

Christmas Newsletter 2019

LBC
1921



THE UNIVERSITY of EDINBURGH
Lothian Birth Cohorts

LBC
1936



Welcome to the Lothian Birth Cohorts (LBC) newsletter for 2019. As is our tradition, we take this opportunity to let you know what the LBC team have been up to this year. This newsletter will tell you about some of our latest research findings, and the scientific and public engagement events we've been involved in. None of this would be possible without your continued involvement. Thank you all for your participation in the studies. We hope you all have a happy Christmas and wish you all the best for 2020.

If you would like to get in touch, our contact details are included at the end of the newsletter. Please do let us know if you have moved house, or are about to, so we can update our records and keep in touch with you. We're always pleased to hear from you.

Welcome from LBC Director, Professor Ian Deary

If you skip to the end of this Newsletter, you will see a list of just some of this year's scientific reports from the Lothian Birth Cohorts. That's the stuff that all of us—participants, collaborators, and the LBCs' team members—should be proudest of; we work together to produce these new understandings of why some people's brains and thinking skills age better than others. The LBCs' high profile beyond the academic world is thus well-earned. It is over 20 years since we had the idea of re-contacting people who'd taken an intelligence test at age 11, thinking they might tell us something valuable about how to age well. At the end of this special 20th year, I and the team thank the LBCs' participants and many friends. To participants, we also say: you'll be hearing from us in the next year or two, to take part in LBC1936's Wave 6.

The Lothian Birth Cohorts turn 20!



It's been a year to celebrate, with 2019 being the the Lothian Birth Cohorts' 20th birthday. On 7th September we held a reunion to mark 20 years to the day since the first LBC1921 participant was tested. The LBC team were delighted to welcome around 300 LBC1921 and LBC1936 participants and guests to the special event at the Royal College of Physicians of Edinburgh.

The event kicked off with Director, Ian Deary, showing some of LBC1936's new, age-82, cognitive data, and giving a countdown of the cohorts' 'top 20 scientific reports' of the past 20 years. There were exciting sneak previews of the LBC1936 age-82 brain imaging and health results. There were short talks by LBC researchers and collaborators on the newest types of LBC1936 data collected during Wave 5: musical experience, financial capacity, dietary information, longitudinal retinal imaging, and 'omics – the study of a large amount of data representing a collection of a particular type of biological molecule. Guests also had a chance to explore cutting-edge augmented reality (AR) brain displays, based on LBC1921 and LBC1936 data, showing 3D brain images - with their anatomy and structural differences related to lifestyle and vascular risk factors - floating in real space.

One of the many highlights of the day came when LBC1936 participant, Mr Tom Sommerville, gave a wonderfully entertaining account of his trip to the House of Lords Select Committee on Science, for their newly launched Inquiry into Ageing. The remaining speakers had drawn the short straw following Tom! The event was very well received, and the team were touched by kind words and feedback from those who attended. Particularly appreciated were the positive words of Age UK Trustee, Stuart Purdy, who called the event

'remarkably successful', and noted the 'real enthusiasm and commitment from participants'. Thank you to all of our guests for an enjoyable and memorable afternoon celebrating 20 years of LBC. Thanks also go to Douglas Robertson whose photographs beautifully captured the day.

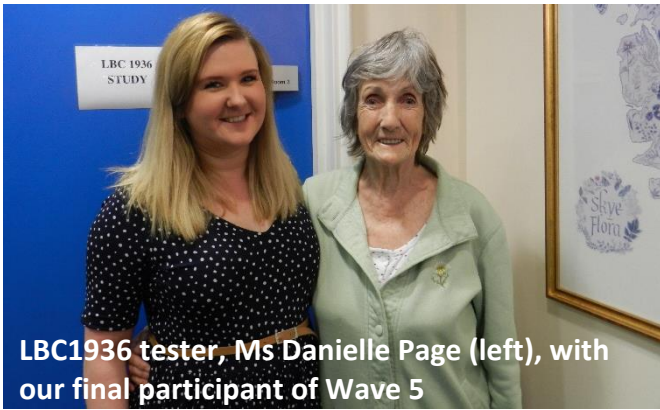


20th anniversary commemorative brochure

Our 20th anniversary commemorative brochure highlights the generosity of all our LBC1921 and LBC1936 participants over the last 20 years. It gives an overview of the many types of data we have collected from you since the studies began, and shows how important the LBCs are in studying cognitive, brain, and general ageing. Some of you will have received the brochure at our reunion in September, but don't worry if you were unable to attend, you can download it for free from the LBC website: www.lothianbirthcohort.ed.ac.uk, or we'd be happy to post a copy to you at home. Contact details for requests are on the last page.



