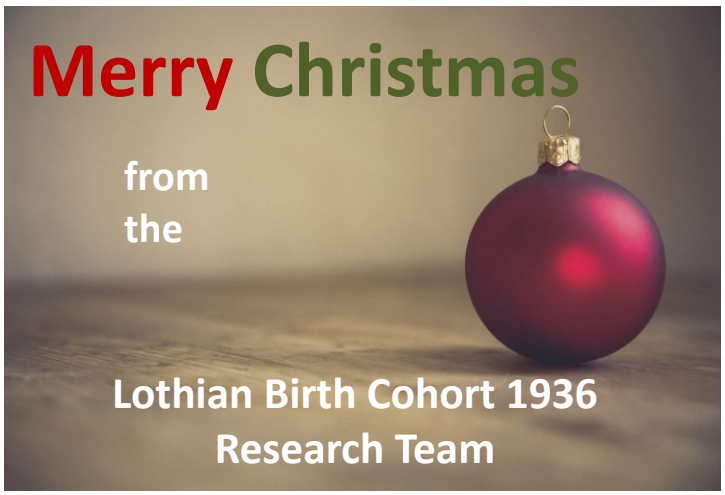
LBC1936

Christmas Newsletter



Season's greetings from the LBC1936 study team! Good tidings we bring, to you and your kin, we wish you a merry Christmas and a Happy New Year.

Another busy year has passed and we have received an amazing response from you in this fourth wave of testing. Thank you so much for your continued interest and involvement in this exceptional study. We've made great progress in the last year- increasing awareness of the LBC1936 study and its contributions, both nationally and internationally. In this newsletter we will update you on what's been happening. We hope you have all had a good year.

Happy 80th birthday

The LBC1936 research team were aware that this was a special year for you all. We hope you had pleasant celebrations of your 80th birthday with your family and friends. And we hope you received the special birthday card from us, and signed by Professor Deary on behalf of the team.

LBC1936 Study Wave 4 almost complete

We are happy to report that Wave 4 of the LBC1936 study is now drawing to a close. We have seen almost all of you at the Wellcome Trust Clinical Research Facility. At the time of writing this newsletter, 547 of you have attended the clinic and we expect to see the final few of you early next year.

Please do get in touch with us as soon as possible if you have not participated in Wave 4 of the study and would still like to.

Last year in December, we updated you on our collaboration with Cedars-Sinai Medical Center, in Los Angeles, USA, in production of induced Pluripotent Stem Cells (iPSC) from LBC1936 cohort members' blood samples. We can use these blood samples to grow any type of cell (e.g. brain cells). This will allow us to explore ageing at a biological, cellular level. With the piloting finished early in the year, the first batch of blood samples has been sent for processing to Cedars-Sinai Medical Center. We hope this is the beginning of a fruitful collaboration that will influence our understanding of the fundamentals of cognitive and other aspects of ageing.

Some of you took part in the Seniors Understanding Sedentary Patterns feature of the study, where we asked participants to write a diary and wear an activPAL activity monitor that records how much you stand, sit and move around. We aimed to include 300 people in this sub-study and, in fact, 302 LBC1936 participants completed diaries documenting their activity and wore the activPAL activity monitor for over a week. This was well received by the LBC1936 cohort members. We will be looking at how physical activity and sedentary behaviour contribute to health and ageing.

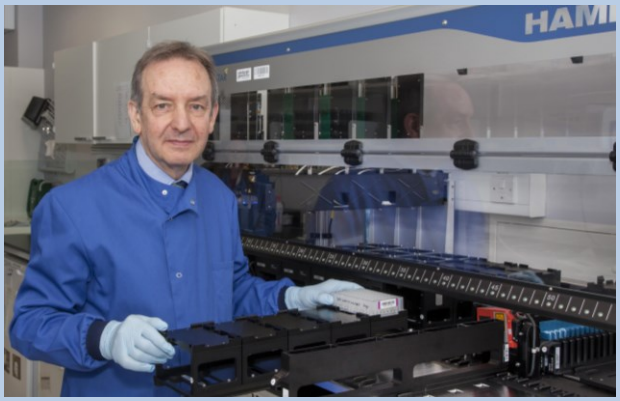
Next reunion Date, and Prepare for Wave 5!

