CHRISTMAS NEWSLETTER 2024

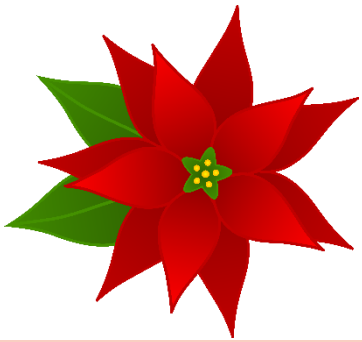
WELCOME!

THE UNIVERSITY of EDINBURGH
Lothian Birth Cohorts

Welcome to the Lothian Birth Cohorts (LBCs) 2024 Christmas newsletter!

As always, the LBC team has been busy all year – as have many of you - making great progress with the study, and we're excited to share the latest updates with you. In this newsletter, you'll find news about our latest developments, research and new publications, and events where we've shared our findings. We are incredibly grateful for your continued support of the study; none of this would be possible without you.

We hope you have a very happy festive season, and wish you and your loved ones all the best for 2025.



LBC1936 STUDY: WAVE 7 UPDATES

We are delighted to report that Wave 7 of the LBC1936 study has progressed very well since starting in March 2024. Thank you to everyone who has attended the Wellcome Trust Clinical Research Facility (WTCRF) so far. Your data becomes more valuable every time we see you, and we are extremely grateful for your ongoing dedication to the LBCs. When this newsletter arrives with you, we will have seen over 100 of you at the WTCRF for cognitive testing appointments, and 69 will have had an MRI brain scan at the scanning facility at Edinburgh Imaging Facility (EIF), Royal Infirmary of Edinburgh. We look forward to seeing more of you in the New Year!

The first LBC1936 participant returning for Wave 7 MRI scan

CELEBRATING THE ANNIVERSARIES OF THE LBCs

This year we celebrate two special anniversaries in the history of the Lothian Birth Cohorts studies: it is the 25th anniversary of the LBC1921 established in 1999 and the 20th anniversary of the LBC1936.

Participants in the LBC1921 were tested five times from around age 79 to 92. Beginning in 2004 we have been inviting members of the LBC1936 for testing every three years; we hope to see over 200 of you as you come back for a seventh time!

The richness of the data collected is unprecedented, and we have published over 700 scientific papers using these data. You have taught us a great deal about the secrets of healthy ageing and cognitive health. These have also directly contributed

to public health policy and advice (the list of >60 policy and advice documents to which the team's research has directly contributed is available on the study website. Website details can be found at the end of this newsletter). Your contributions have made the Lothian Birth Cohorts known worldwide and have shaped our understanding of ageing. Soon, the LBC studies will continue their work as part of the Edinburgh Futures Institute, allowing your legacy to continue far into the future.

A few words from Professor Cox:

"I wonder how many of you have reflected on the moment you first decided to sign up to the LBC studies. I wonder if – at the time - you anticipated the innumerable and invaluable contributions you would make to multiple fields of scientific study. Many of those contributions to scientific areas could not have been envisioned at the outset (even by Prof Deary, and he knew very well how valuable you all were from the beginning!). That is a credit to your foresight to sign up, and to the superb research team. As you will see in this newsletter, they continue to work hard to maximise what we can learn from the information you so generously provide.

Among those of you who participated in a recent LBC focus group, a strong theme was your desire to contribute a legacy of knowledge for future generations. It is fitting, therefore, that the LBC team should be taking up residence in the new Edinburgh Futures Institute (the newly-renovated former Edinburgh Royal Infirmary) since the LBCs are both a very 'Edinburgh' story (even the school test you sat at age 11 was designed in Edinburgh), and a very 'Futures' story. You will see in the sections below how we engage with the next generation about our findings based on your data.

I hope you feel a quiet sense of pride and satisfaction when reviewing this annual list of achievements. It is well-earned via your special and continuing support of the study, for which we are continually grateful. I wish you and your loved ones a very happy festive period and best wishes for 2025."

