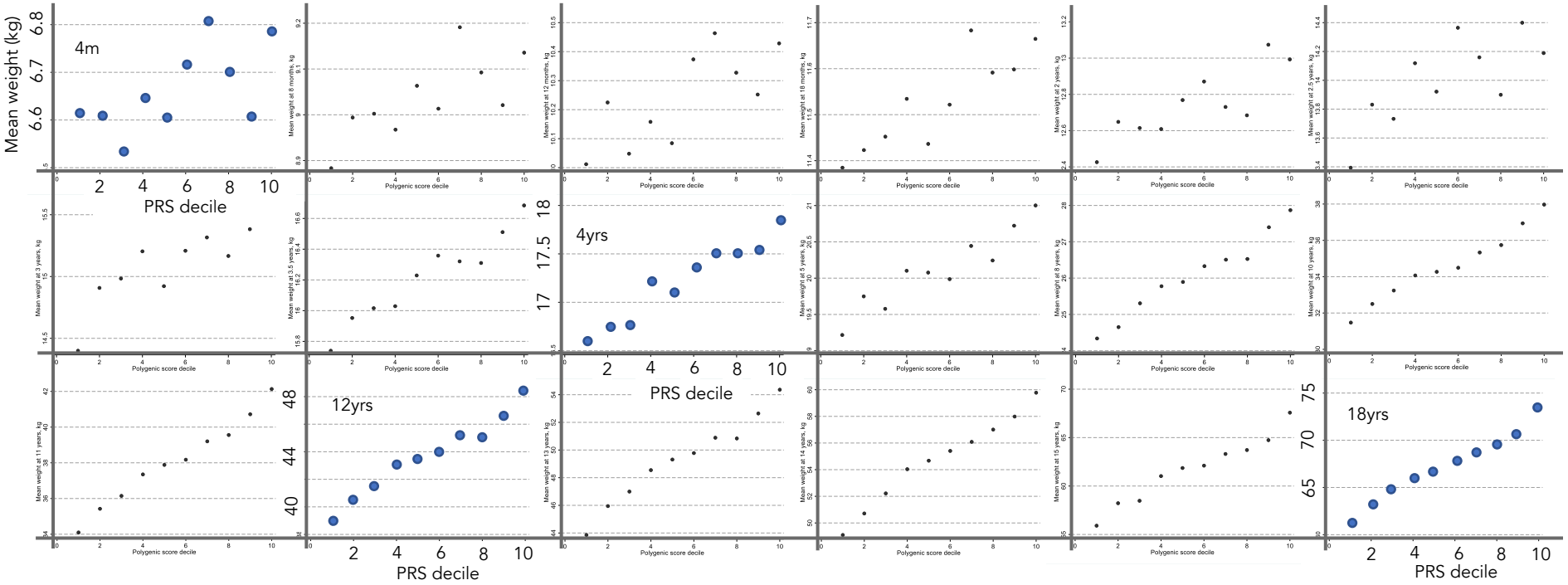


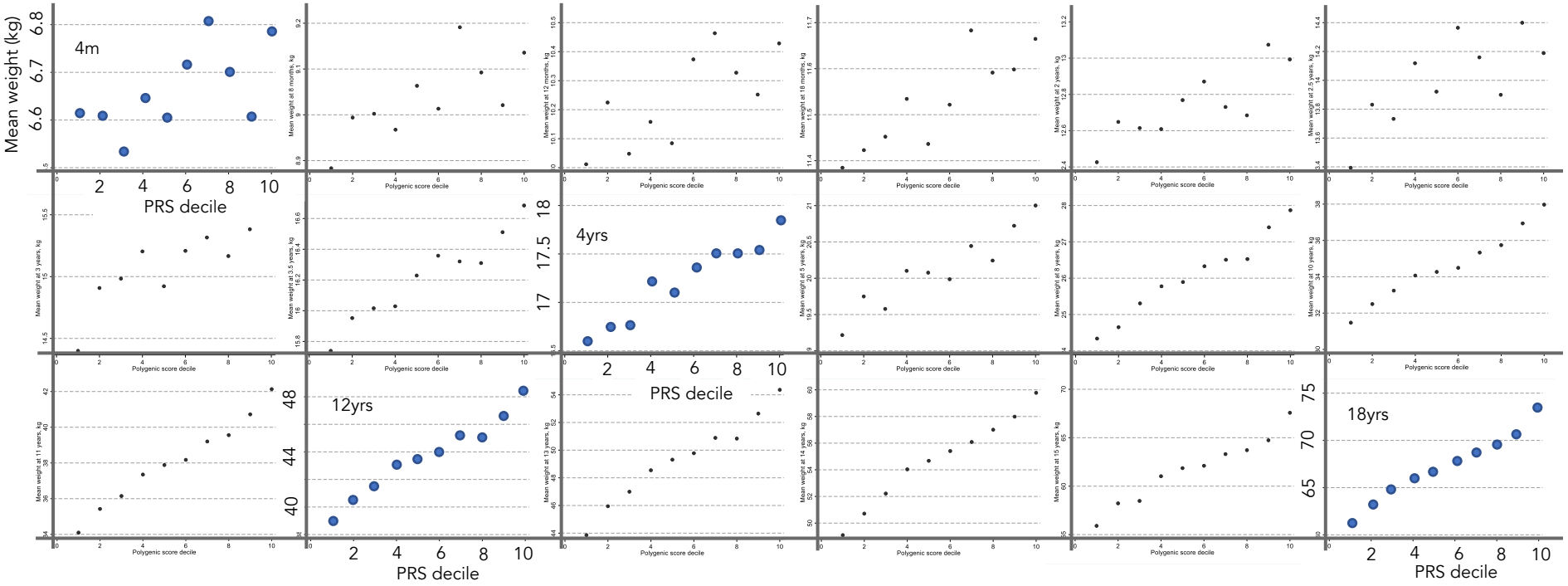
~2k young participants in Framingham Offspring Study

~3 kg/m2 higher BMI
~7kg higher weight
~4-fold increased risk for severe obesity
Increased risk cardiometabolic diseases & all-cause mortality

Severe obesity - 5-fold increased risk of bariatric surgery

Khera AV et all, Cell 2019


Mean weight (kg)
4m
Mean weight at 8 months, kg
Mean weight at 12 months, kg
Mean weight at 18 months, kg
Mean weight at 2 years, kg
Mean weight at 2.5 years, kg
Polygenic score decile
PRS decile
Mean weight at 3 years, kg
Mean weight at 3.5 years, kg
4yrs
Mean weight at 5 years, kg
Mean weight at 8 years, kg
Mean weight at 10 years, kg
Mean weight at 11 years, kg
12yrs
Mean weight at 13 years, kg
Mean weight at 14 years, kg
Mean weight at 15 years, kg
18yrs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4m
4yrs
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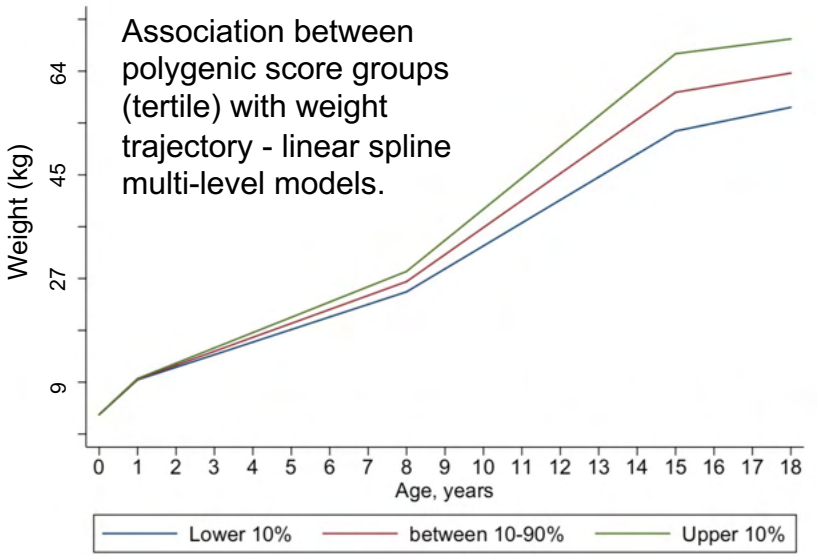
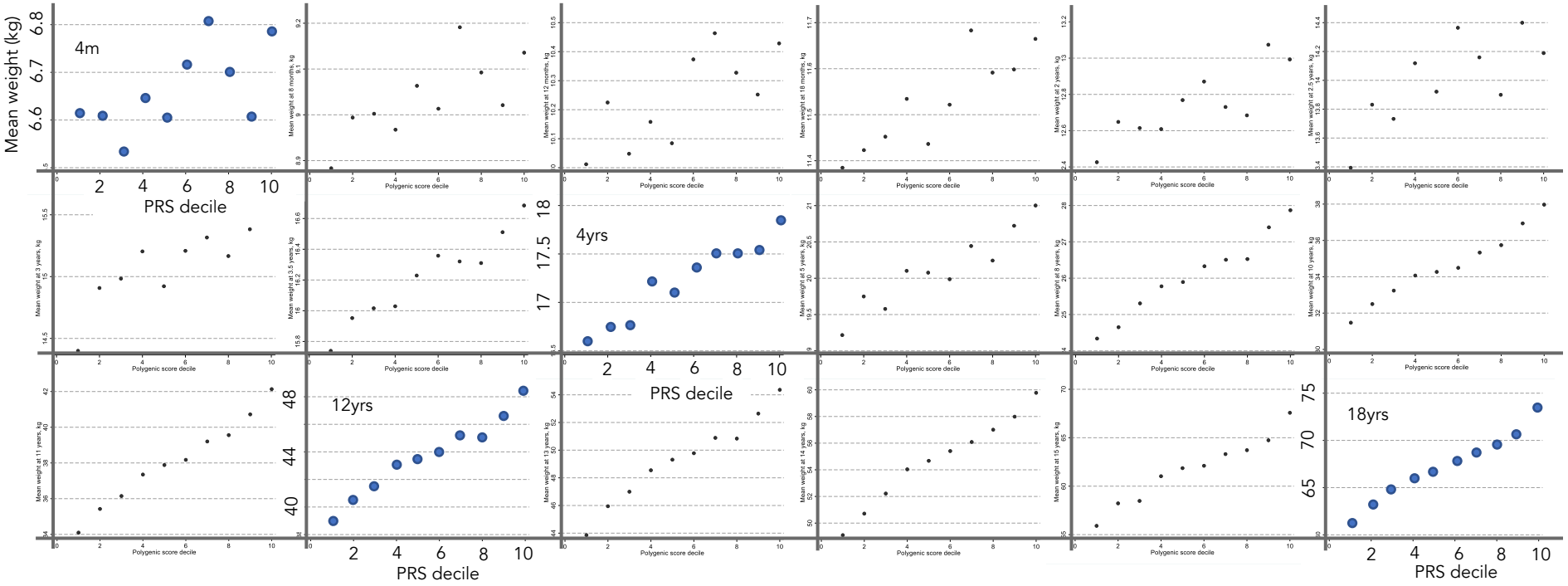
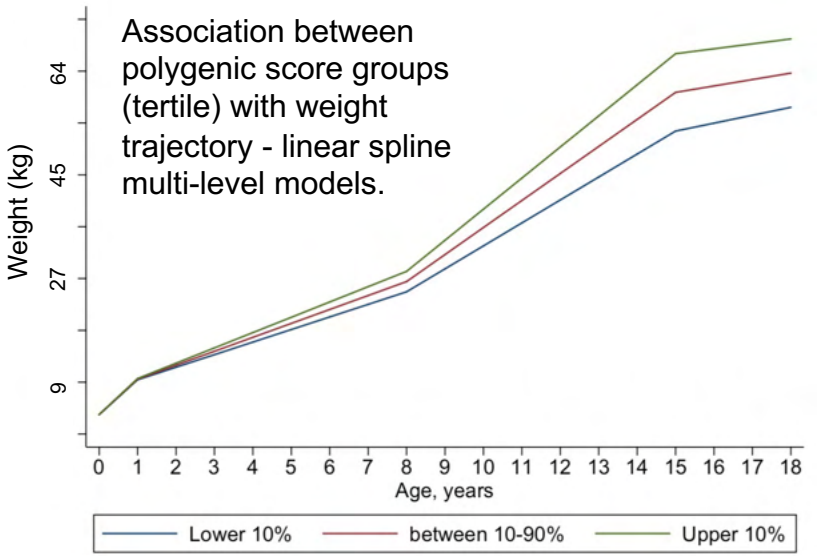
18yrs
PRS decile
Polygenic score decile