LBC1936 Study Wave 5 completed



We're pleased to tell you that the 5th wave of LBC1936 testing was successfully completed in May. The LBC team were delighted to see 431 participants for cognitive and medical assessment at age ~82 years, and 304 participants returned for their 4th MRI brain scan (with 105 of you braving 2 scans as part our scanner validation study). A big thank you to all who took part. The study would not be possible without your continued dedication and enthusiasm. The LBC team are now busy collating, entering, and cross-checking your valuable data. We look forward to sharing our new findings soon.



Farewell to Brain Research Imaging Centre

The Brain Research Imaging Centre (BRIC; now Edinburgh Imaging Facility) at the Department of Clinical Neurosciences in Edinburgh's Western General Hospital, has been the home of LBC brain imaging since the studies began. As part of major redevelopment works, the facility has moved to the Royal Infirmary of Edinburgh (RIE). LBC1921 participants were scanned twice at BRIC, and it also marks the end of a 10-year (4 wave) consecutive run of structural brain imaging of LBC1936 participants using the same scanner. Some of you will already have had a brain scan at the new location, as well as your usual scan at BRIC. From now on, all LBC brain imaging will take place at the new Edinburgh Imaging Facility RIE.

LBC1936 Wave 6 coming soon!

No sooner does one wave end, than we begin to start planning the next. Our preparations for Wave 6 are well under way, with this new wave due to begin in spring 2020. We hope to see as many LBC1936 participants as possible, for cognitive and physical testing (still at the Western), and repeat brain scans (at the Royal) at average age 85 years.

LBC staff news

We've had some changes in the LBC team this year. First, the sad news: in March, we said goodbye to Alison Pattie as she started her retirement. Alison worked continuously with Ian on the LBC studies since they began in 1999. Many of you will know Alison from your visits to the studies; she tested participants at all waves of the LBC1921 and LBC1936, and was the sole tester of the LBC1921s at ages 90 and 92 years. She was a real asset to the studies, loved by the team and participants alike.



Clockwise from left: Professor Ian Deary, Dr Martha Pollard (past LBC1936 Study Co-ordinator), and Mrs Alison Pattie on 31st January 2019 celebrating her 20th year of work on the LBC studies

We're very excited to welcome two new people to the team. Mr Miles Welstead is our new LBC / Disconnected Mind-funded PhD student, whose project will be based on frailty. Dr Barбора Skarabela is our Knowledge Exchange and Impact Officer, who will oversee the LBCs' online presence and public engagement events. In other team news, Dr Judy Okely (who some of you will know from testing), has been awarded an ESRC grant for a project in collaboration with Dr Katie Overy (Reid School of Music) and Ian, investigating the link between musical experience and healthy ageing. This will use data on lifetime musical experience that many of you provided in the LBC1936 Wave 5 questionnaire. Congratulations Judy!

Professor Ian Deary Awarded OBE



"It was the Queen!", came the message from Ian, following his visit to the Palace of Holyrood in July, to be awarded the prestigious Officer of the Order of the British Empire (OBE). The LBCs Director received the OBE for services to the Social Sciences. Ian said, "I am delighted and proud to take this bow for the research team, participants, and our achievements. I include our partners at Age UK in that. From the many heart-warming messages of congratulation, I was especially gladdened by the letter from the Right Honourable Nicola Sturgeon, First Minister of Scotland. She wrote to me:

"Dear Ian... Your work with the Disconnected Mind project has been a great success and has allowed us to take great strides in the understanding of the many factors that contribute to health ageing. I understand the information from the Lothian Birth Cohort Studies 1936 is now used all over the world to help not only with cognitive ageing research but also contributes to a wealth of additional age-related research... Best wishes, Nicola".

Now, that's an endorsement to savour and keep."