The new home of the Lothian Birth Cohorts - Edinburgh Futures Institute at Lauriston

LBC 1936 STAFF UPDATES

Professor Simon Cox speaking at the LBC reunion in May 2023

We are delighted to announce that the LBC Study Director, Dr Simon Cox has been promoted to professor and took up his Personal Chair in Brain and Cognitive Ageing in August. Simon received his PhD in 2012 at the University of Edinburgh, examining how the brain facilitates complex cognitive abilities, and how and why people differ in their abilities across the life course. Since December 2020, Simon has been the Director of the Lothian Birth Cohorts and currently holds a Sir Henry Dale Fellowship from the Wellcome Trust and The Royal Society. He is the Principal Investigator on the core LBC grant, jointly funded by the BBSRC and ESRC. He also recently established a new research collaboration worth an additional £1.1M to use the blood samples you have provided to identify DNA fragments from brain cells, and investigate how chemical changes (methylation) to brain cells' DNA change over time. Congratulations on this fantastic and well-deserved achievement, Simon!

This Spring we also celebrated Dr Sarah Harris' promotion to the post of Senior Research Fellow. Sarah joined the team in 2003 as the LBC geneticist and has contributed to over 200 scientific papers using LBC data. She is a current LBC Co-Investigator and was recently awarded $4.7 million in grant funding from the US National Institutes of Health to lead a large-scale longitudinal proteomics study in the LBC focusing on the relationship between proteins in blood and cognitive function and brain structure before a clinical diagnosis of Alzheimer's Disease. Congratulations, Sarah!

Dr Sarah Harris speaking at the LBC reunion in 2019

This Spring our team said goodbye to LBC Study Coordinator, Adele Taylor and welcomed a new Study Coordinator, Dr Sarah McGrory. Sarah has a background in psychology and has previously worked on the LBC1936 Study as a post-doctoral research fellow. A very warm welcome back to the team, Sarah!

Adele said good-bye after almost 12 years with the Study: she joined the team in 2012 as a member of the cognitive testing team for Wave 3. She was the very heart of the study, and the right hand of both founding and current directors during her tenure. With her knowledge, patience and professionalism she kept the team supported and the study running smoothly. Simon, on behalf of the team, thanked Adele for all her excellent work and we all were sad to see her go.

Adele said: "*I was incredibly fortunate to join the Lothian Birth Cohorts on completing my undergraduate degree in Psychology.*

For my first job in the world of research to be with one of the most successful and long-running studies of cognitive ageing in the world was a dream come true. Over almost 12 years I've learned an incredible amount from experienced and talented colleagues, as well as from the participants of the LBC1936 who have been a pleasure to get to know. My time with the study has been rewarding and fun, and I wish the study and all its contributors every success." Adele was a fantastic colleague and friend, and we will miss her but wish her all the best on her new adventure travelling to the Indonesian Archipelago!

A change of scenery for Adele – enjoying the rice terraces in Bali!

We are also delighted to have Alison Pattie returning as a member of the cognitive testing team for this 7th wave. Alison has been a core member of the LBC studies since their inception in 1998. Alison has once again demonstrated her commitment to the study and its participants by returning for this current wave of testing, and we're sure many of you will be looking forward to seeing her again at the clinic. Welcome back (again!), Alison!

SCIENTIFIC HIGHLIGHTS

Here are just a few of the discoveries our researchers and collaborators have made in 2024, using your data:

COGNITIVE AGEING:

Gardening Linked to Staying Sharp in Later Life

Author: Janie Corley et al.
Journal: *Journal of Environmental Psychology*

A study led by Dr Janie Corley was the first to explore whether gardening might help keep the mind sharp across the life-course. Using data from the Lothian Birth Cohort 1921, the study found that those who gardened tended to have better cognitive function in later life compared to those who didn't. Those who gardened frequently or occasionally showed greater improvement in cognitive skills over their lifetimes than those who rarely or never gardened. Between ages 79 and 90, memory and problem-solving abilities generally declined, but gardeners maintained an advantage, even after considering other factors like education, childhood ability, health, and overall activity level.

