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
How can we meet the demands of our science?

MACRO

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)

MICRO

How can we meet the demands of our science?
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

>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)
Current ALSPAC LPS/CSRG proposal (July 2019-June 2024)

G0/G1/G2

- Open clinic, record linkage, remote data
- 8000 participants over 3 years from 2020
- 3300 participants from 1700 families from current to 2024

Core clinic interactions for G0/G1/G2 parents

Followup clinic sessions for G2 participants

Expansion of record linkage to ALSPAC city footprint

Future ALSPAC demographics and opportunities post 2024

**ALSPAC generation structure**

- G0 (14k)
- G1 (5k)
- G2 (4k)
- G3

**GUI Annual Conference 2021**
Current ALSPAC LPS/CSRG proposal (July 2019-June 2024)

- G0/G1/G2 Open clinic, record linkage, remote data
- G0/G1 8000 participants over 3 years from 2020
- G2 3300 participants from 1700 families from current to 2024
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Future ALSPAC demographics and opportunities post 2024

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**COHORT PROFILE**

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

Andy Boyd, Jean Golding, John Macleod, Debbie A Lawlor, Abigail Fraser, John Henderson, Lynn Molloy, Andy Ness, Susan Ring and George Davey Smith
Visibility and Access

Access Policy
v. 13.0
February 2021

Research Advancement through Coho

More and more people are affected by chronic diseases as these diseases have their origins in early life, (conception, birth). The Research Advancement through Cohort Cataloguing and Integration (ReACH) is a project that is developing a new protocol to identify and catalogue data that can be used to study the impact of these diseases on society. The ReACH initiative is funded through a Civil Operating Grant for Research Advancement through Cohort Cataloguing and Integration (ReACH) (https://www.reach.org.uk).
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.

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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

Dr Rebecca Pearson
Senior Lecturer in Psychiatric Epidemiology
Centre for Academic Mental Health
University of Bristol
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Key point in the frequency and granularity of standardized data
Exemplar 3. Social inequality – measurement and implications

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

“… 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

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

Ana Goncalves Soares
University of Bristol

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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www.ebi.ac.uk/gwas
Meta-analysis of genome-wide association studies for height and body mass index in ~700,000 individuals of European ancestry

Loic Yengo¹, Julia Sidorenko¹,², Kathryn E. Kemper¹, Zhili Zheng¹, Andrew R. Wood³, Michael N. Weedon³, Timothy M. Frayling³, Joel Hirschhorn⁴, Jian Yang¹,⁵, Peter M. Visscher¹,⁵ and the GIANT Consortium

* Combined GWAS meta-analysis reaches N ~700,000 individuals
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 \(N \sim 700,000\) individuals

* \(>900\) independent SNPs associated with BMI

* Genome-wide significant SNPs explain \(\sim 6.0\%\) of the variance of BMI
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

~2k young participants in Framingham Offspring Study

~3 kg/m² higher BMI

~7 kg 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 al., Cell 2019

Application of genetic risk scores in full form…
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Khera AV et al., Cell 2019
Application of genetic risk scores in full form…

[Graph showing frequency distribution of genetic scores and BMI with a shaded area indicating higher risk for severe obesity in the top decile.]

Khera AV et al., Cell 2019

0 5 10 15 20 25
0.00 0.05 0.10 0.15 0.20
Years of Follow-up

Incident Severe Obesity

Polygenic Score

Bottom Decile: 0 / 218 (0%)
Deciles 2−9: 61 / 1741 (3.5%)
Top Decile: 40 / 218 (18.3%)

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GUI Annual Conference 2021
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Khera AV et al., Cell 2019
Association between polygenic score groups (tertile) with weight trajectory - linear spline multi-level models.
### Association between sociodemographic factors and polygenic score

<table>
<thead>
<tr>
<th>Sociodemographic factor</th>
<th>Estimate (95% CI)$^1$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family income (per week)</td>
<td>-0.03 (-0.06, -0.01)</td>
<td>0.002</td>
</tr>
<tr>
<td>Maternal highest qualification</td>
<td>-0.05 (-0.07, -0.03)</td>
<td>2.87x10^{-6}</td>
</tr>
<tr>
<td>Paternal highest qualification</td>
<td>-0.03 (-0.05, -0.01)</td>
<td>0.003</td>
</tr>
<tr>
<td>Household social class</td>
<td>0.02 (-0.002, -0.05)</td>
<td>0.07</td>
</tr>
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</table>

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

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**Estimate (95% CI)**

**P-value**

**Family income**

(per week)

-0.03 (-0.06, -0.01)

0.002

**Maternal highest qualification**

-0.05 (-0.07, -0.03)

2.87x10^{-6}

**Paternal highest qualification**

-0.03 (-0.05, -0.01)

0.003

**Household social class**

0.02 (-0.002, -0.05)

0.07

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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
Using a pooled amplicon NG sequencing approach, identified rare variants in *MC4R* & *MC3R* can be examined re. frequency, function, longitudinal phenotype.
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\textit{MC4R} LoF mutations associated with BMI across the life course. Further, these are effects which exceed polygenic contributions.