Another Lothian Birth Cohort 1936 reunion will be hosted at the Church of Scotland General Assembly Hall on the 4th June 2017. That will be 70 years to the day after you took the mental test in 1947. It would be great if you could join us for this wonderful event to learn about all that the Disconnected Mind project has been up to and catch up with other Cohort members, and Professor Deary and the rest of the research team. We will be sending out more information with regard to this in 2017, so please save the date.

As this Wave 4 chapter of the LBC1936 study draws to a close, we are delighted to announce the plans for a new chapter. With the support of Age UK, we will be inviting you, the LBC1936 members, beginning later in 2017, for Wave 5 visits. This project has produced many valuable findings thanks to the commitment of, first and foremost, the LBC1936 members and the research team funded by Age UK and the Medical Research Council. We plan to continue to follow you in your 80s to help further our understanding of thinking skills, lifestyle and the brain in relation to growing older.

Please do let us know if you have moved house, or are about to, so that we can update your address and are able to keep in touch. Details of how to contact us can be found at the end of the newsletter.

LBC Milestone- Sequencing the future
Edinburgh Genomics, a leading UK clinical genomics facility within the University of Edinburgh, has completed the sequencing of over 1300 whole genomes of the Lothian Birth Cohorts of both 1936 and 1921. This means that, for each person in the cohorts, the scientists will know the three billion or so base pairs that make up their DNA sequence.



Prof Deary loading the last samples to complete the LBC whole genome sequencing

Professor Ian Deary said, *"The Lothian Birth Cohorts are a uniquely valuable group of people whose life-long data from childhood to older age has helped us understand healthy cognitive ageing and wellbeing across the life course. Some of the LBC have been followed across 80 years. We are delighted that, with funding support from the Biotechnology and Biological Sciences Research Council (BBSRC) and the excellent service provided by Edinburgh Genomics, we have managed to sequence the entire genomes of a large number of individuals from the cohort so quickly. Such a massive undertaking on so many people in a single cohort would have been unthinkable just a few years ago. This genome sequence data will prove invaluable for understanding why some people's brains and thinking skills age better than others. The flip side of having such comprehensive genetic data is that we will also understand better how the environment and lifestyles contribute to healthy ageing."*

Edinburgh Genomics is the University of Edinburgh's large new gene sequencing operation, and it has made a video to explain the breakthrough in technology and what it can mean for understanding illnesses and ageing. At the front of the queue to be whole-genome sequenced were the Lothian Birth Cohorts of 1921 and 1936. Watch this video and see the LBCs' Director Professor Ian Deary describe (from 4min 45sec) how the Lothian Birth Cohorts are enhanced by this new information:

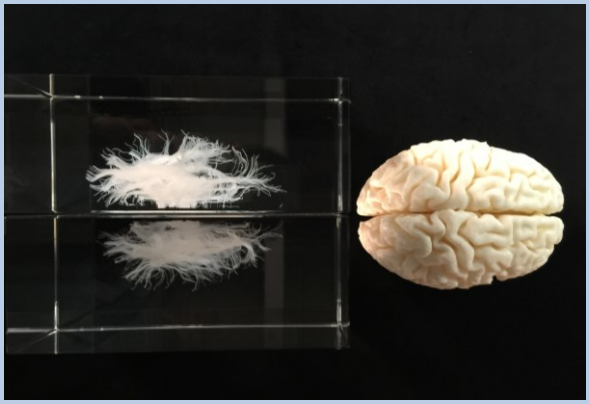
http://tinyurl.com/jbcdmyd

Me, My Brain & My Connected Mind
Once more the LBC1936 study has received national attention beyond the scientific world. In a new series of galleries that covers anything from fashion to science to technology, the National Museum of Scotland is now displaying the 3D-printed brain of Mr John Scott, one of the LBC1936 cohort members! Along with this, laser-etching techniques were used to map out the white matter, or neural connections, of Mr Scott's brain in a crystal block. The aim of this is to help engage people in science by making it more accessible, and specifically to show how modern brain imaging can help us to look inside the head and see the brain's structure. The 3D brain and its laser etched connections are on display at the Museum of Scotland in Chambers Street.

Brain to brain with Mr Scott

Mr Scott and his brain also attracted the attention Scottish television (STV) who broadcast a news item on this fascinating display of science and art. Dr Simon Cox, a Medical Research Council Brain Imaging Research Fellow on the LBC1936 study, appeared on the news item.

