

1958, 1970, 1989-90 and 2000-1 Birth Cohorts: Introduction from a biomedical science perspective

Vanessa Moulton, Senior Researcher Morag Henderson, Director of Next Steps (1989-90) Emla Fitzsimons, Director of MCS (2000-1) George Ploubidis, Director of NCDS1958 and BCS1970 Centre for Longitudinal Studies, UCL Social Research Institute

CENTRE FOR LONGITUDINAL STUDIES CLOSER webinar 7 March 2023



Economic and Social Research Council





- The Centre for Longitudinal Studies is home to four* national longitudinal cohort studies, which follow the lives of tens of thousands of people
- Each of our four studies follows large, nationally representative groups of people born in a given year
- By collecting information from the same people over time, as they live their lives, our studies are powerful resources for answering important research questions
- Multi-purpose and multi-disciplinary studies collecting detailed information on different aspects of cohort members lives (economic, social and health)

Timeline of the studies



1970 British Cohort Study (BCS70)	
1989-90 Next Steps	
2000-2 Millennium Cohort Study (MCS)	

1920	1940	1960	1980	2000	2020
.020		1000	1000	2000	2020

Study timelines and future 2020-2030







Brief overview of our studies

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NCDS A study of everyone born in one week in 1958 (GB)

	1958	1965	1969	1974	1981	1991	2000	2003	2004	2008	2013	
	Birth	7	11	16	23	33	42	44	46	50	55	
□0 main respondent	mother	parents	parents	cohort member / parents	cohort member	cohort member	cohort member	cohort member	cohort member	cohort member	cohort member	
		school	school	school		children (1 in 3)						
s medical	medical exam	medical exam Ht/Wt	medical exam Ht/Wt	medical exam Ht/Wt	Ht/Wt	Ht/Wt		Ht/Wt blood - DNA biomedical		Ht/Wt	Ht/Wt	
survey instrument		cognitive mental h.	cognitive mental h.	cognitive mental h.	mental h.	mental h.	mental h.			cognitive mental h.		
e linked data				area of residence (census)	area of residence (census)					consent for health and economic records		
responsional	17,415	15,425	15,337	14,654	12,537	11,469	11,419	9,377	9,534	9,790	9,137	

BCS70 A study of everyone born in one week in 1970 (GB)

	1970	1975	1980	1986	1996	2000	2004	2008	2012	2016
	Birth	5	10	16	26	30	34	38	42	46
D main respondent	mother	parents	parents	cohort member / parents	cohort member	cohort member	cohort member	cohort member	cohort member	cohort member
others		school	school	school			children (1 in 2)			
ent®redical	medical exam	medical exam Ht	medical exam Ht/Wt	medical exam Ht/Wt	Ht/Wt	Ht/Wt	Ht/Wt		Ht/Wt	biomedical blood (DNA) Ht/Wt accelerometer
ad survey instrume		cognitive mental h.	cognitive mental h.	diet diary cognitive mental h.	mental h.	mental h.	mental h.		cognitive mental h.	diet diary cognitive mental h.
data data									conse ec	ent for health and conomic records*
response rate	16,568	13,135	14,875	11,622	9,003	11,261	9,665	8,874	9,841	8,851



MCS A study of people born in 2000/2 (UK)

	2001/2	2004	2006	2008	2012	2015	2018	
	9m	3	5	7	11	14	17	
E)o nain espondent	main parent	main parent	main parent	main parent	main parent	main parent	cohort member	
Others	partner	older siblings partner	older siblings partner	cohort member teacher partner	cohort member teacher partner	cohort member partner	main parent partner	
Medical		Ht/Wt	Ht/Wt	Ht/Wt accelerometer	Ht/Wt	Ht/Wt Saliva (DNA trio) accelerometer	Ht/Wt	
Survey		cognitive mental h.	cognitive mental h.	cognitive mental h.	cognitive mental h.	time use record cognitive mental h.	cognitive mental h.	
Linked	health records; education records; parents' and CM's economic records; police and criminal justice							
esponse ate	18,552	15,590	15,246	13,857	13,827	11,726	10,625	

Typical information covered

Contoor yeard	Adult
Household composition	Household composition
Parental social class & education	Employment
Parental employment	Social class
Financial circumstances	Income and wealth
Housing Family relationships Health Cognitive tests	Housing Family and partnership history Health (including biomarkers) Well-being and mental health
Emotions and behaviour School Views and expectations	Health-related behaviour Training and qualifications Basic skills
	School years Household composition Parental social class & education Parental employment Financial circumstances Housing Family relationships Health Cognitive tests Emotions and behaviour School Views and expectations Attainment

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STUDIES

COVID-19 surveys

Wave	Dates	Context	Mode
Wave 1	May 2020	First national lockdown	Web
Wave 2	Sept/Oct 2020	Eased restrictions	Web
Wave 3	Feb/Mar 2021	Third national lockdown	Web \rightarrow Telephone

Study	Age in 2020
MCS	19
Next Steps	30
BCS70	50
NCDS	62



https://cls.ucl.ac.uk/covid-19-survey/



Examples of biomedical research in the CLS cohorts

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Hospital Practice BREAST-FEEDING, BRONCHITIS, AND ADMISSIONS FOR LOWER-RESPIRATORY ILLNESS AND GASTROENTERITIS DURING THE FIRST FIVE YEARS

Brent Taylor, Jean Golding, Jane Wadsworth, Neville Butler

Perinatal problems. The Second Report of the 1958, British Perinatal Mortality Survey under the auspices of the National Birthday Trust Fund.