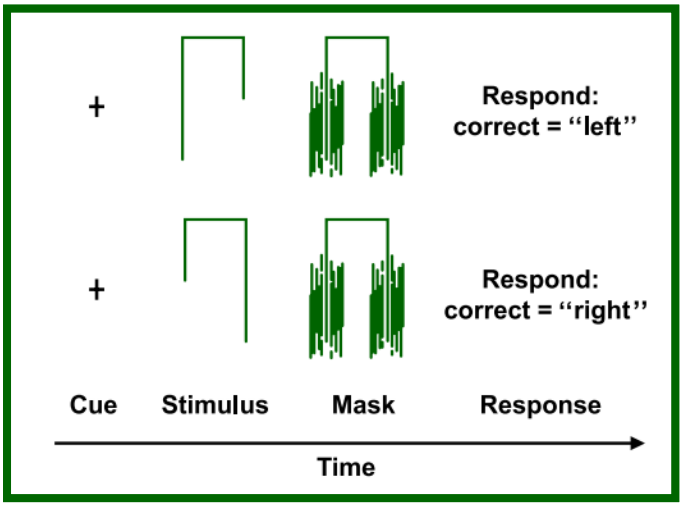
While it's not certain that gardening directly causes these benefits—other factors, like living in a 'green' neighbourhood or the social interactions arising from gardening activity, might help too—it does provide early evidence that gardening is linked to small but noticeable cognitive benefits in older age.

Dr Corley pointed out that activities like gardening, which can involve mental processes like planning and memory, fit the idea of "use it or lose it" when it comes to keeping the mind active. This exciting study has been covered in major media outlets,

including The Telegraph, Daily Mail, and The Mirror.

Does processing speed explain the ageing mind?

Author: Ian Deary et al.
Journal: *Intelligence*



Remember this test?! When you come along to the study you do a visual test on the computer that involves deciding whether the long line is on the left or right of the shape that is presented. A recent study with your data explored how this task —Inspection Time (which is a test of processing speed)— might relate to cognitive ageing differences. Inspection Time measures how quickly a person can identify simple visual information, like determining the longer of two lines flashed briefly on a screen. Taking in visual information quickly tends to slow more in some than others with advancing age, and we have previously shown that it is also related to the health of the brain's white matter connections.

This study examined how changes in Inspection Time from age 70 to 82 related to overall cognitive ability, memory, spatial reasoning, and other thinking skills. Results showed a strong link between performance on the Inspection Time task and cognitive ability in general over the 12-year period, suggesting that slower processing might contribute to cognitive decline. However, the researchers noted this is likely only part of the picture; cognitive decline may also impact processing speed, and other underlying factors might drive both changes in thinking skills and processing speed as we age.

Exceptional longevity: Who Gets to Be (over) 100?

Author: Janie Corley et al.
Journal: *The Journals of Gerontology: Series A*

The Lothian Birth Cohort 1921 has achieved exceptional longevity living to an average of 89.5 years—over a decade beyond Scotland's current average lifespan of 78.6 years. Starting in 1999 with 550 participants around age 79, many lived into their 80s and 90s; 16 of them celebrated their 100th birthday, three of them have reached 103 years of age, and two have birthdays in the coming months.

To uncover factors behind this longevity, Dr Janie Corley and the team examined traits linked to longer life in the cohort. Findings showed that those who lived longer tended to be women, had better physical and cognitive functioning at age 79, were more active, and had lower smoking rates and cancer history. Cognitive ability measured at age 79 stood out as the most important predictor of a long life. Additionally, people with more education and a more advantageous childhood environment had

better health in adulthood, contributing to a longer lifespan.