Simon said, *"I am used to looking at brain images on the computer day-to-day, but seeing a real model of the brain's white matter connections in glass and the outer surface of the brain like this is a unique experience – they are incredibly striking objects".*



The ins, laser etched white matter connections (left) and the outs, 3D print (right), of the brain

A blog post with details of the exhibit can be found on the link below:

http://tinyurl.com/hta6xsy

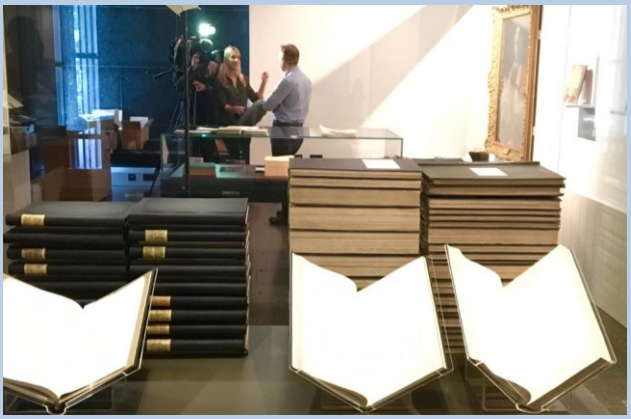
Grand Opening of the Godfrey Thomson Exhibition

July 28th 2016 saw the opening of an exhibition displaying and explaining a treasure trove of artefacts relating to Professor Sir Godfrey Thomson (1881-1955), a pioneering educational psychologist. He and his work—especially the Moray House Tests of intelligence—are at the core of the LBC1936 and LBC1921 studies. The exhibition ran at the University of Edinburgh Main Library from Friday 29th July until 26th November 2016. We hope that many LBC1936 participants were able to attend following the invitation letter you received.

The exhibition reconstructed Thomson's life and work through personal and professional papers and the display of ledgers other materials from the two Scottish Mental Surveys. Sir Godfrey was an innovative educator with the firm belief that educational opportunity should not be linked to social status, and, from the 1920s onwards, he advocated comprehensive-style education. Thomson was based at the Moray House School of Education, which is now part of the University of Edinburgh. His greatest legacy for today's researchers was to test the intelligence of almost every Scottish 11-year-old child in 1932, and again in 1947, resulting in the basis of the LBC1936 and LBC1921 projects. An annexe of the exhibition was devoted to the Lothian Birth Cohorts' work, showcasing the methodology and findings that are a foundation of the Disconnected Mind project.

For the first time, this exhibition presented the Scottish Mental Surveys' unique ledgers to public view, with a selection of sample pages on show. These ledgers hold the world's only record of IQ-type scores from full national year-of-birth cohorts. Professor Deary has spent the past decade investigating Sir Godfrey's life and, in 2008, he rescued a mass of never-before-seen documents and objects from Thomson's family home in Ravelston Dykes in Edinburgh, just before it was demolished. A selection of those artefacts, portraits and documents featured in the exhibition, telling the story of

who Sir Godfrey was and what his motivations were. The BBC took interest in this, interviewing Prof Deary about the exhibition.



Prof Deary being interviewed by the BBC about Prof Sir Godfrey Thomson

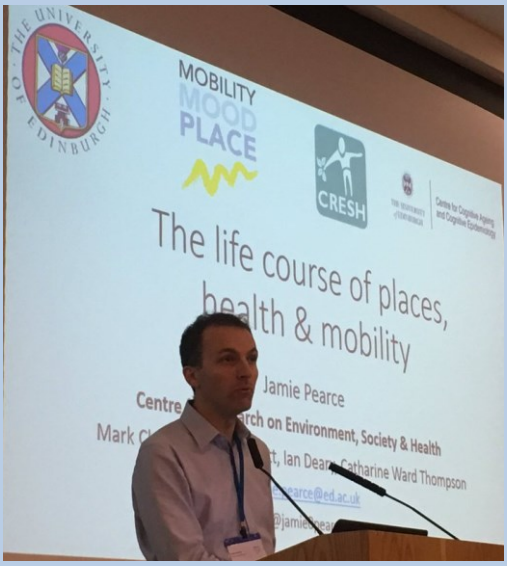
Ian Deary said: "*Godfrey Thomson saw mental ability tests as an imperfect but useful means to give poor children a chance in life. He was determined to look past pupils' social status, and try to see their underlying ability. By all accounts he was modest, not motivated by money, and happy to share academic wins, which in part led him to fade from the history books. I'm delighted we are now able better to understand and evaluate the pioneering work of this multi-talented and elusive man.*"