Author(s) : <u>Butler, N. R.</u>; <u>Alberman, E. D.</u> Editors : <u>Butler, N. R.</u>; <u>Alberman, E. D.</u> Book : <u>Perinatal problems. The Second Report of the 1958, British Perinatal Mortality Survey</u> <u>under the auspices of the National Birthday Trust Fund.</u> 1969 pp.xx + 395 pp.

Growth in utero, blood pressure in childhood and adult life, and mortality from cardiovascular disease.

British Medical Journal 1989; 298 doi: https://doi.org/10.1136/bmj.298.6673.564 (Published 04 March 1989) Cite this as: British Medical Journal 1989; 298:564

Article Related content Metrics Responses Peer review

D. J. Barker, C. Osmond, J. Golding, D. Kuh, M. E. Wadsworth

ARTICLES | APRIL 01 2007

Breastfeeding and Hospitalization for Diarrheal and Respiratory Infection in the United Kingdom Millennium Cohort Study 只

The Effect of Hypertensive Disorders of Pregnancy on the Risk of ADHD in the Offspring

Stefanie Böhm¹, Eileen A. Curran², Louise C. Kenny², Gerard W. O'Keeffe², Deirdre Murray², and Ali S. Khashan

Maria A. Quigley, MSc; Yvonne J. Kelly, PhD; Amanda Sacker, PhD

Address correspondence to Maria A. Quigley, MSc, National Perinatal Epidemiology Unit, Oxford University, Old Road Campus, Headington, Oxford OX3 7LF, United Kingdom. E-mail: maria.quigley@npeu.ox.ac.uk Pediatrics (2007) 119 (4): e837-e842.

https://doi.org/10.1542/peds.2006-2256 Article history

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Research Article

Complications of pregnancy and delivery in relation to psychosis in adult life: data from the British perinatal mortality survey sample.

British Medical Journal 1991 ; 302 doi: https://doi.org/10.1136/bmj.302.6792.1576 (Published 29 June 1991) Cite this as: British Medical Journal 1991;302:1576

Article	Related content	Metrics	Responses	Peer review
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D J Done, E C Johnstone, C D Frith, J Golding, P M Shepherd, T J Crow



Free Access

Prenatal and perinatal antecedents of febrile convulsions and afebrile seizures: data from a national cohort study

Rosemary Greenwood, Jean Golding, Euan Ross, Chris Verity

First published: 04 January 2002 | https://doi.org/10.1046/j.1365-3016.1998.0120s1076.x | Citations: 28

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▼ Professor Jean Golding Unit of Paediatric and Perinatal Epidemiology, Division of Child Health, 24 Tyndall Avenue, Bristol BS8 1TQ, UK.



THE LANCET

Volume 345, Issue 8957, 29 April 1995, Pages 1071-1074

Is measles vaccination a risk factor for inflammatory bowel disease?

N.P Thompson MRCP *, Prof R.E Pounder DSc *, A.I Wakefield FRCS * Q, S.M Montgomery BSc b

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Intergenerational studies of human birthweight from the 1958 birth cohort. 1. Evidence for a multigenerational effect IRVIN EMANUEL HAROULLA FILAKTI, EVA ALBERMAN, STEPHEN J. W. EVANS First published: January 1992 | https://doi.org/10.1111/j.1471-0528.1992.tb14396.x | Citations: 154



Health inequalities: Embodied evidence across biological layers

Paolo Vineis * b 🞗 🗃, Cyrille Delpierre ^c, Raphaële Castagné ^c, Giovanni Fiorito ^b, Cathal McCrory ^d , Mika Kivimaki,*, Silvia Stringhini f, Cristian Carmeli #, Michelle Kelly-Irving f



Measuring the timeliness of childhood vaccinations: Using cohort data and routine health records to evaluate quality of immunisation services

Suzanne Walton *, Mario Cortina-Borja *, Carol Dezateux *, Lucy J. Griffiths *, Karen Tingay b, Ashley Akbari ^b, Amrita Bandyopadhyay ^b, Ronan A. Lyons ^b, Helen Bedford * 🔍 😝

* Population, Policy and Practice Programme, UCL Great Ormond Street Institute of Child Health, London WCIN 1EH, UK ⁸ Farr Institute, Swansea University Medical School, Wales SA2 8PP, UK

Received 18 May 2017, Revised 26 October 2017, Accepted 27 October 2017, Available online 10 November 2017, Version of Record 1 December 2017.



Juliane Spiegler MD 12 & B. Marina Mendonca PhD 1, Dieter Wolke PhD. Dr rer nat h.c.