BRAIN AGEING:

Life-course neighbourhood deprivation linked to adverse brain structure characteristics in older adults

Author: Gergo Baranyi et al.
Journal: *Molecular Psychiatry*

Across the world people are living longer and the number of older people is steadily increasing. It is important to find ways to create the environments that ensure everyone can have the opportunity to live a long and healthy life. Neighbourhood characteristics have been shown to influence cognitive ageing, but how neighbourhood disadvantage at different stages of the life course may be associated with brain health has remained poorly understood. Using your data the study explored the relationship between levels of neighbourhood deprivation from birth to late adulthood, and brain health. The study found that living in disadvantaged neighbourhoods in mid- to late adulthood was associated with poorer brain health among older adults. The study suggests that living in deprived neighbourhoods, especially from middle age onward, is linked to negative changes in brain structure.

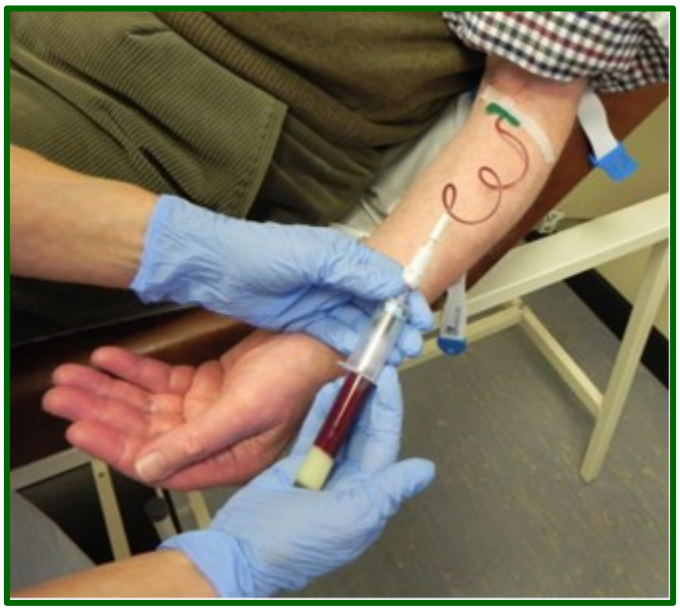
BEYOND BRAIN AND COGNITIVE AGEING:

LBC1936 blood samples help to understand blood clotting

Author: Paul de Vries et al.
Journal: *Blood*

Your blood samples were recently used as part of a global study aimed at understanding blood clotting and the genes involved in it. Blood clotting is the process that stops bleeding by forming clots when there's an injury. It involves key blood components like platelets and a protein called Factor VIII (FVIII). When a blood vessel is damaged, FVIII helps to start the clotting process.

The study discovered new genetic regions linked to FVIII levels and another protein called von Willebrand factor (VWF), both of which we inherit from our family. These proteins are associated with conditions like stroke, heart disease, and thrombosis (blood clots). This research may help to improve how we predict and treat bleeding or clotting issues in the future.



LBC1936 participant's blood sample donation

LBC1921 and LBC1936 data give insights unto the genetic basis of thyroid function and disease

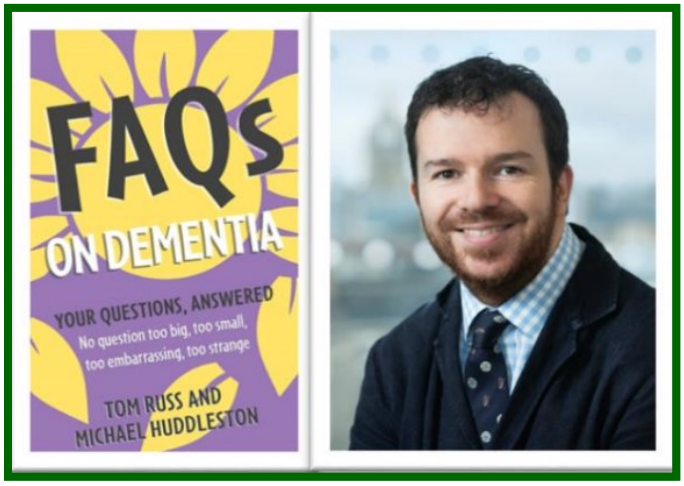
Author: Roselie B.T.M Sterenborg et al.
Journal: Nature Communications

The thyroid gland is a small organ in your neck that makes two key hormones, called T4 and T3, which help keep your body's cells working properly. These hormones play an important role in a wide range of body processes, such as managing your metabolism, heart rate, breathing, and body temperature. When the thyroid isn't

working well, it can increase the risk of conditions like heart disease, stroke, type 2 diabetes, dementia, and depression.