LBC1936 participant attends House of Lords Select Committee on Science and Technology

In our story about the LBC reunion we told you that our speakers this year included an LBC1936 participant, who recounted his summer trip to the Houses of Parliament. In July, Tom Sommerville was chosen to attend a focus group with the House of Lords Select Committee on Science & Technology to help shape the newly launched Inquiry into Ageing: Science, Technology and Healthy Living. On his return, the keen writer jotted down a few words to share his experience with the LBCs team and our collaborators. Now we'd like to share it with you, his LBC colleagues.

Lording it, by Tom Sommerville



Tom Sommerville with Age UK's Libby Archer in front of the Houses of Parliament

On Tuesday, July 9, 2019 on a hot, humid day I was, courtesy of Age UK, in the House of Lords as a member of a six-person focus group to discuss the impact of ageing on one's life. We commoners sat with eight peers for one hour and told our stories. We had been given four suggestions for discussion: 1) the impact of ageing on emotional wellbeing and the practicalities of daily life ; 2) the importance of social interactions; 3) access to medicines and products that can help with the impact of ageing ; 4) the role of digital services in helping to reduce the impacts of ageing.

But we oldies were a fairly opinionated group who were determined to get over experiences that were not necessarily covered by the four suggestions. I have to say the rapport between the peers and us commoners was excellent and the hour was very informal and often humorous. Five of the group were able-bodied and seemed to be ageing well. Most of the discussion concentrated on the imperative need for social interaction, friends and family and the ways in which digital devices could help. I did shoe-horn the LBC into the talk at one point and got three questions on it. Three of us were computer users and strongly encouraged the others to consider the usefulness of Skype or FaceTime and the internet. Computer courses for older people were discussed.

An hour was hardly long enough to do the subject justice and as I walked back over Westminster Bridge I began to think of the things I would have liked to say before we ran of time. I will remember the alfresco lunch overlooking the Thames and the tour of the Palace of Westminster and Portcullis House. My last thoughts were gratitude to Libby Archer of Age UK for looking after me and, well... I wouldn't mind being a lord...for a week or two.

Storytelling with Parkside Primary School



LBC1936 participants and Parkside Primary school pupils sharing their memories and experiences

In January, the P7s at Parkside Primary School in Edinburgh welcomed a group of LBC1936 participants for a creative afternoon of art and storytelling. P7s are about 11 years old, the same age the LBC1921s and LBC1936s were when they took the Moray House Test in 1932 or 1947. The event began with some enchanting stories from Claire McNicol, a professional storyteller who facilitated the event. Then the class and the LBC participants broke off into smaller groups to share their experiences and memories of school at age 11. The P7s were interested to hear about school life 70 years ago, particularly about rationing of sweets, getting 'the belt' and life without any smart phones! A love for sweeties and playing football at break time were two things the generations found they had in common. After a short tea break, Claire told the story of the Goodbye Cloak – a beautiful cloak covered with colours and symbols that represents a person's life. The P7s and LBCs then designed their own cloaks reflecting the lives they have lived so far. The afternoon was rounded off with a lovely rendition of the song, *Lean on Me*, from the P7s. Deputy Head teacher at the school Christine MacLeod said, "The class really enjoyed talking to our visitors and hearing their stories."

Scottish Parliament Festival of Politics

In last year's newsletter we told you about the opening of a major exhibition, *The Art of Intelligent Ageing*, at The Edinburgh College of Art. It was a collaboration between the LBCs and renowned portrait artist Fionna Carlisle, which celebrated the coming together of the worlds of science and art. The exhibition showcased the entire series of Fionna's portraits of LBC participants and researchers. When the opportunity arose to show part of the exhibition again at the Scottish Parliament for *The Festival of Politics*, we knew it was too good to miss. It ran from 10th-12th October and was a huge success. Here's Fionna, reflecting on the event.

Fionna said, "When Alan Rennie invited me to show a selection of portraits from my exhibition *The Art of Intelligent Ageing* during The Festival of Politics, I immediately contacted Professor Ian Deary. This project had always been a collaboration and I was sure he would be interested too... This was a prestigious event with thousands of visitors able to access parts of the Parliament not usually available to the public... this 'organically grown' mix of science and art was a real draw."