Association between polygenic score groups (tertile) with weight trajectory - linear spline multi-level models.
Weight (kg)
Age, years
Lower 10%
between 10-90%
Upper 10%

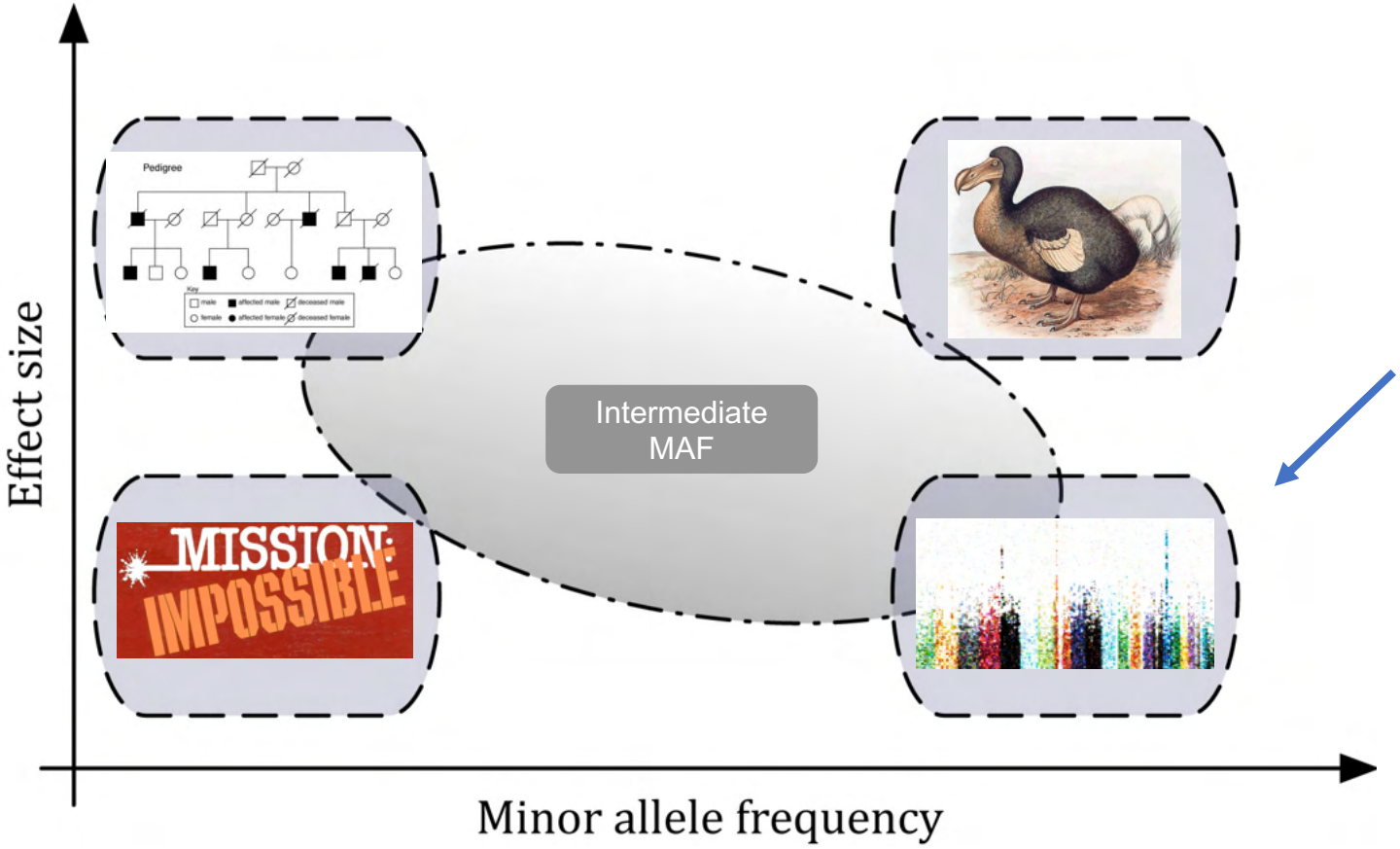


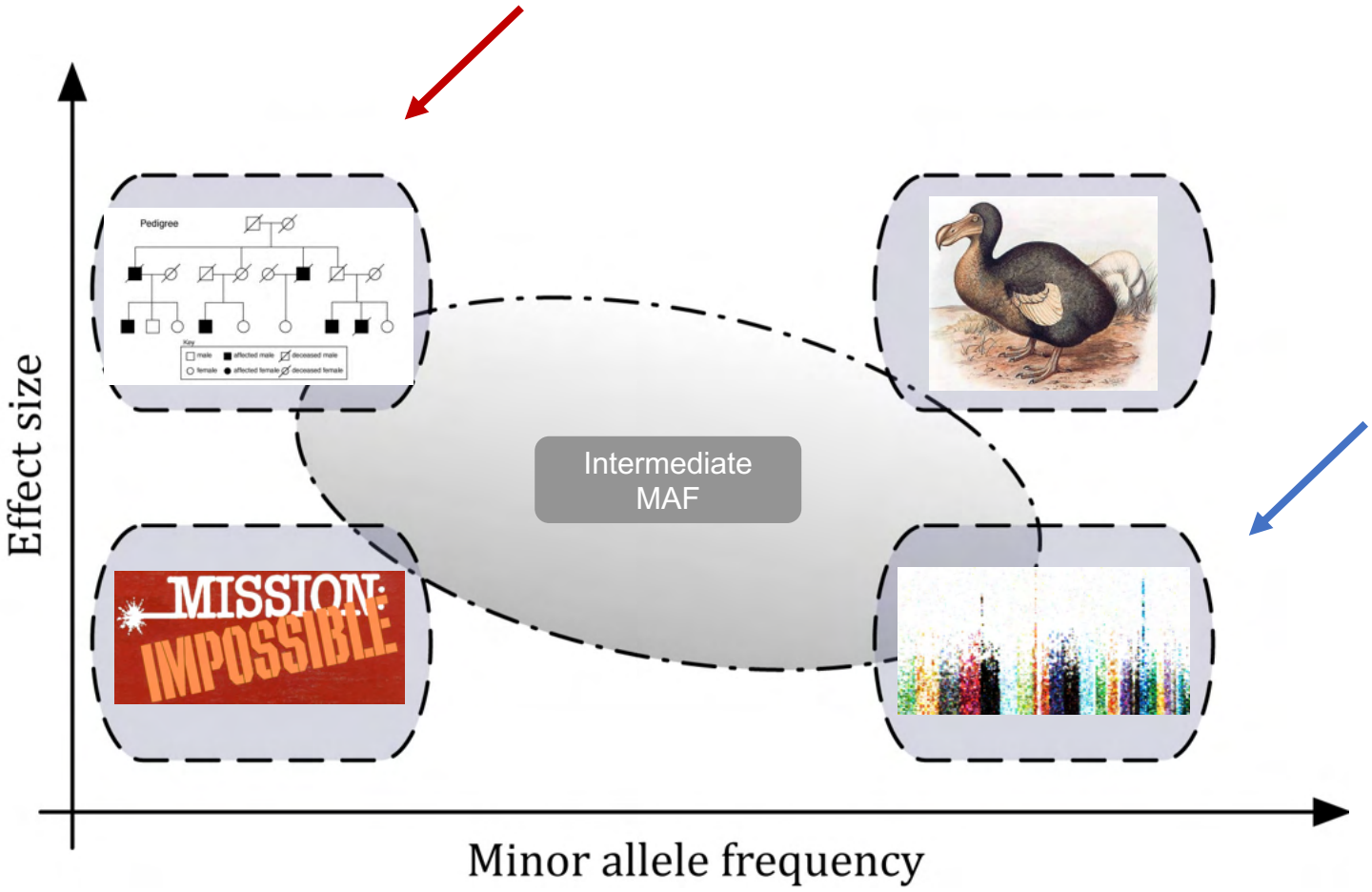


Sociodemographic factor	Estimate (95% CI)[1]	P-value
Family income (per week)	-0.03 (-0.06, -0.01)	0.002
Maternal highest qualification	-0.05 (-0.07, -0.03)	2.87×10^{-06}
Paternal highest qualification	-0.03 (-0.05, -0.01)	0.003
Household social class	0.02 (-0.002, -0.05)	0.07

Association between sociodem' factors and polygenic score

[1]Estimates represent the average change in the standardized polygenic score with each unit increase in the categorical sociodemographic factors