You can see Ian's introductory film for the exhibition here:

http://tinyurl.com/zjylzqk

Mobility, Mood and Place (MMP) Project Conference

Professor Jamie Pearce and Dr Mark Cherrie presented new LBC1936 findings at the international conference: "Habitats for Happy and Healthy Ageing" in October 2016. Jamie gave a keynote speech on the history and importance of a life course approach in geographical epidemiology, and introduced the new methods that the team have been using to assess physical, built and social environments in Edinburgh from the 1930's onwards. Mark presented the group's recent findings from their life course analysis of public parks availability and cognitive ageing in the LBC1936. This study used information you provided on address history, which we collected from you by questionnaire at about age 78. This helped our new geography colleagues to determine the availability of public parks within your local neighbourhood at various time points through your life course. Our team found that greater availability of public parks in both childhood and adulthood reduced the likelihood of a decline in cognitive function from age 70 to 76. This finding supports the notion of a "childhood factor" whereby the continued use of natural spaces in adulthood starts with positive experiences in childhood. The study shows that certain features of the urban environment may be important throughout the life course to promote healthy ageing. We expect to publish these findings from next year.



Prof. Jamie Pearce gives keynote talk on green space and cognitive ageing in the LBC1936

Staff News

Dr Ratko Radakovic, the Postdoctoral Research Associate/LBC1936 Study Co-ordinator defended his PhD successfully, passing his PhD viva with only minor corrections. The thesis was entitled 'Multidimensional Apathy in Neurodegenerative Diseases' and looked at different profiles of apathy/demotivation in healthy and pathological ageing, and how apathy subtypes associate

with disease stage, activities of daily living and cognitive dysfunction. Well done Ratko!
We congratulate Dr Janie Corley on passing her viva for a PhD by publication with flying colours in mid-February. Most laudably, she was required to make no changes to her submitted thesis, a rare occurrence and a mark of very high quality. Her valuable research with the LBC1936 will carry on, looking at the ageing brain and how different lifestyle factors may help or hinder it, especially diet. Additionally, she will continue in her role of seeing LBC1936 members as a part of the cognitive testing team at the Wellcome Trust Clinical Research Facility. Well done Janie!

We are also delighted to announce that Ciara Madden passed her MSc by Research, wherein she explored resilience in older age, using the LBC1936 data. Following her achievements and work as a Research Assistant, she has left the Disconnected Mind project after studying and working with us for more than 2 years. During her employment on the project has been an integral part of the team, as well as a pleasure to work with. We wish her all the best and much luck in all her future endeavours.

It is also our pleasure to introduce a new Research Assistant on the Disconnected Mind project, Ms Elaine Tang. She will be working data entry for the LBC1936 study, as well as organising the Brain Imaging appointments. Welcome Elaine!

CBE for Prof Joanna Wardlaw
Congratulations to Professor Joanna Wardlaw, FRSE, the lead of the brain imaging part of the LBC studies, who was awarded the prestigious Commander of the Order of the British Empire (CBE) in the Queen's New Year Honours list 2016. Professor Wardlaw received a CBE for services and contributions to neuroimaging and clinical science. Professor Wardlaw said, *"This is a real surprise to me, but great recognition for neuroimaging research, for stroke, ageing research, Edinburgh and encouraging for women in science and medicine too."*

Telling U3A about Healthy Cognitive Ageing
On 17th March Professor Ian Deary spoke to the Science Group of the University of the Third Age at Epworth Halls in Edinburgh. The topic was Healthy Cognitive Ageing, with the focus on how the Lothian Birth Cohorts and Disconnected Mind project had contributed.

"They were an attentive and active audience", said Ian. *"I talked for about 50 minutes and there was well over half an hour of questions, with no signs of that slowing when the Chair had to intervene and let people get home."* Dr Peter Edwards afterwards wrote to Ian, *"your insights into the factors which affect cognitive decline, and those which don't, were particularly interesting. The audience was bigger than expected; it was, in fact, by far the largest audience that we have ever had at one of our talks."* About 30 to 40 were expected; there were, in fact, about 100 people there.