Genes play a big part in how well the thyroid works. Between 58 and 71% of the differences in people's thyroid hormone levels come from their genes, though much about these genetic influences remains unclear. Recently, your data contributed to a large study with over 271,000 people, helping researchers to understand the genetics of thyroid function and its links to various health issues, including thyroid cancer.

DR TOM RUSS PUBLISHES A BOOK ON DEMENTIA



"No question too embarrassing, naive, complicated or simple – everything that's ever been asked about dementia, answered." This is a subtitle for a new book "FAQs on dementia", co-authored by Dr Tom Russ – an LBC Co-Investigator and Principal Medical Consultant, Director of the Alzheimer Scotland Dementia Research Centre at the University of Edinburgh. We are delighted his book has been included on the updated Reading Well for Dementia list. This is a list of recommended books chosen by people living with dementia, carers and health professionals. The booklist provides reliable information, advice and support as well as personal stories. The new booklist is targeted at people living with dementia, carers and family members including younger children to help them understand more about dementia. The list was launched during the Dementia Action Week in May and suggests titles for public libraries across England and Wales to stock. One of the reviewers on Amazon said about the book: *"A concise, eloquent, and thought-provoking overview of a complex topic. Highly recommended."* Congratulations, Tom!

RETHINK DEMENTIA

A new campaign challenging people to Rethink Dementia was launched this September, supported by the Scottish Government. To help address the stigma around the illness, people are being encouraged to continue doing everyday activities with friends or relatives diagnosed with dementia. Research shows that making this effort to include people in social activities can help them stay well for longer as well as alleviate symptoms such as depression, anxiety and apathy.

Dr Tom Russ, said: *"Over the past 20 years I've engaged with hundreds of people who have been diagnosed with dementia, and often they will withdraw from social activities, which can have a negative impact on their overall wellbeing. For anyone with friends or relatives who have been diagnosed with dementia, it's vital to stay in touch to help them maintain their usual social activities, or even try something new together."*

Listen to Arlene Stuart's radio show on Greatest Hits Network about living with dementia - featuring Dr Tom Russ here:

ReThink Dementia | NHS inform

https://edin.ac/3CcGTyo

DR JANIE CORLEY OFFERS EVIDENCE FOR AN INQUIRY ON URBAN GREEN SPACES IN THE HOUSE OF COMMONS

Green spaces, including parks, woodlands and community gardens, are valuable for health and wellbeing. Public Health England estimate that £2.1 billion could be saved in healthcare costs each year if everyone in England had good access to green spaces where they could exercise, providing evidence that living in a greener environment can promote and protect good health.

A recent UK parliamentary inquiry by the Environment, Food and Rural Affairs Committee, focused on the benefits of green spaces for people and the environment, with the aim to explore the best ways to make cities greener and more nature rich. The LBC studies have provided important insights into green spaces across the life course, and the key findings were summarised and submitted as written evidence by Dr Janie Corley. Janie's evidence, now published on the Committee's website, concludes: "*The findings from the LBC studies make an especially valuable contribution to understanding how aspects of physical environment can act as protective factors against cognitive decline. Moreover, these findings are amongst the first to shed light on the lifelong impact of early-life environmental circumstances, particularly the accessibility of local parks. These effects are particularly noteworthy for women and those in lower socioeconomic groups during adulthood. This research underscores the necessity of ensuring consistent and equitable access to urban green spaces throughout one's life to safeguard our future health.*" Another example of how important and influential your data can be!