Effect size
Minor allele frequency
Intermediate MAF
Pedigree
MISSION: IMPOSSIBLE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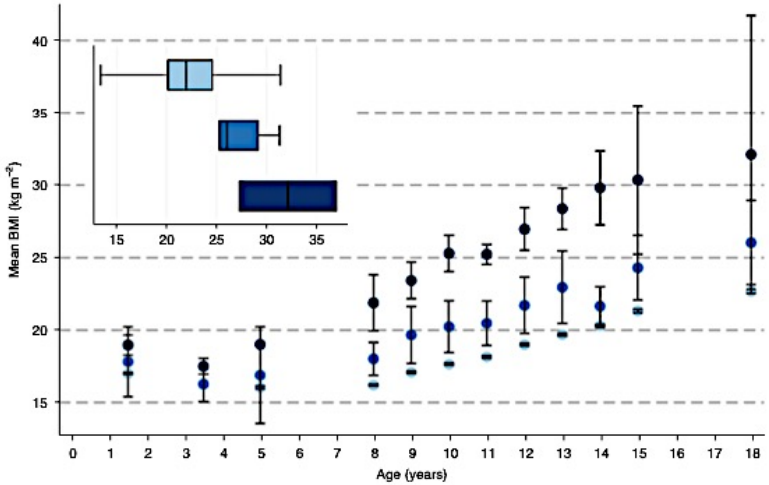
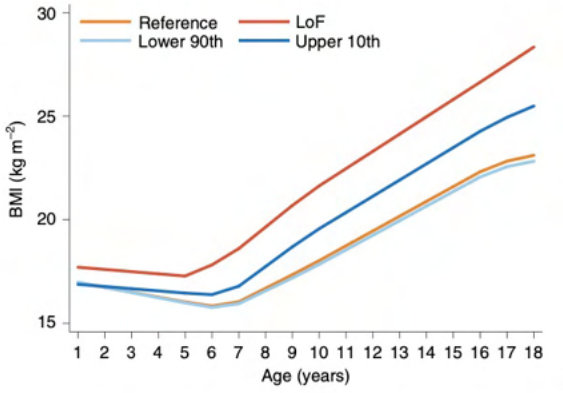


Reference, pLoF and cLoF groups are depicted in light, medium and dark blue, respectively.

Heterozygous mutations that impair the function of the *MC4R* gene may very well be found in several millions of people worldwide a frequency of **~1 in 340**



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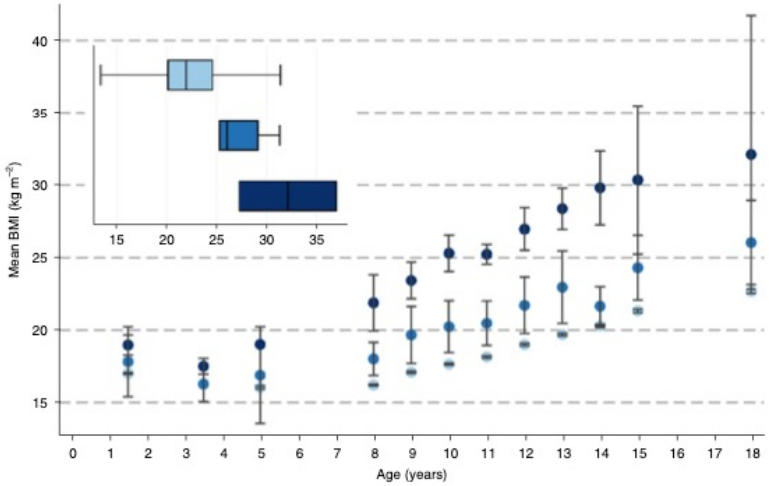

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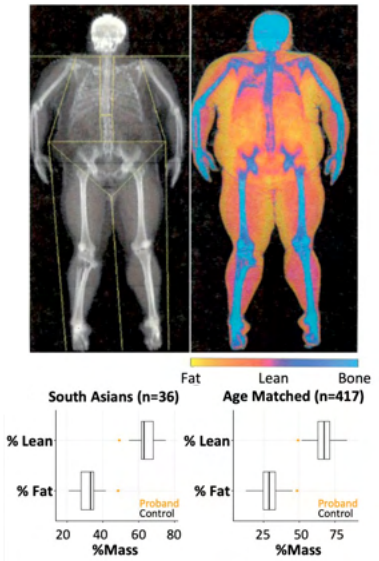

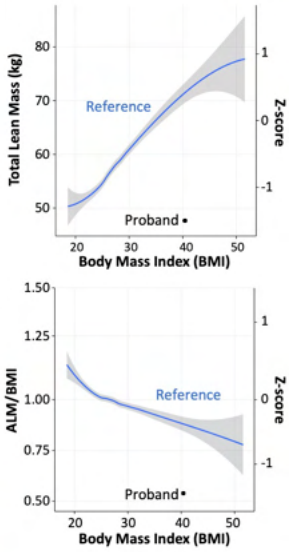

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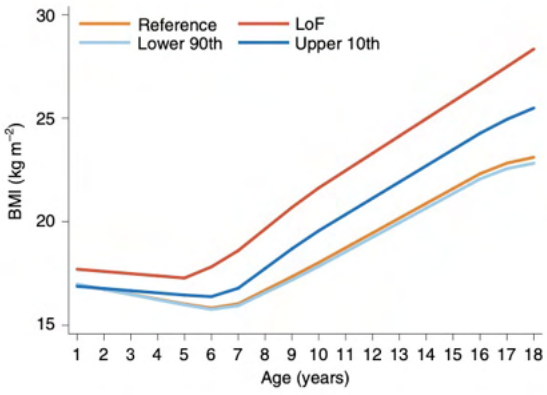

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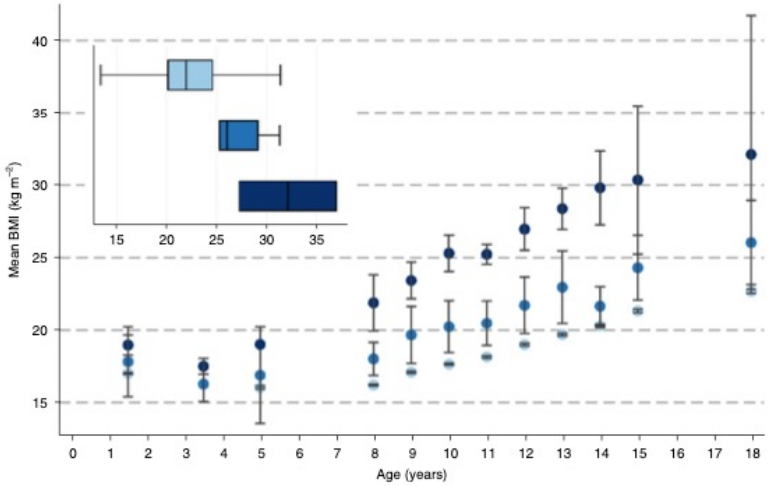

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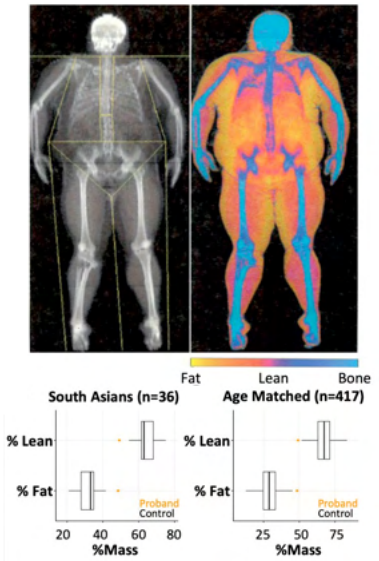

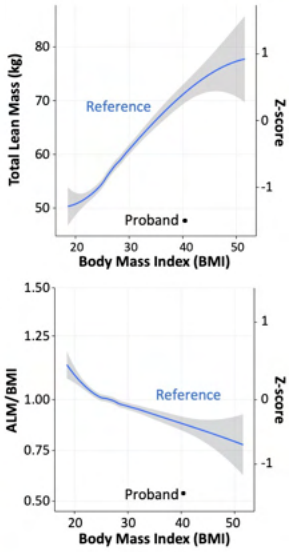

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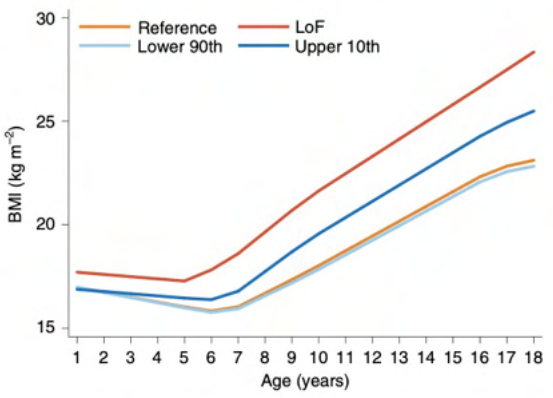

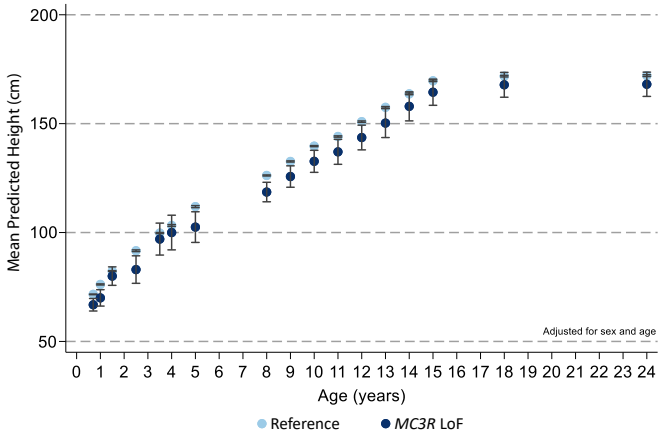

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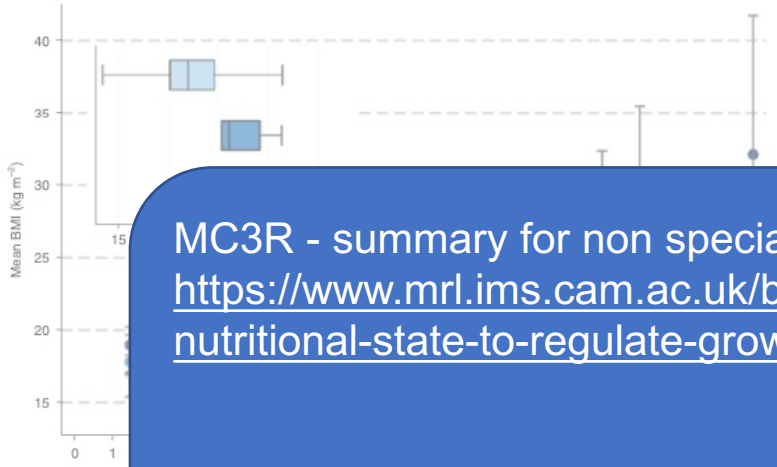