Guests enjoying Fionna's portraits at the Festival of Politics, and above, Ian Deary with Former Leader of the Scottish Conservative Party, Ruth Davidson

LBCs on BBC Brainwaves



From left: Dan Holland, Danielle Page, Fionna Carlisle, and Pennie Latin recording at 7 George Square for BBC Brainwaves

In August, BBC Radio Scotland's Pennie Latin and Dan Holland recorded a special LBC episode of their show, *Brainwaves*. Along with interviews with Ian, some of the LBC team, and artist Fionna Carlisle (who has painted some LBC participants and researchers), LBC1936 and LBC1921 participants were also interviewed. The show which aired in September, is available to listen to online at <http://edin.ac/2ZWhpka>. The BBC were so taken by the LBCs that they chose to include them in a further two shows: the first, a slot on *The Afternoon Show* featured an interview with Fionna Carlisle; the second, *Our Lives with Michelle McManus*, included a fascinating interview with an LBC1936 participant who spoke about her earliest war time memories. The latter show is available to listen to online at <https://edin.ac/2ObAqXZ>.

MSPs meet LBCs at the MRC

In February, the LBC materials were on show in the Members' Room of the Scottish Parliament. This was part of the Medical Research Council's Science Showcase in Scotland. "It was an important event for me to be at," said Ian, "because ageing and its effect on cognitive skills is such a large issue. And because Scotland—via the Lothian Birth Cohorts—is so well set up to address it." Among the several MSPs who showed much interest in the LBCs were representatives from different parties. The Minister for Further Education, Higher Education and Science, Richard Lochhead, was keen to hear about protective and risk factors for cognitive ageing, and how the LBCs were unusually valuable in finding these. Health and Sport Convener, Lewis Macdonald was similarly enthralled. Ian hopes to follow-up the meetings with more in-depth discussions about contributions to policies.



Ian Deary (left) shows crystal etching of an LBC1936 participant's brain white matter connections to Lewis MacDonald MSP.

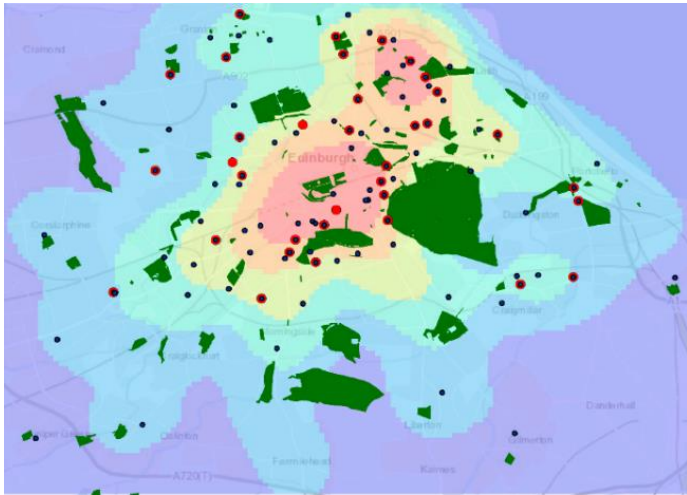
BBC Music Day: Ageing, Dementia & Music

The team jumped at the chance to join in with celebrations for **BBC Music day** in September, which this year had a special focus on music and dementia. Our collaborator from the Reid School of Music, Dr Katie Overy, hosted a special event at Saint Cecilia's Hall which was an engaging mix of short talks and interactive fun. Prof Ian Deary gave a talk on the history of the LBCs and their key findings, and the LBC team were there with their latest teaching tool - the 3D brain display; it was a hit with guests, who tried it out while exploring the museum's unusual and historical musical instruments. Katie followed with an introduction to the Scottish Chamber Orchestra (SCO) Reconnect project. Reconnect workshops bring together SCO musicians and patients in hospital dementia wards. Three SCO musicians were there to give a heart-warming demonstration of the interactive sessions they take onto the wards, and the audience were encouraged to join in singing and playing instruments with them throughout.



Ian joins in with the SCO Reconnect workshop at St. Cecilia's Hall on BBC Music Day 2019

Scientific Highlights (Spring-Summer 2019)



Association between the activity space exposure to parks in childhood and adolescence and cognitive aging in later life.