HOW TO STAY SHARP IN OLDER AGE: THE NEXT GENERATION

The team is always keen to spread the word about what we know from the LBC studies about how to keep our thinking skills sharp in older age. This year we've had many opportunities to engage with children about the LBCs and what we know about healthy ageing!

LOTHIAN BIRTH COHORTS AT EDINBURGH SCIENCE FESTIVAL WITH THE GAME OF LIFE

How do your brain and thinking skills develop and change throughout your life? How important are your genes or is it all about how you choose to live your life? These were some of the questions raised at The Game of Life: Who gets to be 100? workshop at this year's Edinburgh Science Festival. The LBC team, joined by S5 pupil volunteers from the Boroughmuir High School, delivered three sold-out workshops at the National Museum of Science. The workshop was designed around a boardgame inspired by LBC-related research on cognitive and brain ageing. The participants – between eight and eleven years of age – enjoyed the opportunity to create a DNA bracelet as they reviewed basic concepts from genetics, speculated what factors influence healthy brain ageing while exploring 3D-printed brain models and played a boardgame which took them on a journey from birth to old age, learning how our genetic make-up and lifestyle choices influence cognitive and brain

ageing. As the players went through 'life', they encountered a range of conditions and factors that either increase (e.g., smoking) or decrease (learning a new language, playing a musical instrument, being physically fit) their risk of dementia. While children took part in these activities, their parents were introduced to the LBC studies to provide the context for the children's activities and were invited to explore LBC resources that supported the session (augmented reality glasses, 3D brain models, brain scans as well as art inspired by LBC research) and could test their knowledge about brain and cognitive ageing in a quiz. One parent said: *"We really enjoyed the workshop. It was educational and fun for the kids. Also, I enjoyed that they engaged the parents. We also got useful information that helps us to shape our life and our kids' future better. Thank you!"* We look forward to offering the workshop to many others.

Volunteers with a display of activities at The Game of Life at Edinburgh Science Festival in April

In June Lothian Birth Cohorts were invited to Niddrie Mill Primary School in Craigmillar for their 'Science of Healthy Living' Week.

Over three sessions we joined almost 60 Primary 5 children for an interactive workshop on brain and cognitive health. Drs Sarah Harris and Barbora Skarabela together with wonderful volunteers from Edinburgh Neuroscience engaged the children in activities about the role of genes and lifestyle in our cognitive and brain health: children enjoyed creating a DNA bracelet, again playing our bespoke boardgame and children as well as teachers were mesmerised and drawn to 3D-printed brain models, leading to lively discussions about structural differences between healthy and less healthy brain ageing, and the factors that may influence the outcomes. The children were keen to engage (and eager to get to 100 in the game), and the staff were excellent in supporting our activities. We look forward to another future collaboration!

Niddrie Mill Primary 5 pupils playing the LBC-inspired Game of Life

LOTHIAN BIRTH COHORTS AT THE CASTLEBRAE COMMUNITY SCIENCE FESTIVAL

Dr Barbora Skarabela represented Lothian Birth Cohorts at the Community Science Festival at Castlebrae, organised by Edinburgh BioQuarter. She set up a display table featuring brain models, augmented reality glasses, and Fast Facts cards to engage in a conversation about Lothian Birth Cohorts. 3D printed brain models based on LBC MRI scans immediately drew

attention of visitors of all ages, leading to interesting conversations about the study and findings. Barbora met with Castlebrae High Schoolers and primary school children who came along on a Friday afternoon with their parents and guardians. The festival was attended by over 120 visitors.