News from Age UK
Age UK has been a proud supporter of The Disconnected Mind project since 2003. This year the project has seen yet more success, bringing to light fascinating research which will benefit both current and future generations of older people. At Age UK, we are enormously grateful for all of the time and information which you have given, and continue to give, as Lothian Birth Cohort members since the project began.

One of our highlights of 2016 was in March, when our Trustees' Board committed to funding The Disconnected Mind project for another three years, to 2019. This support will enable Ian Deary and his team to complete the current testing and data analysis for the LBC1936 at average age 79.

As a result of our support for the LBC1936 study over many years, Age UK was thrilled to receive the University of Edinburgh's Benefactor Award in July. Tom Wright, the Chief Executive of Age UK said, "We very much hope that our partnership with the University and The Disconnected Mind project will continue to flourish and ultimately translate

to better cognitive health and quality of life for older individuals and populations." Age UK is now busy concentrating on our winter loneliness campaign, "No one should have no one." More than a million older people say they go for over a month without speaking to a friend, neighbour or family member. Our campaign is raising awareness and funds so that we can continue to provide companionship, advice and support for the millions who have no one to turn to. We are very excited that the actors James Bolam and Miriam Margolyes will be a part of the campaign.

Tom Wright (left) receives the University of Edinburgh Benefactor Award from acting Vice-Chancellor Charles Jeffrey

We are looking forward to the continued discoveries of The Disconnected Mind project in 2017, as we are sure that you will be. From all at Age UK, we would like to wish you a very Merry Christmas.

Latest Results

With the data from three waves of the study now available to analyse and publish on and the fourth wave drawing to a close, this year has been as productive as ever. We have published over 30 papers this year. A selected sample of this year's publications are listed at the end of the newsletter.

Would you mind giving us your email address?

We would also like to ask if any LBC participants with email addresses would send us an email to **lbc1936@ed.ac.uk** containing your LBC number. This is just so we can have up to date records of contact details for notification of LBC related events, information and research initiatives. Your email will not be passed on to anyone.

Newly 'in press'

Wardlaw, J. M., Allerhand, M., Eadie, E., Thomas, A., Corley, J., Pattie, A., Taylor, A., Shenkin, S. D., Cox, S., Gow, A., Starr, J. M., & Deary, I. J. (in press). Carotid disease at age 73 and cognitive change from age 70 to age 76. A longitudinal cohort study. *Journal of Cerebral Blood Flow and Metabolism.*

Cox, S. R., Dickie, D. A., Ritchie, S. J., Karama, S., Pattie, A., Royle, N. A., … Deary, I. J. (in press). Associations between education and brain structure at age 73 years, adjusted for age 11 IQ. *Neurology.*

Field, T. S., Doubal, F. N., Johnson, W., Backhouse, E., McHutchison, C., Cox, S., Corley, J., Pattie, A., Gow, A. J., Shenkin, S., Cvoro, V., Morris, Z., Staals, J., Bastin, M., Deary, I. J., & Wardlaw, J. M. (in press). Early life characteristics and late life burden of cerebral small vessel disease in the Lothian Birth Cohort 1936. *Aging.*

Gale, C. R., Ritchie, S. J., Cooper, C., Starr, J. M., & Deary, I. J. (in press). Cognitive abilities in later life and the onset of physical frailty: the Lothian Birth Cohort 1936. *Journal of the American Geriatric Society.*

Gow, A. J., Pattie, Al., & Deary, I. J. (in press). Life course activity participation from early, mid and later adulthood as determinants of cognitive ageing: The Lothian Birth Cohort 1921. *Journal of Gerontology: Psychological Sciences.*

Joehanes, R., Just, A. C., Marioni, R. E., Pilling, L. C., Reynolds, L. M., Mandaviya, P. R., … London, S. J. (in press). Epigenetic Signatures of Cigarette Smoking. *Circulation. Cardiovascular Genetics.*

Luciano, M., Corley, J., Cox, S. J., Valdes Hernandez, M., Craig, L., Dickie, D., …, Deary, I. J. (in press). Mediterranean-type diet and brain structural change from 73 to 76 years in a Scottish cohort. *Neurology.*

McGrory, S., Taylor, A. M., Kirin, M., Corley, J., Pattie, A., Cox, S. R., Dhillon, B., Wardlaw, J. M., Doubal, F. N., Starr, J. M., Trucco, E., MacGillivray, T. J., & Deary, I. J. (in press). Retinal microvascular network geometry and cognitive abilities in community-dwelling older people: The Lothian Birth Cohort 1936 study. *British Journal of Ophthalmology.*