Open Access Published: 22 June 2016

Rare disruptive mutations and their contribution to the heritable risk of colorectal cancer

Daniel Chubb, Peter Broderick, Sara E. Dobbins, Matthew Frampton, Ben Kinnersley, Steven Penegar, Amy Price, Yussanne P. Ma, Amy L. Sherborne, Claire Palles, Maria N. Timofeeva, D. Timothy Bishop, Malcolm G. Dunlop, Ian Tomlinson & Richard S. Houlston

Nature Communications 7, Article number: 11883 (2016) Cite this article

Research article Open Access Published: 19 August 2013

Childhood adversity as a risk for cancer: findings from the 1958 British birth cohort study

Michelle Kelly-Irving 🖾, Benoit Lepage, Dominique Dedieu, Rebecca Lacey, Noriko Cable, Melanie Bartley, David Blane, Pascale Grosclaude, Thierry Lang & Cyrille Delpierre

BMC Public Health 13, Article number: 767 (2013) Cite this article

MC Medicine Home About Articles Submission Guidelines

Research article Open Access Published: 18 November 2020

Socioeconomic inequalities in blood pressure: coordinated analysis of 147,775 participants from repeated birth cohort and cross-sectional datasets, 1989 to 2016

David Bann 🖾 Meg Fluharty, Rebecca Hardy & Shaun Scholes

BMC Medicine 18, Article number: 338 (2020) Cite this article

Published: 01 August 1990

Clinical Oncology/Epidemiology

Factors associated with childhood cancer in a national cohort study

THE LANCET

J Golding, M Paterson & LJ Kinlen







cohort studies

Lubnaa Hossenbaccus BScH * [†], Sophia Linton BSc.[†][‡], Rashi Ramchandani BHSc.[†][‡], Mallory J, Gallant MSc. BScH 1, Anne K, Ellis MD, MSc *1 2, 68

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MORTALITY | Open Access | Published: 23 February 2018

Allostatic load and subsequent all-cause mortality: which biological markers drive the relationship? Findings from a UK birth cohort

Alerts

Raphaële Castagné ^{CO}, Valérie Garès, Maryam Karimi, Marc Chadeau-Hyam, Paolo Vineis, <u>Cyrille Delpierre</u> & <u>Michelle Kelly-Irving for the Lifepath Consortium</u>

European Journal of Epidemiology 33, 441–458 (2018) | Cite this PLOS GENETICS

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September 30, 2020

Association of Early-Life Mental Health With Biomarkers in Midlife and Premature Mortality Evidence From the 1958 British Birth Cohort

George B. Ploubidis, PhD³; G. David Batty, PhD, DSc^{1,2}; Praveetha Patalay, PhD^{3,4}; <u>et al</u>

» Author Affiliations | Article Information

JAMA Psychiatry. 2021;78(1):38-46. doi:10.1001/jamapsychiatry.2020.2893



Brain, Behavior, and Immunity Volume 90, November 2020, Pages 303-310

Patterning of educational attainment across inflammatory markers: Findings from a multicohort study

Marine Maurel^{* 1}, Baphaële Castagné^{* 1}, Eloise Berger^{*}, Murielle Bochud^b, Marc Chadeau-Hyam^{*}, Silvia Fraga⁴, Martina Gandini^{* 4}, Nina Hutri-Kähönen[†], Sirpa Jalkanen^{h i}, Mika Kivimäki ^j^{*}, Michael Marmot¹, Cathal McCrory^m, Martin Preisig.^b, Olli Raitakari.^{n o p}, Eulvio Ricceri^{* 4}, Marko Salmi^{h i}, Andrew Steptoe^j, Paolo Vineis^{*}, Cyrille Delpierre^{* 2}, Michelle Kelly-Irving^{* 2} **A 53**



RESEARCH ARTICLE | MARCH 25 2020 Fertility History and Biomarkers Using Prospective Data:

Evidence From the 1958 National Child Development Study 👌

Maria Sironi; George B. Ploubidis; Emily M. Grundy Demography (2020) 57 (2): 529–558. https://doi.org/10.1007/s13524-020-00855-x

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Published: July 14, 2022 • https://doi.org/10.1371/journal.pgen.1010233

David Bann 🖾, Liam Wright 🖾, Rebecca Hardy, Dylan M. Williams, Neil M. Davies

RESEARCH ARTICLE

American Journal of Epidemiology, Volume 190, Issue 1, January 2021, Pages 176–178, https://doi.org/10.1093/aje/kwaa079 Published: 01 June 2020 Article history ▼

nature genetics

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Published: 10 May 2009

Genome-wide association study and meta-analysis find that over 40 loci affect risk of type 1 diabetes

Leffrey C. Barrett, David G. Clayton, Patrick Concannon ^{C2}, Beena Akolkar, Jason D. Cooper, Henry A. Erlich, Cécile Julier, Grant Morahan, Jørn Nerup, Concepcion Nierras, Vincent Plagnol, Flemming Pociot, Helen Schuilenburg, Deborah J. Smyth, Helen Stevens, John A. Todd, Neil M. Walker, Stephen S. Rich & The Type 1 Diabetes Genetics Consortium

Nature Genetics 41, 703–707 (2009) Cite this article 10k Accesses 1237 Citations 15 Altmetric Metrics

November 21, 2019

Comparison of Genetic Liability for Sleep Traits Among Individuals With Bipolar Disorder I or II and Control Participants