Author: Cherrie, M, et al.

Journal: *International Journal of Environmental Research and Public Health*

This study, based on LBC1936 data, found that green space exposure during early life may be important for healthy cognitive aging between age 70 and 76.

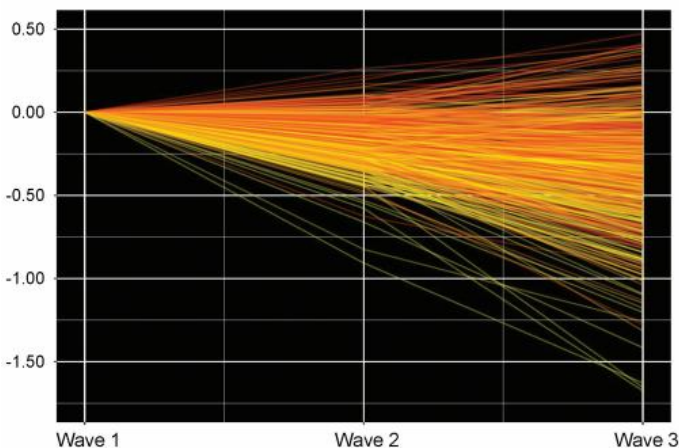
Image (left) shows public parks (green), schools (blue and red dots) and density of road traffic accidents (shading red to purple) in Edinburgh in 1949.

Association analyses identify 31 new risk loci for colorectal cancer susceptibility.

Author: Law, P.J., et al.

Journal: *Nature Communications*

LBC1921 and LBC1936 participants were controls in this study of colorectal cancer (CRC) which identified 31 regions of the genome and biological pathways not previously known to be associated with CRC.



Sleep and cognitive aging in the eighth decade of life.

Author: Cox, S.R., et al.

Journal: *Sleep*

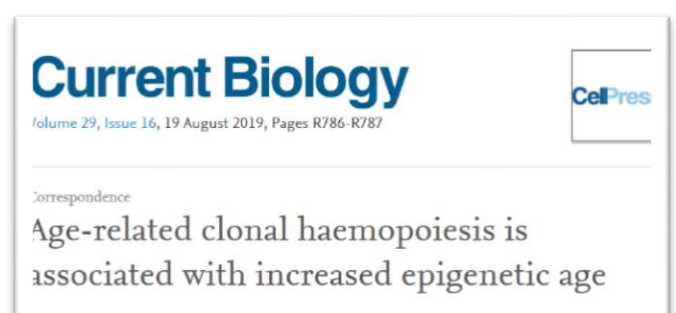
This study found that LBC1936 participants who reported sleeping longer during the day had slightly more decline in processing speed and visuospatial reasoning. Image (left) shows the relationship between daytime sleep and steeper decline in processing speed. Each line represents a single participant's trajectory of processing speed from age 70 to 76, with yellow lines indicating greater decline.

Age-related clonal haemopoiesis is associated with increased epigenetic age.

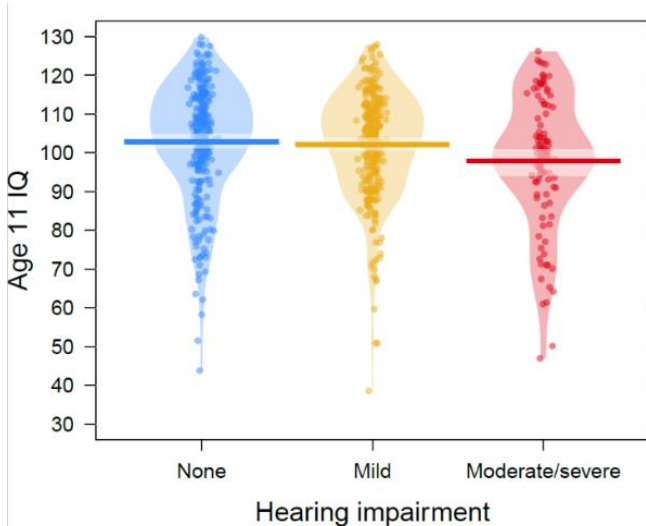
Author: Robertson, et al.