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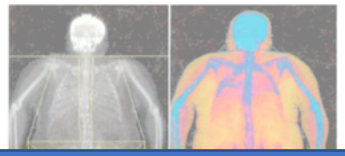

MC3R - summary for non specialists – https://www.mrl.ims.cam.ac.uk/blog/scientists-discover-how-our-brain-uses-nutritional-state-to-regulate-growth-and-age-at-puberty

Steve O'Rahilly - blog on the way this story evolved – https://www.mrl.ims.cam.ac.uk/blog/the-long-story-on-mc3r-regulation-of-growth-and-age-at-puberty-how-we-did-it

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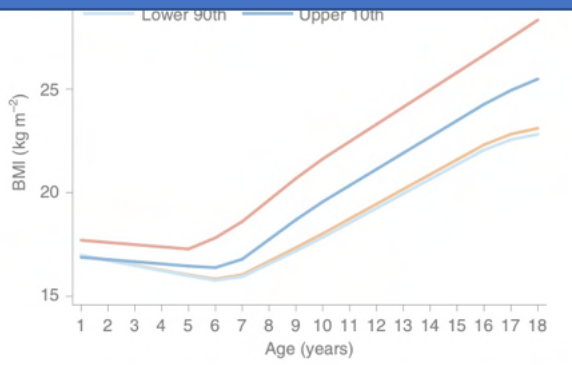
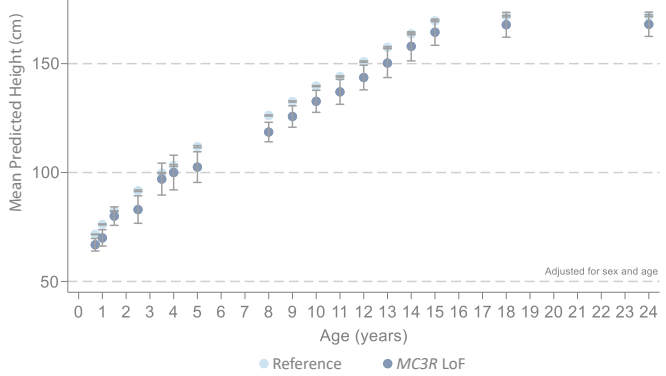
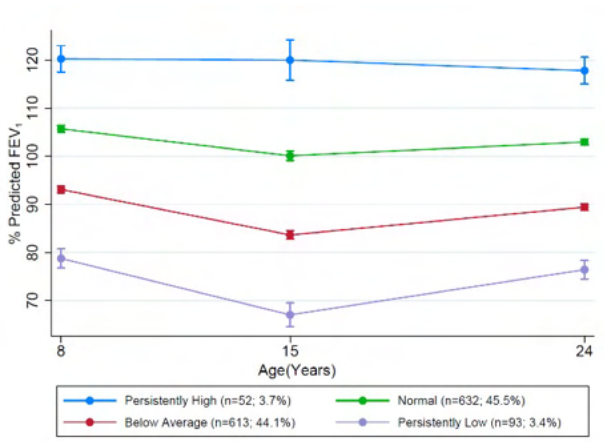


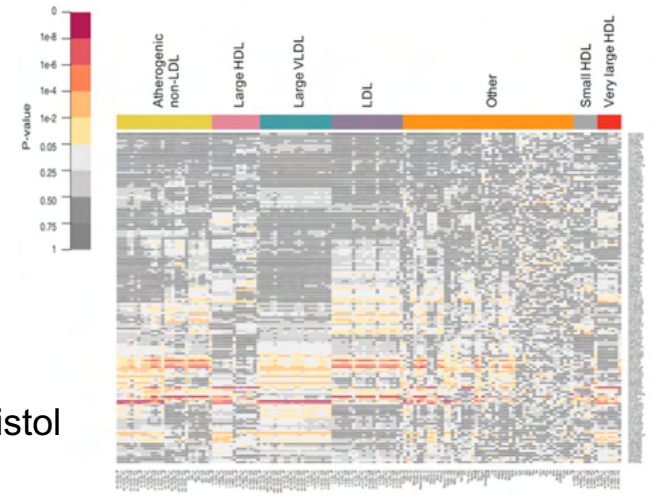


Exemplar 6. Why should we examine healthy folk?

(T1) The antecedents of disease and well-being
(T2) Cross-generation contributions to health and well-being
(T3) Era specific contributions to health and well-being



Raquel Grannel
University of Bristol



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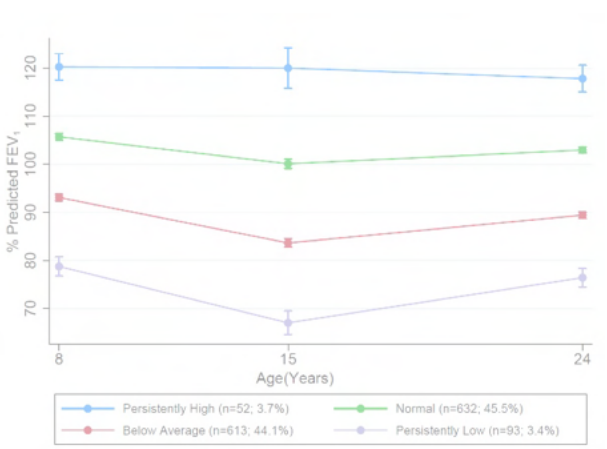

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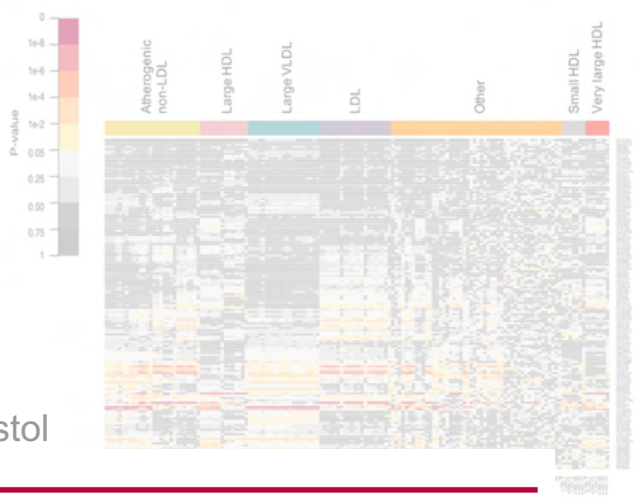


Tom Battram
University of Bristol

Prevalence of steatosis and fibrosis in young adults in the UK: a population-based study

Kushala W M Abeysekera, Gwen S Fernandes, Gemma Hammerton, Andrew J Portal, Fiona H Gordon, Jon Heron, Matthew Hickman

Summary

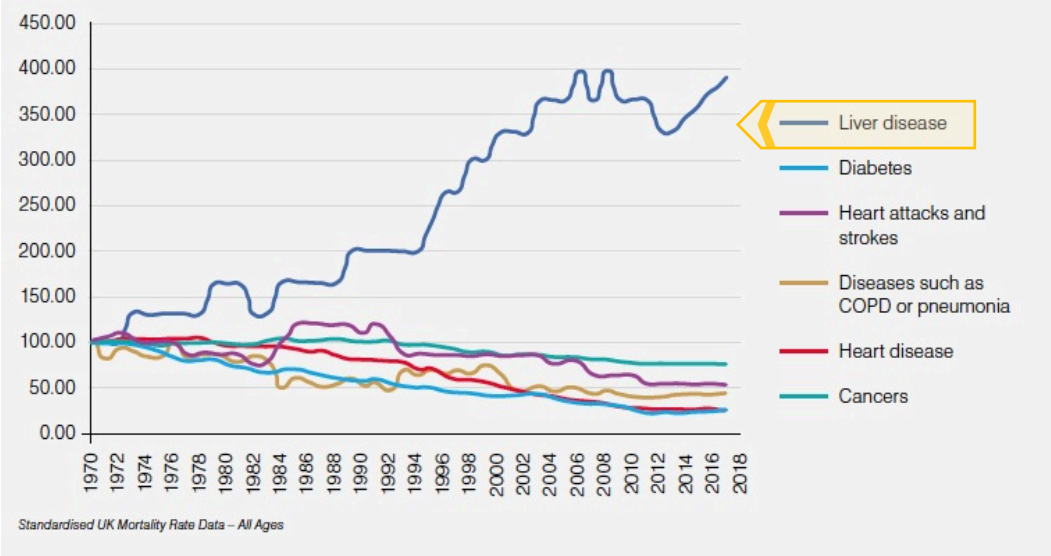
Background The estimated worldwide prevalence of non-alcoholic fatty liver disease (NAFLD) in adults is 25%; however, prevalence in young adults remains unclear. We aimed to identify the prevalence of steatosis and fibrosis in young adults in a sample of participants recruited through the Avon Longitudinal Study of Parents and Children (ALSPAC), based on transient elastography and controlled attenuation parameter (CAP) score.

Lancet Gastroenterol Hepatol 2020
Published Online January 15, 2020
https://doi.org/10.1016/

Kushala Abeysekera
University of Bristol

Exemplar 6. Why should we examine healthy folk?

- Liver disease mortality rates in the UK have increased in the last 50 years
- One of the leading causes of death in working age
- Patients often present as medical emergencies to A&E
- Long asymptomatic course offers window for prevention, but we lack normative data on liver health in younger years
- 2 major causes in the UK:
  - Alcohol related liver disease
  - Non-alcoholic fatty liver disease (NAFLD - related to obesity)



British Liver Trust report "The alarming impact of liver disease in the UK" (https://www.britishlivertrust.org.uk/wp-content/uploads/The-alarming-impact-of-liver-disease-FINAL-June-2019.pdf)

Acknowledgements:

Wellcome Trust

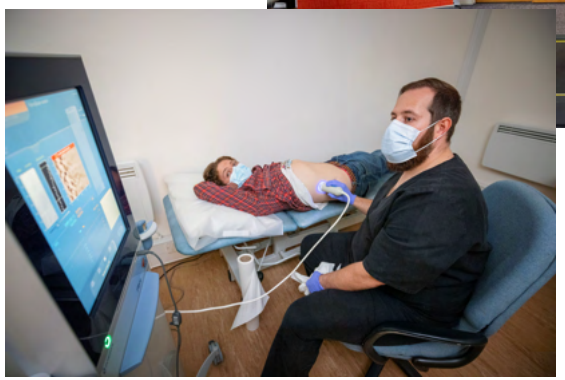
Medical Research Council

University of Bristol

Bristol alumni and friends – key supporters

Co90s team

Co90s participants



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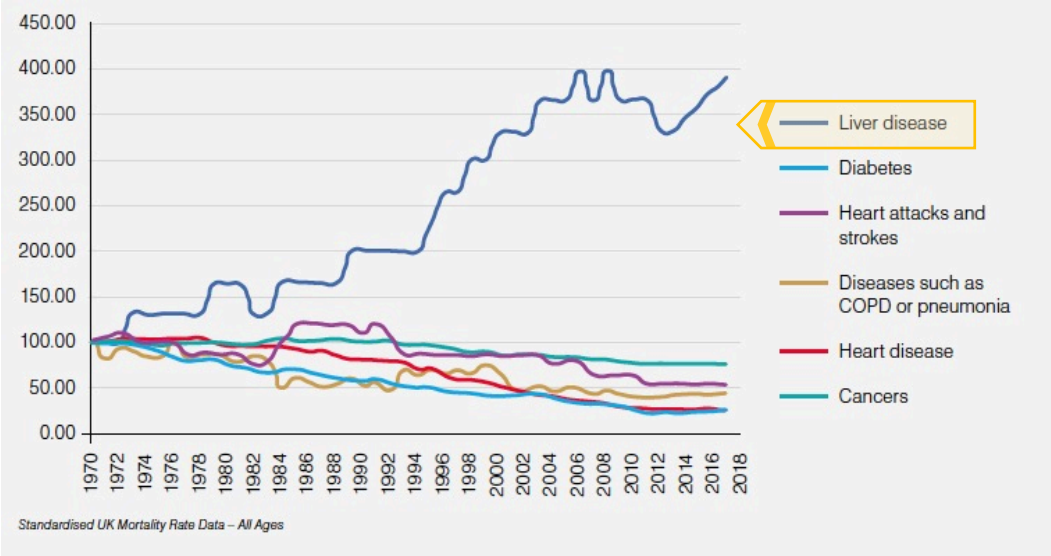

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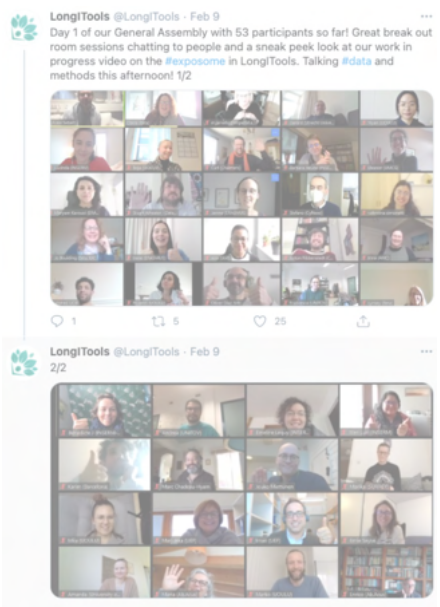
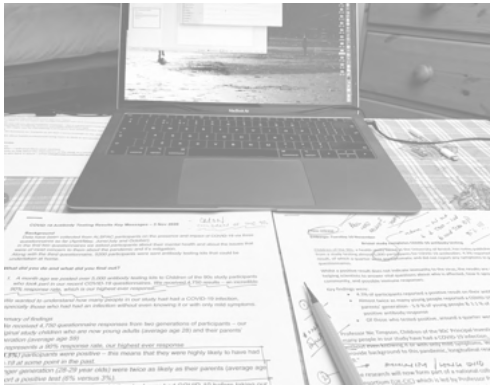
At age 17 years – 2.5% had NAFLD
At age 24 years – **>20% had NAFLD**, and 1 in 40 had liver scarring (fibrosis)

Pressing questions:

What is the **prevalence** of NAFLD and fibrosis at the pivotal age of 30?
What are the life course **determinants** of early liver disease?
What biological **mechanisms** underpin the progression of early liver disease?

An exemplar to wrap up... SARS-CoV-2 & COVID-19





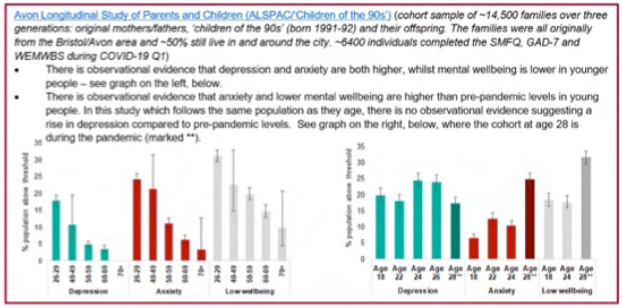
To whom it may concern,

The Avon Longitudinal Study of Parents and Children (ALSPAC) have been able to provide the Mental Health Intelligence Network at Public Health England (PHE) with valuable data on the mental health and wellbeing of the population during the Covid-19 pandemic.

In collaboration with colleagues from the Department for Education (DfE) and the Department of Health and Social Care (DHSC), we are trying to monitor changes in mental health and wellbeing, both at the population level and within particular sub groups. One of the groups that are reporting worse mental health and wellbeing at the moment (April, May, June 2020) are younger adults. This makes ALSPAC very useful.

In addition, it is hard to know whether current levels of self reported mental health reflect a change from before the Covid-19 pandemic. This makes pre-existing longitudinal cohort studies particularly useful.

The image below is a section from one of our weekly information syntheses. We have been producing these for a mailing list within Cabinet Office, NHS England, DHSC, DfE and PHE. We are working towards a regular public update of this evidence sysnthesis, and, in this, look forward to continuing our positive working relationship with the ALSPAC team.



Your sincerely,

Alex Jones

Public Health Intelligence Analyst

National Mental Health, Dementia & Neurology Intelligence Network

Public Health England

PHE Chilton, Didcot, Oxfordshire, OX11 0RQ

01865 458 327

Alex.Jones@phe.gov.uk

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Research and analysis

COVID-19: mental health and wellbeing surveillance report

This report compiles routinely updated indicators from multiple sources and summarises important findings from ongoing surveys.

Published 8 September 2020
From: Public Health England

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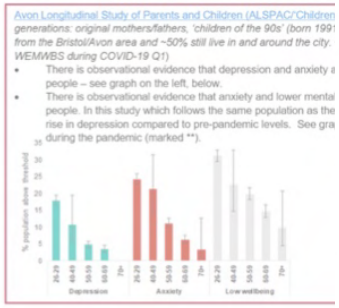

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Quick findings on age distributions of grandparents and parents of primary school aged children

Centre for Ageing and Demography

18/5/2020

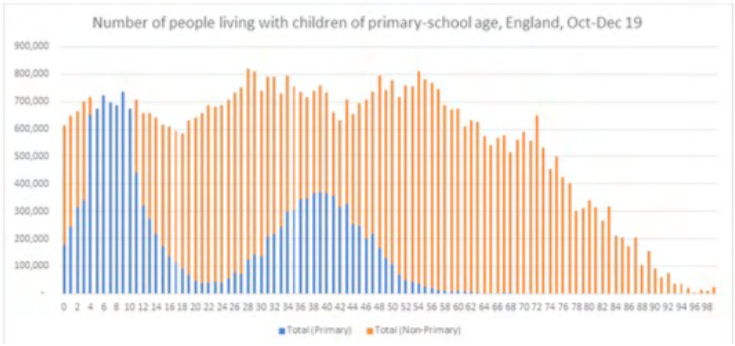
Question 1: What is the age distribution of parents of primary school aged children?

Source: Labour Force Survey

The table below gives proportions of the population aged 20+ within each bracket, for England. The final column is an approximation of the distribution of age of parents of primary-aged children.

Age bracket	General population (percentage of age 20+ population in age bracket)	Parents living in a family unit of 1 or more primary-aged children (Percentage of age 20+ parents in age bracket)
20-24	8%	1%
25-29	9%	7%
30-34	9%	17%
35-39	9%	27%
40-44	8%	26%
45-49	9%	15%
50-54	9%	5%
55 and over	40%	2%

The chart below shows the distribution graphically. The blue bars show the number of people at each age who live in a family unit with one or more primary-aged children. The orange bars show the number of people at each age who don't meet this criterion (so stacked blue and orange is total population at that age).



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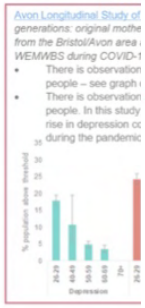

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CHILDREN OF THE 90s

Priority research questions with new insights generated this week – 23 June 2020

Health data research on COVID-19 continues to grow, now reaching 115 pre-print publications

Priority research questions	Insights from ongoing studies (links provide further details):
1. Understanding immunity & testing reliability (R01, 50, 95, 102, 51, 54, 55, 104)	• SARS-CoV-2 antibody responses become detectable after the first week of illness. Dual (nucleic acid & antibody) point of care SARS-CoV-2 testing can significantly improve diagnostic sensitivity, whilst maintaining high specificity.
2. Why do BAME groups have an increased risk of severe COVID-19 outcomes (RQ34, 68)?	• The ISARIC CCP-UK study has shown that ethnic minorities with COVID-19 were more likely to be admitted to critical care, despite similar disease severity on admission, similar duration of symptoms, and being younger with fewer comorbidities. South Asians are at greater risk of dying, due at least in part to a higher prevalence of pre-existing diabetes. • Studies using linked UK Biobank data have demonstrated that being overweight is more strongly linked to COVID-19-related deaths in younger people and non-white ethnicities and that multimorbidity, especially cardiometabolic multimorbidity, and polypharmacy are associated with a higher risk of developing COVID-19, particularly in those of non-white ethnicity. • ZOE Symptom Tracker app data found the risk for a positive COVID-19 test was increased across racial minorities, not completely explained by other risk factors, comorbidities, and sociodemographic characteristics.
3. How do we best understand and protect vulnerable groups? (RQ 22, 32, 36, 62, 102) **- Risk prediction** **- Social & mental health**	• Research using longitudinal research cohorts (ALSPAC and Generation Scotland) has shown increases in anxiety and lower wellbeing since COVID-19, particularly in young people. • Zoe app data was used to identify six distinct symptom presentations, using time-series data that has the potential as a clinical prediction tool. • Analysis of ONS data from the early phases (Dec'19-Mar '20) of the pandemic has shown that paradoxically lower than average mortality rates were observed.
4. Impact on Non-COVID care provision (RQ29, 30, 94)	• Supply and demand for cardiovascular disease services have dramatically reduced, with potential for substantial, but avoidable, excess mortality during and after COVID-19. • A study looking at the impact on provision of mental healthcare found significant reductions in caseloads and total contacts for home treatment teams March to May 2020, although they are now back on the rise (Stewart).
5. Use of existing treatments (RQ18, RQ98)	• The RECOVERY Trial has shown that low-cost dexamethasone reduces death by up to one third in hospitalised patients with severe respiratory complications of COVID-19. • The OpenSAFELY study found that inhaled corticosteroid use in people with asthma did not protect against COVID-19 related deaths.