Katie J. S. Lewis, PhD¹²; Alexander Richards, PhD¹; Robert Karlsson, PhD²; <u>et al</u> → Author Affiliations | Article Information IAMA Psychiatry: 2020;77(3):303-310. doi:10.1001/jamapsychiatry.2019.4079

nature genetics

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Published: 06 February 2017

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Brian D Hobbs, Kim de Jong, Maxime Lamontagne, Yohan Bosté, Nick Shrine, María Soler Artigas, Louise V Waln, Jan P, Hall, Victoria E Jackson, Annsh & Wyss, Stephanie J, London, Kari E North, Nora Franceschni, David P, Stanchan, Terri H, Berky, John E. Hokanson, James D. Crapo, Peter J. Castaldi, Bobert P. Chase, Tracit Bartz, Susan R, Heckbert, Bruce M, Pasty, Sina A, Sharib, Pieter Zanen, COPDGene Investigators, ECUPSE Investigators, Lifelines Investigators, BROMICS Besearch Group, International COPD Genetics, Network Investigators, UK BILIVE Investigators & International COPD Genetics, Consortium + Snow authors

Nature Genetics 49, 426–432 (2017) | Cite this article 8790 Accesses | 223 Citations | 234 Altmetric | Metrics

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Cigarette Smoking in Pregnancy: Its Influence on Birth Weight and Perinatal Mortality

Br Med J 1972 ; 2 doi: https://doi.org/10.1136/bmj.2.5806.127 (Published 15 April 1972) Cite this as: *Br Med J* 1972;2:127



N. R. Butler, H. G Papers And Originals

Smoking in Pregnancy and Subsequent Child Development

Br Med J 1973 ; 4 doi: https://doi.org/10.1136/bmj.4.5892.573 (Published 08 December 1973) Cite this as: *Br Med J* 1973;4:573

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N. R. Butler, Research Article

Smoking in pregnancy and development into early adulthood.

British Medical Journal 1988 ; 297 doi: https://doi.org/10.1136/bmj.297.6658.1233 (Published 12 November 1988) Cite this as: British Medical Journal 1988;297:1233

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K. R. Fogelman, O. Manor



Article

June 7, 2010

Childhood Hardship, Maternal Smoking, and Birth Outcomes

A Prospective Cohort Study

Emily W. Harville, PhD; Renée Boynton-Jarrett, MD, ScD; Chris Power, PhD; et al

Author Affiliations | Article Information Arch Pediatr Adolesc Med. 2010;164(6):533-539. doi:10.1001/archpediatrics.2010.61 Research article | Open Access | Published: 06 March 2015

Life course trajectories of alcohol consumption in the United Kingdom using longitudinal data from nine cohort studies

Annie Britton 🗁, Yoav Ben-Shlomo, Michaela Benzeval, Diana Kuh & Steven Bell

Impaired vision and physical activity in childhood and adolescence: findings from the Millennium Cohort Study

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Lisanne Andra Horvat-Gitsels^{1, 2}, In Mario Cortina-Borja¹, Ameenat Lola Solebo^{1, 2, 3}, In Jugnoo Sangeeta Rahi^{1, 2, 3, 4, 5}

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RESEARCH ARTICLE 🛛 🔂 Open Access 🛛 😨 🚺

Independent associations of sleep timing, duration and quality with adiposity and weight status in a national sample of adolescents: The UK Millennium Cohort Study

Paul J. Collings 🔀

First published: 22 July 2021 | https://doi.org/10.1111/jsr.13436 | Citations: 5

Epidemiology Research

How active are our children? Findings from the Millennium Cohort Study 8

Lucy J Griffiths¹, Mario Cortina-Borja¹, Francesco Sera¹, Theodora Pouliou¹, Marco Geraci¹, Carly Rich¹, Tim J Cole¹, Catherine Law¹, Heather Joshi², Andrew R Ness³, Susan A Jebb⁴, Carol Dezateux¹ Correspondence to Dr Lucy Griffiths; lucy.griffiths(Qucl.ac.uk



Epidemiology & Community Health

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Original research Changes in the behavioural determinants of health during the COVID-19 pandemic: gender, socioeconomic and ethnic inequalities in five British cohort studies 8

(b) David Bann¹, Aase Villadsen¹, Jane Maddock², Alun Hughes², George B. Ploubidis¹, Richard Silverwood¹, (b) Praveetha Patalay 1, 2

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The UK Coronavirus Job Retention Scheme and smoking, alcohol consumption and vaping during the COVID-19 pandemic: evidence from eight longitudinal population surveys

Michael J. Green 🖂, Jane Maddock, Giorgio Di Gessa, Bożena Wielgoszewska, Sam Parsons, Gareth J. Griffith, Jazz Croft, Anna J. Stevenson, Charlotte F. Huggins, Charlotte Booth, Jacques Wels, Richard J. Silverwood, Praveetha Patalay, Alun D. Hughes, Nishi Chaturvedi, Laura D. Howe, Emla Fitzsimons, Srinivasa Vittal Katikireddi & George B. Ploubidis

BMC Medicine 20, Article number: 345 (2022) Cite this article 410 Accesses | 17 Altmetric | Metrics