Journal: *Current Biology*

Using data from LBC1921 and LBC1936, this study found that mutations to human DNA that were previously thought to be linked only to blood cancers are also related to DNA methylation-based measures of biological ageing which are related to cognitive ability, health and fitness in older people.



Scientific Highlights (Autumn-Winter 2019)



Longitudinal associations between hearing loss and general cognitive ability: The Lothian Birth Cohort 1936

Author: Okely, J.A. & Deary, I.J.

Journal: *The Journals of Gerontology: Series B*

This study found that lower childhood cognitive ability predicted a higher risk of hearing impairment at age 76, and that this relationship partly accounted for the link between hearing impairment and lower cognitive ability in older age. The results challenge the view that associations between auditory and cognitive health originate in old age.

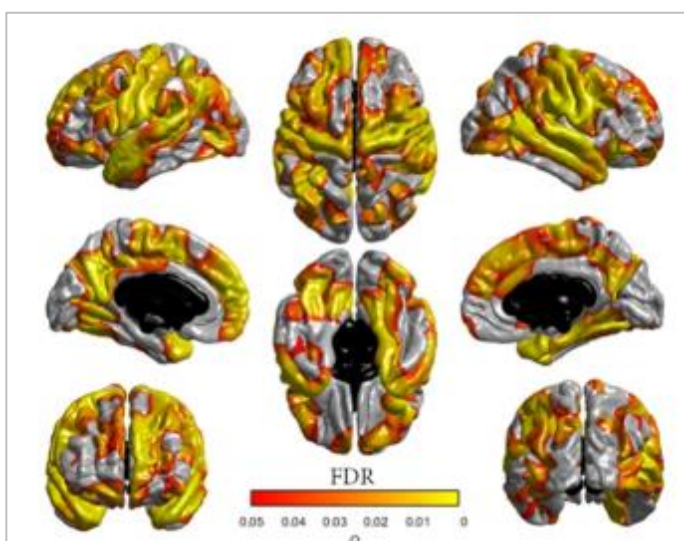
The image (left) shows the relationship between age 11 IQ and age 76 hearing impairment (none, mild, or moderate/severe). The horizontal blue, yellow and red bars show the average childhood IQ score for each hearing impairment group.

Physical frailty and decline in general and specific cognitive abilities: the LBC1936

Author: Gale, C., et al.

Journal: *Journal of Epidemiology and Community Health*

This study found that being frail was associated with lower levels of age 70 general cognitive ability, and lower scores in the domains of visuospatial ability, memory, and processing speed. Frailty also associated with a greater decline in general cognitive ability, and in all cognitive domains, between ages 70 and 79.



Epigenetic signatures of smoking associate with cognitive function, brain structure, and mental and physical health outcomes in LBC1936.

Author: Corley, J., et al.

Journal: *Translational Psychiatry*

DNA methylation (DNAm) is a process that influences whether genes are 'switched on or off'. Smoking-DNAm serves as a biological marker of smoking exposure and its impact on this methylation process. This study found that smoking-DNAm scores were associated with poorer health, including poorer cognitive function and brain health, physical function, disease, and mortality, and can be used to improve our prediction of smoking-related health consequences in later life. The image (left) shows areas of brain cortex (in yellow or red) that were thinner in people with a higher smoking-DNAm score.

Thank you from the LBC team

As a member of the LBC1921 or LBC1936 you are helping to further our knowledge and understanding of cognitive, brain, and general ageing. Also, you are helping to train talented new researchers in this important scientific field. We look forward to seeing you in 2020 and beyond.

For a digital copy of this newsletter or a complete list of LBC publications visit our website: www.lothianbirthcohort.ed.ac.uk, and stay up to date with our most recent LBC activities at: www.twitter.com/EdinUniLBC

Contact us at:

Lothian Birth Cohorts
Dept. of Psychology, University of Edinburgh
7 George Square
Edinburgh
EH8 9JZ
Telephone: 0131 651 1681
Email: lbc1936@ed.ac.uk



THE UNIVERSITY of EDINBURGH
Lothian Birth Cohorts



THE UNIVERSITY
of EDINBURGH



National Institutes of Health



The Lothian Birth Cohorts team

Back row (from left): David Liewald, Dr Colin Buchanan, Dr Simon Cox, Dr W. David Hill, Paul Redmond, Miles Welstead

Front row (from left): Dr Barbora Skarabela, Danielle Page, Dr Sarah Harris, Professor Ian Deary, Dr Judy Okely, Dr Janie Corley, Adele Taylor

Not in picture: Dr Gail Davies and Dr Susan Munoz Maniega.