Newly submitted & prioritised research questions (RQ104, 98, 87, 68) include:

- Identifying the proportion of the population not susceptible to COVID-19 i.e. groups who have tested positive but have not displayed symptoms.
- Linked to priority 5 above - the impact of starting inhaled corticosteroids early in the course of COVID-19 illness.
- The short term and long-term impact of hospitalisation on severe COVID-19 survivors.
- Linked to priority2 above - the extent the difference in mortality by ethnicity is driven by urban/rural environments and social deprivation.

HDRUK
Health Data Research UK

Public Advisory Board Feedback

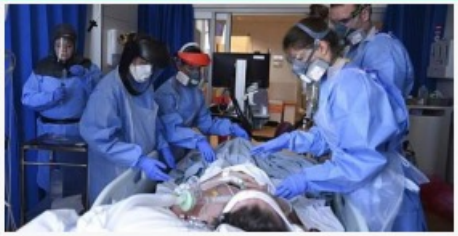
Vital to make full use of datasets available for research across the UK to identify differences and share learning within and been communities.

13 COVID-19 taskforce calls with **67** clinical and health data research leaders engaged

1330 academic, industry and NHS participants in COVID-19 Slack channel with 10 sub-channels

106 health data research questions identified – 40 prioritised

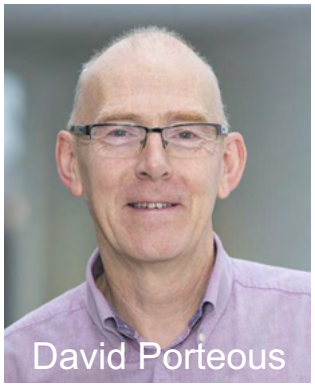
115 COVID-19 pre-print publications

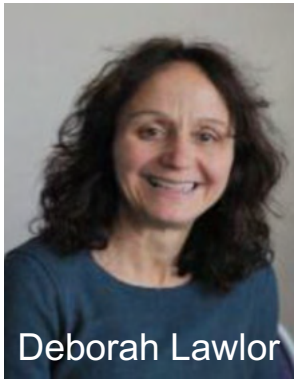


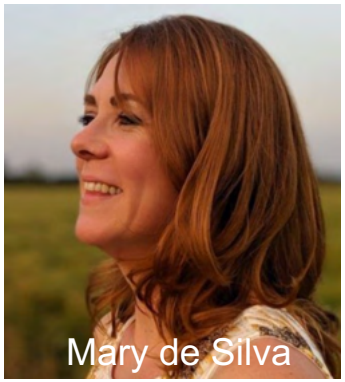
Click here for a link to the full prioritised list of questions, status, and prioritisation process

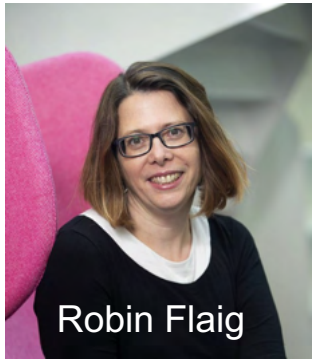
covid-19 questionnaire

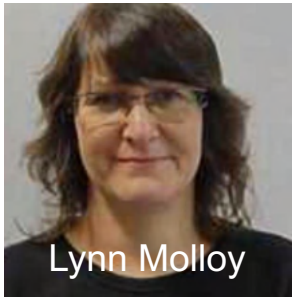
Fully formatted questionnaires (REDCAP/QUALTRICS)
Free access and support for use
Aligned to multiple users

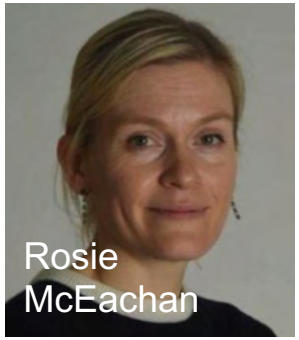










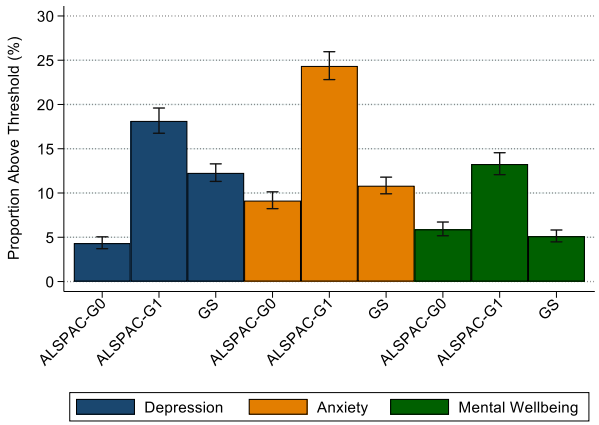


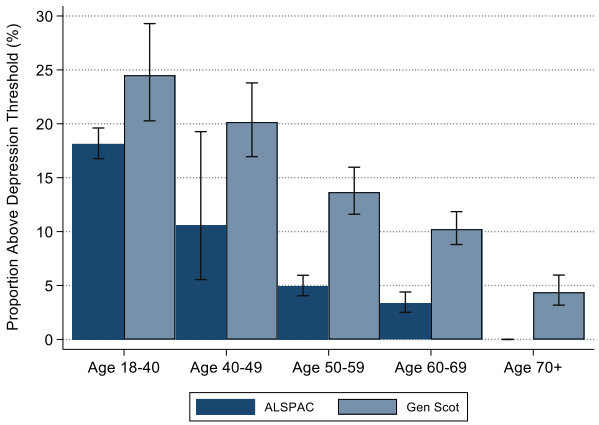
https://bristol.ac.uk/alspac/researchers/wellcome-covid-19/

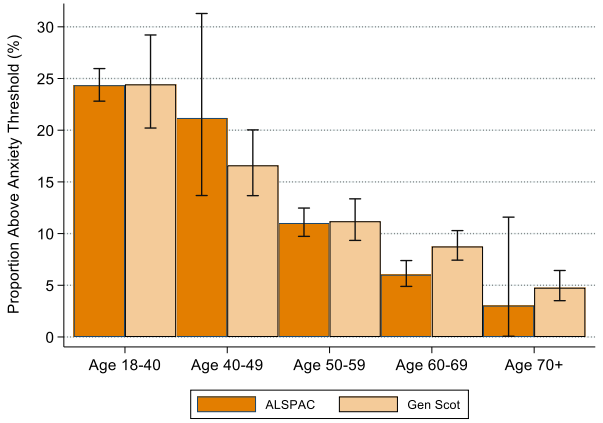
Mental health (MH) during COVID-19

Clear age gradients emerging across MH measures in *both* Generation Scotland and ALSPAC data from Q1

Alex Kwong
University of Bristol &
Edinburgh







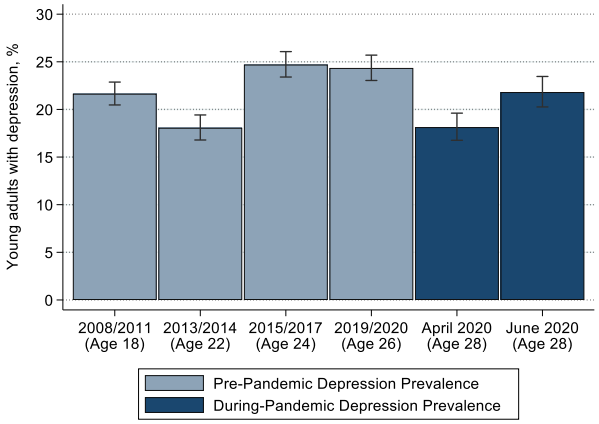
Depression, **anxiety** worse in in younger populations (ALSPAC-G0: n=3720; ALSPAC-G1: n=2850; GS: n= 4233)

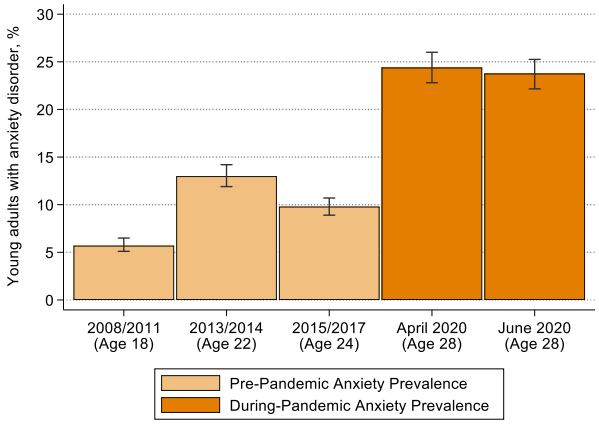
Depression measured by the Short Mood and Feelings Q in ALSPAC and Patient Health Questionnaire 9 in GS
Anxiety measured by the Generalised Anxiety Disorder Assessment in ALSPAC and GS

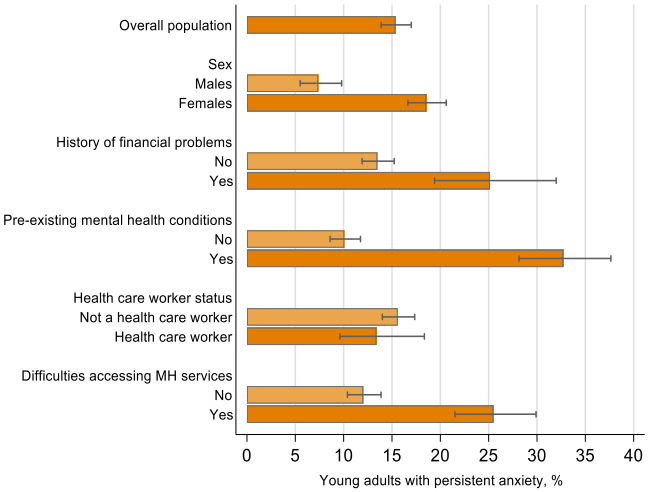
Kwong et al., Mental health during the COVID-19 pandemic in two longitudinal UK population cohorts. *Medrxiv*.

Longitudinal assessment of MH (in the young)

Specificity around anxiety and the persistence of this moving through lockdown and easing.