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

Heterozygous mutations that impair the function of the \textit{MC4R} gene may very well be found in several millions of people worldwide a frequency of \textasciitilde{}1 in 340.
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Genes & Health (G&H) study two rare, homozygous non-synonymous mutations p.M97I and p.G240W.

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**MC3R** LoF mutations associated with lower height throughout childhood, adolescence and early adulthood, with a trend towards lower lean mass and lower weight.

![Graph showing BMI changes across age](image1)

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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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](https://www.mrl.ims.cam.ac.uk/blog/the-long-story-on-mc3r-regulation-of-growth-and-age-at-puberty-how-we-did-it)
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
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

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.
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)

Acknowledgements:

Wellcome Trust

Medical Research Council

University of Bristol

Bristol alumni and friends – key supporters

Co90s team

Co90s participants
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)

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?

British Liver Trust report “The alarming impact of liver disease in the UK”
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 synthesis, 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 0RG

01865 458 327
Alex.Jones@phe.gov.uk
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.

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In addition, it is hard to know whether current levels from before the Covid-19 pandemic. This makes pre-putative.

The image below is a section from one of our weekly producing teams for a mailing list within Cabinet Office working towards a regular public update of this evidence continuing our positive working relationship with the

**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 of the five, for England. The final column is an approximation of the distribution of age of parents of primary aged children.

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

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).

Your sincerely,

Alex Jones
Public Health Intelligence Analyst
National Mental Health, Dementia & Neurology Intell
Public Health England
PHE Chilton, Didcot, Oxfordshire, OX11 0RQ
01865 458 337
Alex.Jones@phe.gov.uk
### 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-publication publications

<table>
<thead>
<tr>
<th>Priority research questions</th>
<th>Insights from ongoing studies (links provide further details):</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Understanding immunity &amp; testing reliability</strong> (RO1, 50, 95, 102, 51, 54, 55, 104)</td>
<td>SARS-CoV-2 antibody responses become detectable after the first week of illness. Dual (nucleic acid &amp; antibody) point of care SARS-CoV-2 testing can significantly improve diagnostic sensitivity, whilst maintaining high specificity.</td>
</tr>
<tr>
<td><strong>2. Why do BAME groups have an increased risk of severe COVID-19 outcomes</strong> (RQ34, 68)?</td>
<td>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. 2CE 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.</td>
</tr>
<tr>
<td><strong>3. How do we best understand and protect vulnerable groups?</strong> (RQ22, 32, 36, 62, 102) - Risk prediction - Social &amp; mental health</td>
<td>Research using longitudinal research cohorts (ALSPAC and Generation Scotland) has shown increases in anxiety and lower wellbeing since COVID-19, particularly in young people. Zeo 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.</td>
</tr>
<tr>
<td><strong>4. Impact on Non-COVID care provision</strong> (RQ29, 30, 94)</td>
<td>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 case loads and total contacts for home treatment teams March to May 2020, although they are now back on the rise. (Stewart).</td>
</tr>
<tr>
<td><strong>5. Use of existing treatments</strong> (RQ16, RQ98)</td>
<td>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.</td>
</tr>
</tbody>
</table>

**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 tasted 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.
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

Depression, anxiety worse 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

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

Alex S. F. Kwong*, Rebecca M. Pearson*, Mark J. Adlam, Chloe Fawns-Ritchie, Helen Bould, Naomi Warne, Stana Ljubisavljevic, Nadia Micali, Abraham Reichenberg, Matthew Hickman, Drew Altschul, Robin Flagg, Andrew M. McIntosh, Delia M. Furlong and Nicholas J. Timpson*

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

Giorgio Di Gessa, Jane Maddock, Michael J. Green, Ellen J. Thompson, Eoin McIlroy, Helen L. Davies, Jessica Mundy, Anna J. Stevenson, Alex S. F. Kwong and Gareth J. Griffith

*Corresponding author.
Cohorts

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

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

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

BMI (<25kg/m²=blue, >=25=red)

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

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

Number of previous infections. Median or below =blue. Higher than median=red.
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
IMPACT 1 – scientific advance – fast, policy relevant, dynamic data collection
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CHALLENGE 1 – post COVID_19 spotlight – engagement and maintenance
CHALLENGE 2 – visibility and access – from data collection to use

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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