Research article Open Access Published: 06 April 2022

The UK Coronavirus Job Retention Scheme and diet. physical activity, and sleep during the COVID-19 pandemic: evidence from eight longitudinal population surveys

Bożena Wielgoszewska, Jane Maddock 🖾, Michael J. Green, Giorgio Di Gessa, Sam Parsons, Gareth J. Griffith, Jazz Croft, Anna J. Stevenson, Charlotte Booth, Richard J. Silverwood, David Bann, Praveetha Patalay, Alun D. Hughes, Nishi Chaturvedi, Laura D. Howe, Emla Fitzsimons, Srinivasa Vittal Katikireddi & George B. Ploubidis 🗠

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Article | Open Access | Published: 28 June 2022

Long COVID burden and risk factors in 10 UK longitudinal studies and electronic health records

Ellen J. Thompson ⊠, Dylan M. Williams ⊠, Alex J. Walker, Ruth E. Mitchell, Claire L. Niedzwiedz, Tiffany C. Yang, Charlotte F. Huggins, Alex S. F. Kwong, Richard J. Silverwood, Giorgio Di Gessa, Ruth C. E. Bowyer, Kate Northstone, Bo Hou, Michael J. Green, Brian Dodgeon, Katie J. Doores, Emma L. Duncan, Frances M. K. Williams, OpenSAFELY Collaborative, Andrew Steptoe, David J. Porteous, Rosemary R. C. McEachan, Laurie Tomlinson, Ben Goldacre, ... Claire J. Steves 🖂 🗧 + Show authors

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BMI across adulthood, COVID-19 and long COVID in two British birth cohorts

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University College London George Ploubidis University College Londor Alissa Goodman University College Londor Richard Silverwood University College London



Mental health in relation to changes in sleep, exercise, alcohol and diet during the COVID-19 pandemic: examination of four UK cohort studies

Published online by Cambridge University Press: 02 November 2021



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Psychological Medicine

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'Biomedical' data

Overview of health measures Medical history Anthropometrics / physical function Biomarkers Health behaviours Genetic data COVID-19 Linked health data

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Overview of health measures



Physical health measures	NCDS 58	BCS 70	NS 89	MCS 01
Self assessed general health	7, 11,16, 33, 44, 46, 50, 55	5, 10, 16, 34, 42, 46	25	3, 5, 7, 11, 14, 17
Medical conditions/ *long term illness	0, 7, 11, 26, 23, 33, 42, 44, 46, 50, 55	0, 5, 10, 16, 26, 30, 34, 38, 42, 46	14*, 15*, 16*, 17*, 18*, 19*, 20*, 25*	9m, 3, 5, 7, 11, 14, 17
Anthropometry	7,11,16, 23, 33, 42, 44, 50, 55	10,16, 26, 30, 34, 42, 46	25	3, 5, 7, 11, 14, 17
Physical activity (leisure time)	11, 16, 23, 33, 42, 44, 46, 50, 55	5, 10, 16, 34, 42, 46	20, 25	5, 7, 11, 14, 17
Diet related measures (intake, overeating)	7, 33, 42, 44	10, 16, 30, 34, 42, 46	25	9 months, 3, 7, 11, 14, 17
Smoking, drugs & alcohol consumption	16, 23, 33, 42, 44, 46, 50, 55	10, 16, 26, 30, 34, 42, 46	14, 15, 16, 17, 18, 19, 20, 25	11, 14, 17
Sleep	7,16, 50	16, 42, 46	25	14,17
DNA /biomarkers	44 genetic & bio	46 (genotyping & bio)	Planned for age 32	14 (genetic)
Linked Health admin. data	England & Scotland	England & Scotland	England	England, Scotland & Wales

Medical history (survey records)

<u>NCDS</u>

- Birth
 - Abnormalities in pregnancy, labour (induction, progress, medications, mode of delivery), infant (weight, gestational age), obstetric complications
- Immunisation /vaccinations (7,16)
- Childhood illness (7,11,16)
- Hospital admissions (7,11,16, 23, 33, 42, 46)
- Medication (44/5)

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• Chronic widespread pain (44/5)

<u>BCS70</u>

- Birth
 - Antenatal care, abnormalities in pregnancy and labour, analgesia and anaesthesia, infant (weight, progress, management and outcome), obstetric history
- Immunisation /vaccinations (5,10,16)
- Accidents (5, 10, 16, 26, 30, 34)
- Use of health services (5,10,16)
- Hospital admissions (5,10,16, 30, 34)
- Medication (10, 16, 46)

<u>MCS</u>

- Birth
 - Fertility treatment; antenatal care; health problems during pregnancy; pregnancy and labour (mode of delivery, pain relief, complications, analgesia and anaesthesia); birthweight and gestational age; breastfeeding; antenatal care, obstetric history
- Incidence / number of health problems (e.g. chest infections, ear infections, skin problems) (9mths, 3)
- Immunisation /vaccinations (9mths, 3)
- Accidents (9mths, 3)
- Use of health services (3)
- Hospital admissions (9mths, 3)