Left: **Depression** across COVID-19 is stable compared to previous waves in young ALSPAC
Middle: **Anxiety** is higher across COVID-19 compared to previous waves
Right: The proportion of young people with **anxiety** at both COVID-19 waves (persistent anxiety) by subgroups

Kwong et al., Longitudinal evidence for persistent anxiety in young adults through COVID-19 restrictions. *Wellcome Open Res 2020, **5**:195*

covid-19 questionnaire

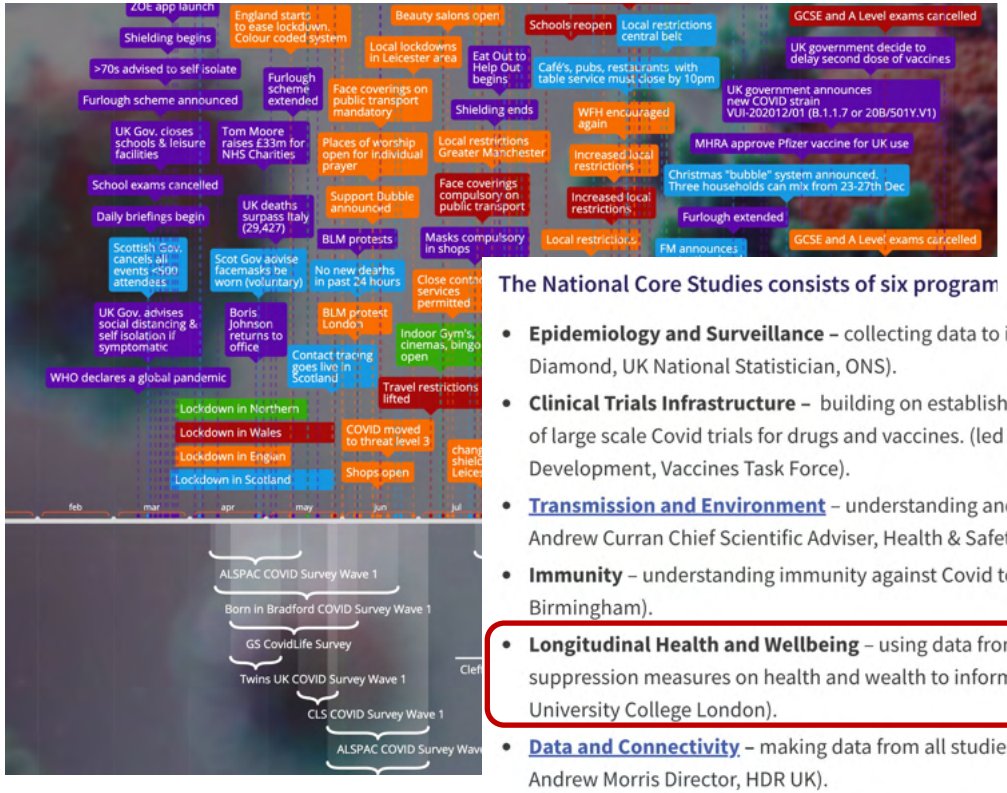
HDRUK Health Data Research UK

Visit the Gateway | Visit the Alliance | Visit HDR UK Futures

Our previous reports to SAGE

We work with The Strategic Advisory Group for Emergencies (SAGE) by providing SAGE with the prioritised health data research related to COVID-19.

SAGE report – 2 November 2021



COVID-19 National Core Studies

The National Core Studies programme is enabling the UK to use health data and research to inform both our near and long-term responses to COVID-19, as well as accelerating progress to establish a world-leading health data and research infrastructure for the future.

The National Core Studies consists of six program :

- **Epidemiology and Surveillance –** collecting data to inform safe level of restrictions and protection against imminent outbreaks (led by Ian Diamond, UK National Statistician, ONS).
- **Clinical Trials Infrastructure –** building on established NIHR infrastructure (and equivalent in Devolved Administrations) to accelerate delivery of large scale Covid trials for drugs and vaccines. (led by Patrick Chinnery, Clinical Director, MRC and Divya Chadha Manek, Head of Business Development, Vaccines Task Force).
- **Transmission and Environment** – understanding and mitigating transmission of the disease in workplace, transport and public places (led by Andrew Curran Chief Scientific Adviser, Health & Safety Executive).
- **Immunity** – understanding immunity against Covid to inform back-to-work policies (led by Paul Moss Professor of Haematology, University of Birmingham).
- **Longitudinal Health and Wellbeing** – using data from longitudinal studies to address the impact of COVID-19 and of associated viral suppression measures on health and wealth to inform mitigating strategies (led by Nishi Chaturvedi, Professor of Clinical Epidemiology, University College London).
- **Data and Connectivity** – making data from all studies available and accessible to inform decision makers and catalyse COVID-19 research (led by Andrew Morris Director, HDR UK).

"Pretty nice to be able to say "social science is super impactful, and strengthened by the capacity to compare patterns/relationships across contexts" – cohorts enable that…"

Gareth Griffith & Alex Kwong
Universities of Bristol & Edinburgh

wellcome covid-19 questionnaire

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BJPsych | The British Journal of Psychiatry (2021) 218, 334–343. doi: 10.1192/bjp.2020.242

CrossMark

Mental health before and during the COVID-19 pandemic in two longitud population cohorts

Alex S. F. Kwong*, Rebecca M. Pearson*, Mark J. Ad
Chloe Fawns-Ritchie, Helen Bould, Naomi Warne, Sta
Nadia Micali, Abraham Reichenberg, Matthew Hickm
Drew Altschul, Robin Flaig, Andrew M. McIntosh, Del
Nicholas J. Timpson*

The British Journal of Psychiatry

Pre-pandemic mental health and disruptions to healthcare, economic and housing outcomes during the COVID-19 pandemic: evidence from 12 UK longitudinal studies

Published online by Cambridge University Press: **30 September 2021**

Giorgio Di Gessa, Jane Maddock, Michael J. Green, Ellen J. Thompson, Eoin McElroy, Helena L. Davies, Jessica Mundy, Anna J. Stevenson, Alex S. F. Kwong and Gareth J. Griffith ...Show all authors

Show author details

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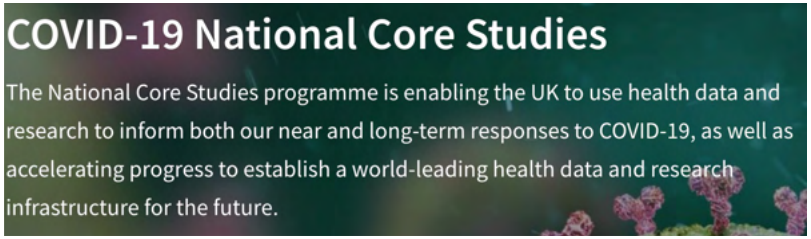

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CrossMark

Mental health before and during the COVID-19 pandemic in two longitud
population cohorts

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Cambridge Core

Characterisation, determinants, mechanisms and consequences of the long-term effects of COVID-19: providing the evidence base for health care services

NIHR | National Institute for Health Research

UK Longitudinal Linkage Collaboration

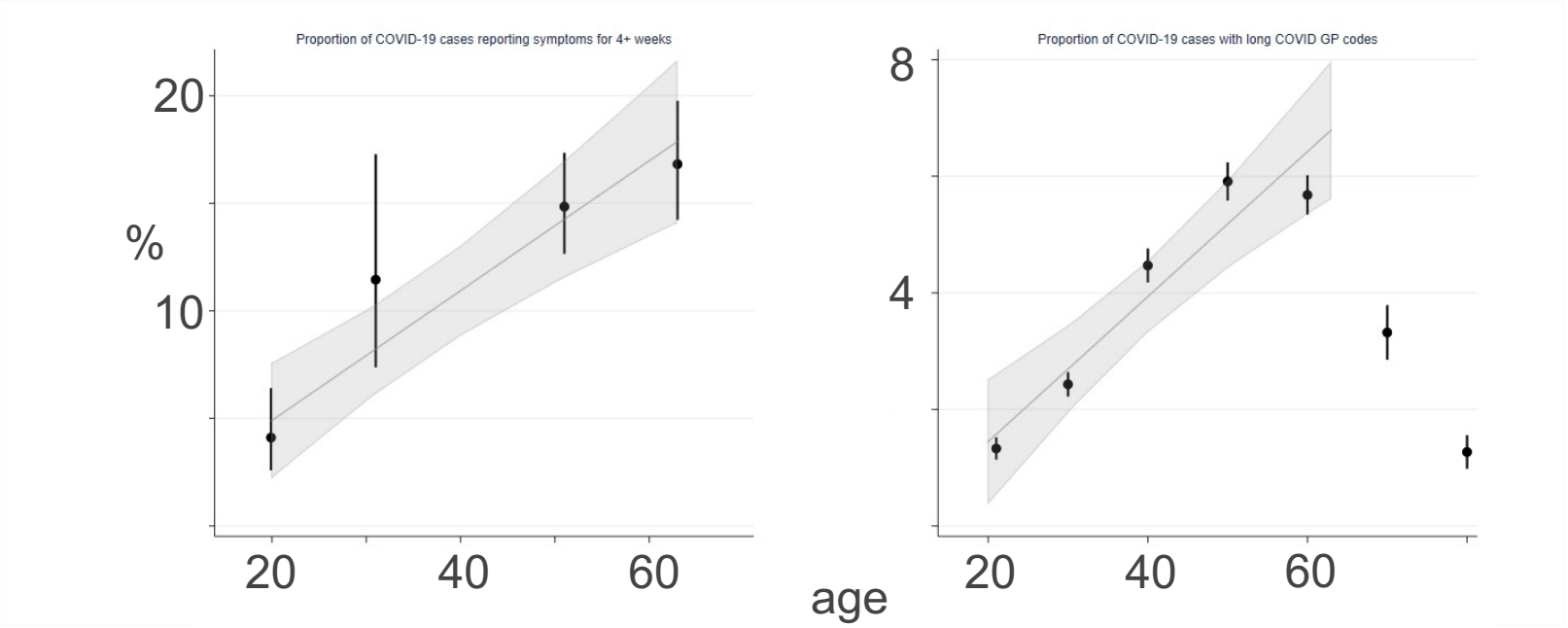
OpenSAFELY

Cohorts

Long COVID (part of SAGE briefing June/July)

Categorised by the UK's National Institute for Health Care and Excellence as acute COVID-19 (AC; lasting up to 4 weeks), ongoing symptomatic COVID-19 (**OSC**; from 4 to 12 weeks), and post-COVID-19 syndrome (**PCS**; over 12 weeks), with the latter two categories combined as 'long COVID'

Thompson et al, medRxiv 2021.06.24.21259277



LEFT - longitudinal studies - proportions reporting symptom length of four or more weeks in COVID-19 cases were ascertained from questionnaire responses.

RIGHT - in OpenSAFELY, proportions represent individuals within 10-year age categories who have long COVID codes in GP records.