ART AND THE LBCS

The Simons Initiative for the Developing Brain (SIDB) and the Patrick Wild Centre partnered up with 'Fusion: Art meets Science' to host an exhibition celebrating the brain. The Developing Brain exhibition was open to artists and neurodevelopmental scientists, to collaborate and create brain-inspired artwork. Lothian Birth Cohorts contributed to the event with two art-science collaborations:

'Shedding Light on the Brain' with re-purposed LBC glass paperweights celebrating the study

Shedding Light on the Brain arose from glass paperweights that were created in 2019 as gifts to celebrate the twentieth anniversary of the Lothian Birth Cohorts. While most were given away (mostly to you!), some of the remaining ones have been used in this artwork by Joan Smith that references the LBC archives and celebrates the study. This (semi)-portable display has been featured at the Inspace gallery and at the Royal Society of Edinburgh.

'Watching your Brain' highlights two sides of science: Scientific discoveries require data and the participants who provide them

Watching your Brain brought together a projected montage of striking images, created by Malgorzata Bugaj, that describe two sides of science that are necessary for helping us understand how the brain changes across the life course. On one side, it represents the abstract data leading to important scientific discoveries. On the other side, it showcases the participants who provide the data and without whose dedication and commitment it would be impossible to uncover secrets of the developing brain.

The opening night of the Developing Brain exhibition on 29 August at Inspace Gallery was incredible, with a lively crowd of around 70 attendants. We look forward to having many opportunities to showcase these LBC-inspired art-science collaborations at future events!

MERRY CHRISTMAS, AND THANK YOU FROM THE LBC TEAM

As a member of the LBC cohort, your contributions are helping to further our knowledge and understanding of cognitive, brain, and general ageing. Thank you for your continued interest and involvement; we look forward to seeing you in 2025 and beyond.

LBC1936 team 2024. Left to right: Barbora Skarabela, Janie Corley, Alison Pattie, Simon Cox, Sarah McGrory, Sabela Mendez, Ian Deary.

CONTACT US

The team is always delighted to hear from you, so if you would like to get in touch with us, please use the contact details found on this page. Please let us know if your contact details have changed, if you require this newsletter in another format, or if you'd like further information about anything you read here.

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LBC PUBLICATION HIGHLIGHTS 2024

- Baranyi, G., et al. (2024). Life-course neighbourhood deprivation and brain structure in older adults: The Lothian Birth Cohort 1936. Molecular Psychiatry.
- Corley, J., Pattie, A., Batty, G. D., Cox, S. R., & Deary, I. J. (2024). Life-course pathways to exceptional longevity: Evidence from the Lothian Birth Cohort of 1921. The Journals of Gerontology: Series A, 79(8).
- Corley, J., Pattie, A., Deary, I. J., & Cox, S. R. (2024). Gardening and cognitive ageing: Longitudinal findings from the Lothian Birth Cohort of 1921. Journal of Environmental Psychology, 97, 102361.
- Deary, I. J., Cox, S. R., & Okely, J. A. (2024). Inspection time and intelligence: A five-wave longitudinal study from age 70 to age 82 in the Lothian Birth Cohort 1936. Intelligence, 105, 101844.
- Thng, G., Shen, X., Stolicyn, A., Adams, M. J., Yeung, H. W., Batziou, V., ... & Whalley, H. C. (2024). A comprehensive hierarchical comparison of structural connectomes in Major Depressive Disorder cases v. controls in two large population samples. Psychological Medicine, 1-12.
- de Vries, P. S., et al. (2024). A genetic association study of circulating coagulation Factor VIII and von Willebrand Factor levels. Blood Journal.
- Higbee, D. H., et al. (2024). Genome-wide association study of preserved ratio impaired spirometry (PRISm). European Respiratory Journal.
- Moodie, J. E., et al. (2024). General and specific patterns of cortical gene expression as spatial correlates of complex cognitive functioning. Human Brain Mapping.
- Sterenborg, R. B. T. M., et al. (2024). Multi-trait analysis characterizes the genetics of thyroid function and identifies causal associations with clinical implications. Nature Communications.

Would you like to receive LBC email updates?

We launched the LBC participant email mailing list in Spring 2023. If you, or your friends and family members, would like to receive our quarterly Disconnected Mind Newsletters from the LBC team, please email us at lbc.ke@ed.ac.uk to sign up.