Anthropometrics / physical function



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	NCDS	BCS70	Next Steps	MCS
Height, Weight and BMI	7, 11**, 16, (23), 33, 44/5, (50), (55)	5*,10**, 16, (26), (30), (34), (42), 46	(25)	3**,5,7,11,14,17
Head circumference	7	5,10,16		
Hip and waist circumference	44/45	46		5,7 (waist)
Body fat		46		7,11,14,17
Vision	7,11,16, 44/5	10, 16		
Audiometry	7,11,16, 44/5	10,16		
Laterality	7	10,16		
Co-ordination	7,11,16	10,16		
Speech	7,11,16	10		
Blood pressure	44/45	10, 16, 46		
Pulse	44/45	10		
Respiratory function (FEV1 and FVC)	44/45			
Maximal grip strength		46		
Leg-raise/balance		46		

Biomarkers in NCDS and BCS70

extracted from blood samples



	NCDS (44/5)	BCS70 (46)
Total and HDL cholesterol	Y	Y
Triglycerides	Y	Y
C-reactive protein (CRP)	Y	Y
Glycosylated haemoglobin (HbA1c)	Y	Y
Insulin-like growth factor 1 (IGF-1)	Y	Y
Total and allergen-specific immunoglobulin E House Dust Mite, Cat and Grass Pollen Allergens	Y	
Fibrinogen	Y	
Tissue plasminogen activator (t-PA)	Y	
Von Willebrand factor (9vWF)	Y	
Serum 25-hydroxyvitamin D	Y	
Fibrin D-dimer	Y	
Ferritin		Y
Cytomegalovirus		Y
Red blood cell count		Y

Measurement of health behaviours BCS70



Age 16: Dietary diary	Age 46: Online diet questionnaire
 Diet questionnaire over 4 days (Fri-Mon) Diet questionnaire over 4 days (Fri-Mon) 	 Oxford WebQ – dev and hosted by CEU Oxford Inventory of food ar consumed on previous
11.00an 1 small packet of plain crisps (Walkers)	 Completed on 2 of following home visit

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- Dietary food group categories
- **Diet nutrient categories**

https://cls.ucl.ac.uk/wpcontent/uploads/2020/05/BCS70-Age-16-Dietary-Diaries-User-Guide.pdf

- veloped
- nd drink ious day
- 7 days
- Nutrient intake calculated e.g. energy (kJ), protein (g), total fat (g) etc

Age 46: Accelerometer

- Thigh worn ActivPal device worn for 7 days
- Accelerometer and also measures postural allocation to accurately distinguish between different types of sedentary activity (standing, sitting, sleeping) and transitions between

https://cls.ucl.ac.uk/wp-

content/uploads/2020/02/BCS70_Accelerometry_User_Guide.pd



Measurement of health behaviours in MCS

- <u>Time use diary (14)</u> was paired with activity monitor: sample and day selection the same
- Full record of activities collected for 2 selected days; also collected information on where they were, who they were with, & how much they liked the activity
 - 4,851 CMs completed day 1 of the time-use record
 - 4,095 CMs completed day 2 of the time-use record
 - 8,946 TOTAL days of information

	Early morning																									
Activities	4am				5a	m				6ar	n				7a	m				8a	m				9ar	n
- What were you doing?	10	20 30	04	0 50	10	20	30	40	50	10	20	30	40	50	10	20	30	40	50	10) 20	30	40	50	10	20 3
Sleep and personal care																										
Sleeping and resting (including sick in bed)																										
Personal care (including taking a shower/bath, grooming, getting dressed etc.)																										

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Activity monitor (7,14)

- Actigraph (waist) every day for 7 days during waking hours (7)
- Geneactiv accelerometer (wrist) – 1 weekday & 1 weekend day measured physical and sedentary activity (14)
- 44 activity codes were grouped into 12 high-level categories
 1.Sleep and personal care
 2.School, homework and education,
 3.Paid or unpaid work
 4.Chores, housework and looking after people or animals
 5.Eating and drinking
 6.Physical exercise and sports
 7.Travelling
 8.Social time and family time
 9.Internet, TV and digital media
 10.Volunteering and religious activities
 11.Hobbies and other free time activities
 12.Any other activity

Genetic data

- New data access system (typically <1 month for a response, simple form; <u>link</u>).
- NCDS: Available, link
- **BCS70**: Available Q2-3 2023.
- **Next Steps**: saliva collection underway for age 32, funding for DNA extraction and genotyping.
- **MCS**: Available (Infinium Global Screening Array (<u>link</u>)).
 - Trios (cohort member, mother, father).
- In future:
 - Website for full technical documentation of data, cleaning (quality control) processes
 - Polygenic scores for multiple health / social phenotypes (TBC on UKDS).

al samples available

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Biological samples available for further use on application: NCDS: blood, saliva BCS70: blood

CLS | Genetic data and biological samples (ucl.ac.uk)



Genetic data in the MCS

MCS6 saliva samples were collected from cohort members and resident biological parents for DNA extraction:

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- Approx. 200 twins or triplets
- Triads (cohort, mother, father) @47%, cohort and one parent @44%
- Now available, genotyped data single chip (Infinium Global Screening Array)

Cohort member	8,031
Mother	8,181
Father	4,782
Total	20,994

- Working on: polygenic scores for multiple phenotypes
 - Fitzsimons, E., Moulton, V., Hughes, D. A., Neaves, S., Ho, K., Hemani, G., ... & Ring, S. (2021). Collection of genetic data at scale for a nationally representative population: the UK Millennium Cohort Study. *Longitudinal and Life Course Studies*.