March/April 2020	October 2020	March 2021	Summer + 2021
Early, bespoke sample collection and analysis (UKCiC)	ORIENTGENE (REACT) ALSPAC/TUK/ Edinburgh/EXCEED/ BiB	**THRIVA** **10 studies** **~30k participants** **Ab results coupled with linkage and longitudinal data**	Primary data analysis of new THRIVA results Continuation of bespoke data collection/analysis Alignment with other enterprises to maximise value: CoCONNECT – ATLAS / ISARIC / PHOSP

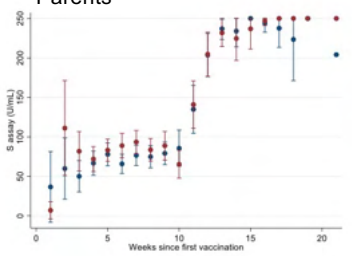
UK Longitudinal Linkage Collaboration

wellcome covid-19 questionnaire

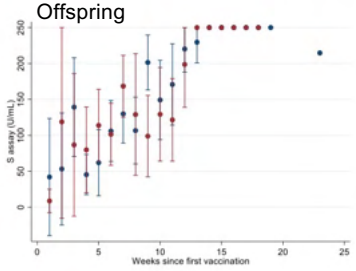
This testing now allows the meaningful analysis of associations between cohort/life course data and potential antibody response set-point.

ALSPAC & TUK - existing, pre-pandemic variables

Parents

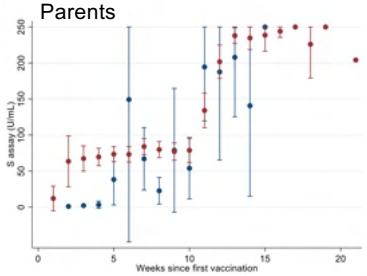


Offspring



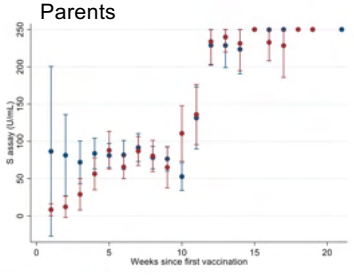
BMI (<25kg/m^2=blue, >=25=red)

Parents

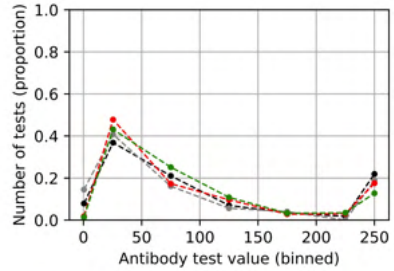


Self report of weakened immune system/ability to fight infection. Yes=blue

Parents

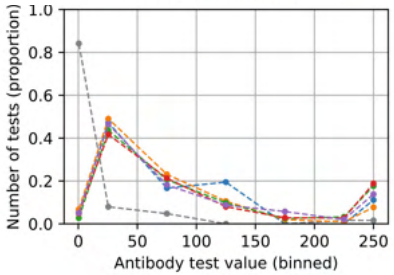


Number of previous infections. Median or below =blue. Higher than median=red.



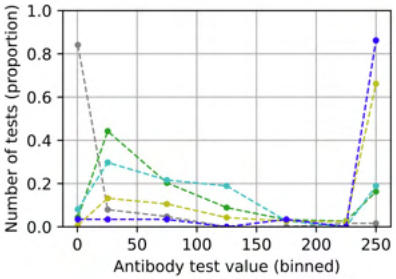
Age

- Anti-S, 1 vaccination, 18-44
- Anti-S, 1 vaccination, 45-54
- Anti-S, 1 vaccination, 55-64
- Anti-S, 1 vaccination, 65+



General health

- Anti-S, 0 vaccinations
- Anti-S, 1 vaccination, PPH: Poor
- Anti-S, 1 vaccination, PPH: Fair
- Anti-S, 1 vaccination, PPH: Good
- Anti-S, 1 vaccination, PPH: Very Good
- Anti-S, 1 vaccination, PPH: Excellent



Ethnicity

- Anti-S, 0 vaccinations
- Anti-S, 1 vaccination, White
- Anti-S, 1 vaccination, Non-white
- Anti-S, 2 vaccinations, White
- Anti-S, 2 vaccinations, Non-white

HLA haplotype

PRS genotypic risk

History of infection

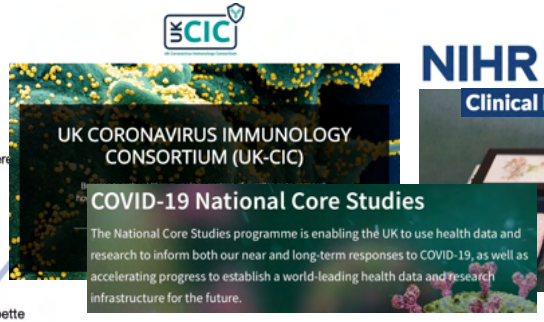
Trajectories health

Epigenetic variation

Other immune variables

Factors in EHR/linkage

IMPACT 1 – scientific advance – fast, policy relevant, dynamic data collection
IMPACT 2 – communication and engagement with the target population



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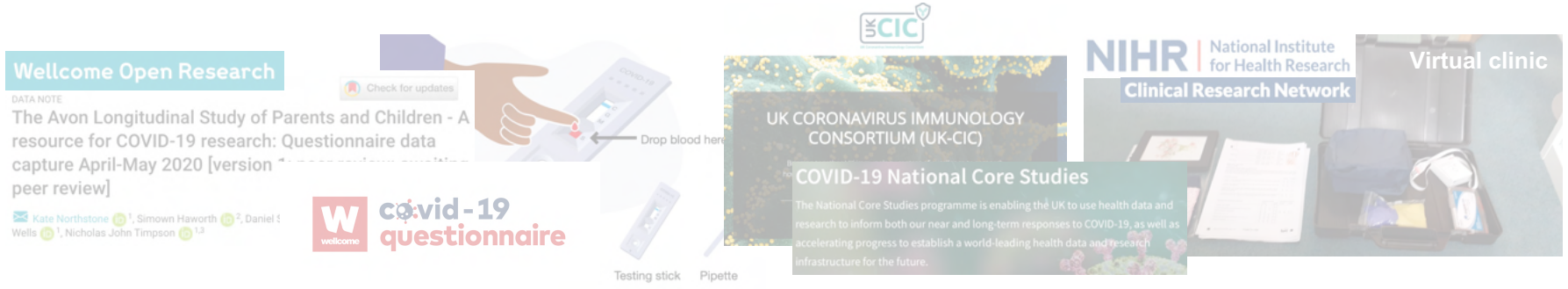
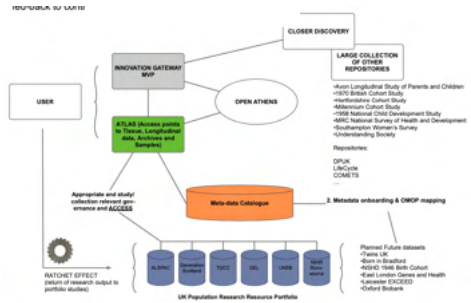


CHALLENGE 1 – post COVID_19 spotlight – engagement and maintenance
CHALLENGE 2 – visibility and access – from data collection to use



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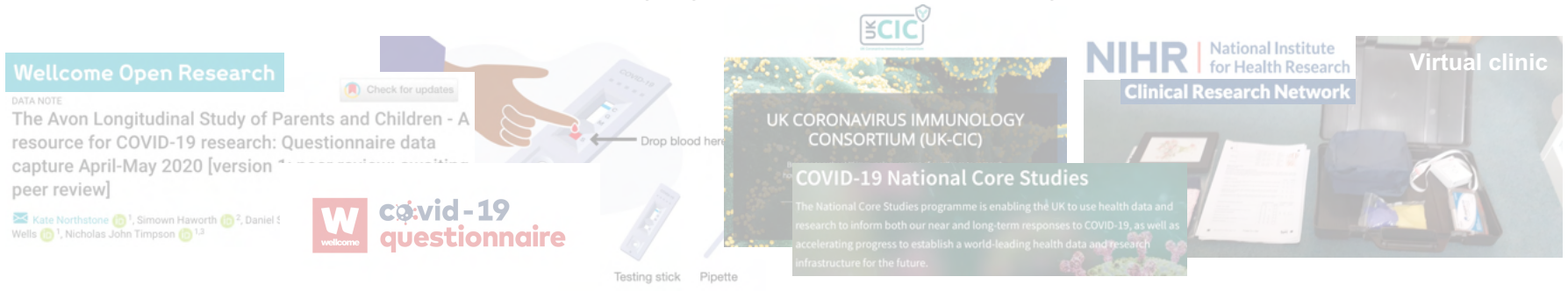

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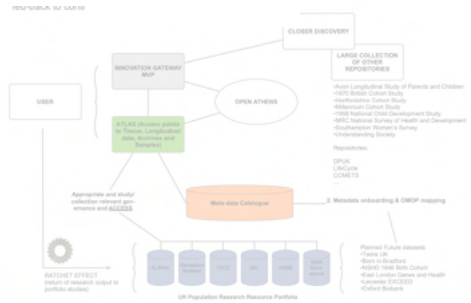
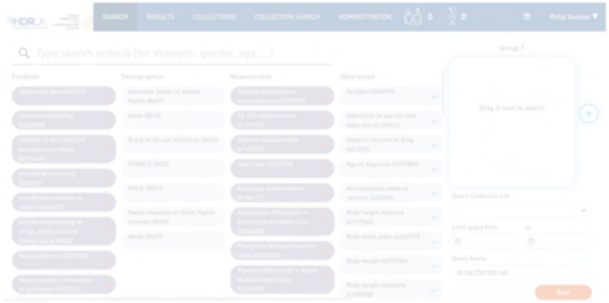
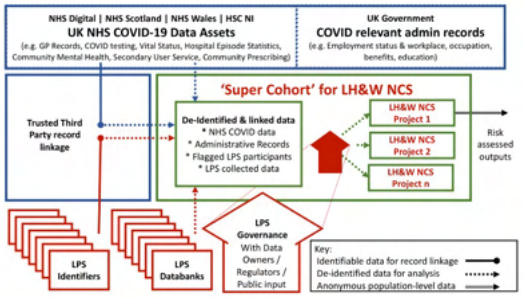
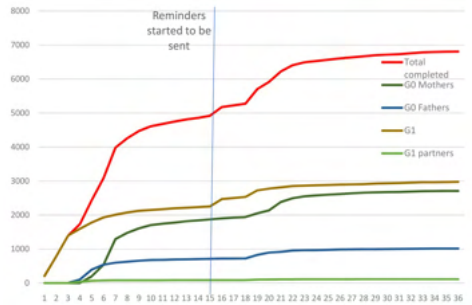




OPPORTUNITY 1 – EHRs and the synergy of scale and bespoke design
OPPORTUNITY 2 – capturing a public understanding of data and research





Potency of longitudinal studies – dynamy and utility amongst other resource types

Investment and support required – maintenance is critical, but requires justification

Headlines when out of the spotlight – needs energy and stakeholder engagement

Breadth and capacity of studies like ALSPAC, Gen Scot, TUK, UKBB, BiB, CLS, US, ELSA, EXCEED… & Growing up in Ireland…

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PLEASE reach out and help us to think imaginatively about cohorts

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