Publications

Highlights of the 63 LBC publications of 2019:

Accepted for publication (not yet in print)

Altschul, D.M. & Deary, I.J., (2019). Playing analog games is associated with reduced declines in cognitive function: a 68 year longitudinal cohort study. *Journal of Gerontology B: Psychological and Social Sciences*.

Hillary, R.F., et al., (2019). An epigenetic predictor of death captures multi-modal measures of brain health. *Molecular Psychiatry*.

Moodie, J.E., et al., (2019). Fluctuating asymmetry in brain structure and general intelligence in 73-year-olds. *Intelligence*.

Stevenson, et al., (2019b). Childhood intelligence attenuates the association between biological ageing and health outcomes in later life. *Translational Psychiatry*.

E-published ahead of print

Aribisala, B.S., et al., (2019). Sleep and brain morphological changes in the eighth decade of life. *Sleep Medicine*

Gale, C., et al., (2019). Physical frailty and decline in general and specific cognitive abilities: the Lothian Birth Cohort 1936. *J Epidemiol Community Health*.

Okely, J.A., et al., (2019). Longitudinal associations between hearing loss and general cognitive ability: The Lothian Birth Cohort 1936. *Psychology & Aging*.

Ritchie, S.J., et al., (2019). Polygenic predictors of age-related decline in cognitive ability. *Molecular Psychiatry*.

Taylor, A.M., et al., (2019). Associations between Brief Resilience Scale scores and ageing-related domains in the Lothian Birth Cohort 1936. *Psychology & Aging*

Published

Brett, C.E., et al., (2019). Predicting change in quality of life from age 79 to 90 in the Lothian Birth Cohort 1921. *Quality of Life Research* 28, 737–749.

Cherrie, M., et al., (2019). Association Between the Activity Space Exposure to Parks in Childhood and Adolescence and Cognitive Aging in Later Life.

International Journal of Environmental Research and Public Health 16, 632.

Corley, J., et al., (2019). Epigenetic signatures of smoking associate with cognitive function, brain structure, and mental and physical health outcomes in the Lothian Birth Cohort 1936. *Translational Psychiatry* 9, 248.

Cox, S.R., et al., (2019). Sleep and cognitive aging in the eighth decade of life. *Sleep* 42.

Deary, I.J., et al., (2019). Brain Peak Width of Skeletonized Mean Diffusivity (PSMD) and Cognitive Function in Later Life. *Frontiers in Psychiatry* 10, 524.

Fawns-Ritchie, C., et al., (2019). Genetic Contributions to Health Literacy. *Twin Research & Human Genetics* 22, 131–139.

Hamilton, et al., (2019). An epigenetic score for BMI based on DNA methylation correlates with poor physical health and major disease in the Lothian Birth Cohort. *International Journal of Obesity* 1.

Hill, W.D., et al., (2019). A combined analysis of genetically correlated traits identifies 187 loci and a role for neurogenesis and myelination in intelligence. *Molecular Psychiatry* 24, 169–181.

Law, P.J., et al., (2019). Association analyses identify 31 new risk loci for colorectal cancer susceptibility. *Nature Communications* 10, 2154.

MacPherson, S.E., et al., (2019). Individual differences in cognitive processes underlying Trail Making Test-B performance in old age: The Lothian Birth Cohort 1936. *Intelligence* 75, 23–32.

Marioni, R.E., et al., (2019). Tracking the Epigenetic Clock Across the Human Life Course: A Meta-analysis of Longitudinal Cohort Data. *The Journals of Gerontology: Series A* 74, 57–61.

Muñoz Maniega, S., et al., (2019). Spatial Gradient of Microstructural Changes in Normal-Appearing White Matter in Tracts Affected by White Matter Hyperintensities in Older Age. *Frontiers in Neurology* 10, 784.

Robertson, N.A., et al., (2019). Age-related clonal haemopoiesis is associated with increased epigenetic age. *Current Biology* 29, R786–R787.