Ritchie, S, J., Tucker-Drob, E., Cox, S. R., Corley, J., Dykiert, D., Redmond, P., Pattie, A., Taylor, A. M., Sibbett, R., Starr, J. M., & Deary, I. J. (in press). Predictors of ageing-related decline across multiple cognitive functions. *Intelligence.*

Russ, T. C., Hannah, J., Batty, G. D., Booth, C. C., Deary, I. J., & Starr, J. M. (in press). Childhood cognitive ability and incident dementia: follow up of participants in the 1932 Scottish Mental Survey into the tenth decade. *European Journal of Epidemiology*.

Valdés Hernández, M., Allerhand, M., Glatz, A.., Clayson, L., Muñoz Maniega, S., Gow, A., Royle, N., Bastin, M. E., Starr, J., Deary, I., & Wardlaw, J. (in press). Do white matter hyperintensities mediate the association between brain iron deposition and cognitive abilities in older people? *European Journal of Neurology*.

Newly 'in print'

Broer, T., Pickersgill, M., & Deary, I. J. (2016). The Movement of Research from the Laboratory to the Living Room: a Case Study of Public Engagement with Cognitive Science. *Neuroethics*, 1–13.

Cox, S. R., Bak, T. H., Allerhand, M., Redmond, P., Starr, J. M., Deary, I. J., & MacPherson, S. E. (2016). Bilingualism, social cognition and executive functions: A tale of chickens and eggs. *Neuropsychologia, 91*, 299–306.

Deary, I. J. & Ritchie, S. J. (2016). Processing speed differences between 70- and 83-year-olds matched on childhood IQ. *Intelligence, 55*, 28-33.

Deary, I. J., Cox, S. R., & Ritchie, S. J. (2016). Getting Spearman off the Skyhook: One More in a Century (Since Thomson, 1916) of Attempts to Vanquish g. *Psychological Inquiry, 27*, 192–199.

Dickie, D. A., Ritchie, S. J., Cox, S. R., Sakka, E., Royle, N. A., Aribisala, B. S., … Wardlaw, J. M. (2016). Vascular risk factors and progression of white matter hyperintensities in the Lothian Birth Cohort 1936. *Neurobiology of Aging, 42*, 116-123.

Dykiert, D., Der, G., Starr, J. M., & Deary, I. J. (2016). Why is Mini-Mental state examination performance correlated with estimated premorbid cognitive ability? *Psychological Medicine, 46*, 2647–2654.

Gale, C. R., Booth, T., Starr, J. M., & Deary, I. J. (2016). Intelligence and socioeconomic position in childhood in relation to frailty and cumulative allostatic load in later life: the Lothian Birth Cohort 1936. *Journal of Epidemiology and Community Health, 70*, 576–582.

Harris, S. E., Marioni, R. E., Martin-Ruiz, C., Pattie, A., Gow, A. J., Cox, S. R., … Deary, I. J. (2016). Longitudinal telomere length shortening and cognitive and physical decline in later life: The Lothian Birth Cohorts 1936 and 1921. *Mechanisms of Ageing and Development*, *154*, 43–48.

Pearce, J., Shortt, N., Rind, E. & Mitchell, R. (2016). Life Course, Green Space and Health: Incorporating Place into Life Course Epidemiology. *International Journal of Environmental Research and Public Health, 13*, 331.

Thanks again

As a member of the LBC1936 you are helping to further our knowledge and understanding of how our thinking skills and lifestyles change over time and how to maintain these, along with brain health. From all of the LBC1936 research team, we send a big thank you. We look forward to seeing you in 2017 and beyond.

Yours sincerely,

Professor Ian J. Deary,
Study Director

Dr Ratko Radakovic,
Study Co-ordinator

Dr Janie Corley
Dr Dominika Dykiert
Dr Simon Cox
Dr William Hill
Mrs Alison Pattie,
Miss Adele Taylor
Miss Elaine Tang,
Research Associates

Mr Paul Redmond,
Database Manager

Would you like to talk to us?

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Do, please, let us know if there is any change to your address, or if you would like a copy of any of the papers listed.

You can stay up to date on the most recent LBC research by checking the regularly-updated list of publications at:

www.lothianbirthcohort.ed.ac.uk

and

https://twitter.com/CCACE