COVID-19 and serology surveys

Available via the UKDS (EUL)

COVID-19 surveys response								
	NCDS	BCS70	Next Steps	MCS CMs	MCS parents			
Wave 1	5,178	4,223	1,907	2,645	2,831			
Wave 2	6,282	5,320	3,664	3,274	5,707			
Wave 3	6,809	5,758	4,239	4,474	5,251			

Serology survey response

	NCDS	BCS70	Next Steps	MCS CMs	MCS parents
Invited	6,939	6,594	4,826	5,266	7,143
Consented	4,156	3,741	2,090	1,397	3,214
Blood sample returned	3,222	2,547	1,267	1,140	2,266

https://cls.ucl.ac.uk/covid-19-survey/

Serology Survey:

- Participants who took part in one of three COVID-19 Surveys were invited to provide a finger-prick blood sample
- Two antibody tests conducted Nassay and S-assay
 - N-assay more likely to identify naturally occurring antibodies through exposure to virus
 - S-assay more likely to identify antibodies occurring following vaccination
- Same antibody tests conducted in multiple longitudinal studies including ALSPAC, USoc, ELSA, TwinsUK and NSHD (1946 cohort), funded by National Core Studies.

Physical health in the COVID-19 surveys

Section	Торіс	W1	W2	W3
Physical health	Whether has had COVID-19	Y	Y	Y
	Whether has had COVID-19 test & results	Ν	Y	Y
	Long COVID-19 symptoms	Ν	Ν	Y
	Symptoms of COVID-19	Y	Y	Y
	Extent of compliance with social distancing guidelines	Y	Ν	Y
	Whether has downloaded NHS Track & Trace app	Ν	Ν	Y
	Whether been offered COVID-19 vaccine; whether received it & date; if not: how likely to have it; if not likely: reasons	Ν	N	Y
	Self-rated general health	Y	Y	Y
	Long-standing health conditions	Y	Y	Y
	Disruption to medical appointments	Y	Y	Y
	Difficulty obtaining medication	Ν	Y	Y
	Whether in defined vulnerable category	Y	Y	Y
Health behaviours	Smoking and vaping	Y	Y	Y
	Alcohol consumption	Y	Y	Y
	Physical activity	Y	Y	Y
	Diet (fruit & veg)	Y	Y	Y
	Sleep	Y	Y	Y
	Weight	Y	Y	Y
	Screen time	Ν	N	Y

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Linked health administrative data in the cohorts

Country	Study	Health admin data	Access
England	NCDS, BCS70, Next Steps, MCS	 Hospital Episodes Statistics (HES) Admitted Patient Care (APC) Critical Care (CC) – linked to APC Accident & Emergency (A&E) Outpatient Care (OP) 	Available at UKDS (e.g. <u>link</u>) via Secure Lab
Scotland		Scottish Medical Records (SMR)	Available at UKDS (e.g. <u>link</u>)
	BCS70, NCDS, MCS	 Inpatient Outpatient Birth and neonatal records Prescribing information 	via Secure Lab
	BCS70, NCDS only	Maternity	
	MCS only	Immunisations (SRS), Child Health Review	
Wales	MCS	 Health data assets from SAIL Databank (e.g. emergency department, outpatient, COVID data) up to age 14 and for cohort members' parents 	Available at Secure Anonymised Information Linkage (SAIL) Databank; to be deposited with UKDS
		 Hospitalisations & no. of diagnoses from ICD-10 chapter codes up to age 11 	Available at UKDS via Secure Lab (<u>link</u>)
All	NCDS BCS70	Deaths (1958-2016)Deaths (1970-2014)	Available at UKDS (e.g. <u>link</u>) via Special Licence

Coming soon:

- HES data linked to MCS; HES refresh in remaining studies, including COVID-19 data
- Refresh of Welsh health dataset linked to MCS (2001-2012)

Biomedical sub-studies in the CLS cohorts

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<u>MCS</u>

- Oral fluids sample assays used to detect variety of infections (3)
- Milk teeth test for exposure to lead in the environment (7)

BCS70

- Impact of foetal nutrition on early development (22 and 42 months)
 - 10% of CM's; >42 weeks gestation and low birthweight; @2,500
 - Family circumstances, development, medical examination

<u>NCDS</u>

- Feasibility Study and Tobacco Research (age 20)
 - @ 800: education, employment, marriage, children, housing, income and savings
 - Adult smoking behaviour self-completion



Resources and access to data

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Economic and Social Research Council

Data <u>freely</u> available to researchers, government analysts and third sector workers: <u>https://ukdataservice.ac.uk/</u>





Key services

_	Cohort	Link
	NCDS	http://discover.ukdataservice.ac.uk/series/?sn=2000032
	BCS70	http://discover.ukdataservice.ac.uk/series/?sn=200001
	Next Steps	http://discover.ukdataservice.ac.uk/series/?sn=2000030
	MCS	http://discover.ukdataservice.ac.uk/series/?sn=2000031

Access to different types of data



Access to data held by the UK Data Service varies depending on how the data is classified:

<u>Tier 1:</u> <u>End User Licence</u> (EUL) for access to data with a low level of sensitivity and disclosivity.

- Most of our data are available under this licence.
- Your application is authorised directly by the UK Data Service, and you can download the data directly from there.

<u>**Tier 2a</u>**: <u>Special Licence</u> (SL) for access to moderately sensitive or disclosive data.</u> Access through the UK Data Service and application approved by CLS before you can download the data.

<u>Tier 2b</u>: <u>Secure Access Licence</u> (SA) for access to the most sensitive and/or potentially disclosive data. Access through the UK Data Service and attend a specialised training course.

https://cls.ucl.ac.uk/data-access-training/data-access/

Genetic data and biological samples *NCDS and MCS

- Data access system via CLS Data Access Committee
- Complete CLS Data Access Request which includes:
 - i. <u>Research project description</u> (up to 500 words)
 - ii. Brief methodology description (up to 500 words)
 - iii. Ethico-legal issues including sensitive or controversial social topics (up to 500 words)
- And attaching *_Data_Dictionary.xlsx with requested variables
- Bespoke survey dataset identified by a specific project ID

CLS Data Access Request

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CLS Data Access Application Form DAC REF:

The CLS Data Access Committee (CLS DAC) welcomes applications to access CLS research data not publicly available via the UK Data Service or other data repositories, and biological samples.

Please read the CLS Data Access Guidelines below (p. 9) prior to completing this form.

1.1. Main data applicant

For applications by students, the main data applicant must be the project supervisor.

Name:	
Affiliation and work Address:	
Academic email address:	
Website (e.g., ORCID or institutional website)	
Telephone:	

1.2. Research team and collaborators

Please list the names of all member(s) of your research team who need access to the data and their contact email address.

Name	Affiliation	Email address
You may add rows for add	itional users if required.	
CLS Application for Data Acces		1

https://cls.ucl.ac.uk/data-access-training/data-access/accessing-data-directly-from-cls/

(For Genome Wide genotyping data if not linked to any NCDS data apply to the European Genome-phenome Archive (EGA) – more information at link above)

Resources available: CLS website

https://cls.ucl.ac.uk/

BCS70 1970 British Cohort Study

single week of 1970.

The 1970 British Cohort Study (BCS70) is following the lives

of around 17,000 people born in England, Scotland and Wales in a

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Resources available on each cohort and sweeps: User Guide, technical resources and questionnaires

Training and Support

Forthcoming events

Handling missing data in the CLS cohorts 27 April 2023, 1.00–4.30pm Children of the noughties: a conference to celebrate 21 years of the Millennium Cohort Study. 12/13 June 2023 https://cls.ucl.ac.uk/events/

Training videos on this page

Upcoming biomedical data

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Upcoming physical health / biomedical data

MCS age 22/23 General / Longstanding COVID-19 Height/Weight/Body fat Substance use Sleep Diet and exercise Pregnancy	Next Steps age 33 General / Longstanding COVID-19 Height/Weight Substance use Sleep Diet and exercise Pregnancy histories, fertility treatments and family planning Saliva collection for DNA extraction and genotyping
BCS70 age 52/53 General / longstanding Health conditions COVID-19 Height/Weight Substance use Sleep Diet and exercise Drinking and smoking Menstruation, gynaecological problems and menopause Sterilisation/Vasectomy Fertility	NCDS age 62/65 General / Longstanding / Physical health problems Health insurance COVID-19 Height/Weight Substance use Sleep Diet and exercise Pain Gynaecological problems Hearing Vision Dental health

NCDS Age 62-64 biomedical sweep

Nurse visit – bio-measures

Prescribed medications Seated and standing blood pressure Maximal grip strength

Blood sampling:

- Total and HDL cholesterol
- Glycated haemoglobin (HbA1c)
- Triglycerides
- High sensitivity c-reactive protein (hsCRP)
- DNA extraction

Anthropometry (weight, body fat, waist and hip)

Timed normal walk

Standing balance: Leg raise

Online diet questionnaire

Oxford WebQ – a 24 hour recall of food and drink consumption on two days. Days randomly selected from the seven days following the nurse visit. Nutrient intake automatically derived.

CLS cohorts and biomedical research To conclude:

- Nationally representative groups of people born in a given 'year'
- Multi-purpose and multi-disciplinary studies collecting detailed information on different aspects of cohort members lives from childhood to early old-age (economic, social, health and behaviours)
- Including:
 - Medical examinations throughout the life-course (birth, childhood, midlife, early old age)
 - Anthropometrics
 - Diet and time-use diaries, accelerometry
 - Genetic data and biological samples
 - Biomarkers
 - Linked health administrative data
 - COVID-19 data and antibody tests
- Opportunities for within cohort biomedical research and
 - Cross-CLS cohort biomedical research e.g. BCS70 & NCDS same protocols; NCDS, BCS70 and MCS anthropometry, COVID-19 serology all our cohorts (and others)
 - Opportunities for direct comparisons with other CLOSER longitudinal datasets e.g. NSHD, ELSA

Thank you.

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