Report on ALSPAC@30 academic workshops

1. Summary

ALSPAC ran two workshops in June 2018 - the first was on 5 June in Bristol (University of Bristol) and the second on 22 June 2018 in London (the Wellcome Trust). The objective of these collaborative workshops was to discuss the design and content of data and sample collection between 2019 and 2024, the funding renewal period.

Key collaborators, stakeholders and experts were invited to attend and consider what should be included in the funding bid and how best to lever value out of the proposed infrastructure.

The reason for reaching out to a broad collection of academics and contributors was to ensure that the design of ALSPAC data collection over the next 5-10 years is informed by demand for the resource and that it can support and facilitate as much scientific output as possible.

Overall there was real interest in the research opportunities afforded by ALSPAC. There is a clear recognition of the value of the ALSPAC resource both retrospectively and in the future.

The next five years represent a critical period for ALSPAC, in which there is real interest. The original ALSPAC offspring (G0) are reaching ~30 years and whilst this marks an apparently healthy maturity, it is a crucial period for the study of precursors of later health and disease.

In addition, the new children in ALSPAC (children of the original offspring) are now part of an established collection effort and will be moving into the optimal time for recruitment and for recording of the events in and around pregnancy (including the broader health of the family).

Lastly, the original mothers and fathers in the ALSPAC study remain an important part of the study in light of trans/inter-generational effects and as an important cohort themselves, with an ability to comment on the health of those in middle age and to link to key resources such as the UK Biobank (www.ukbiobank.ac.uk/).

Together, it was recognised that ALSPAC remains an exceptional resource providing an opportunity for undertaking novel and contributory research, but that a core infrastructure is needed in order to facilitate this and to enable future research.

This document outlines the top-level messages coming from this consultation and provides a collection of grant activity and research collaborations that mark current and planned future use of the resource.

The consultation worked on the assumption that a small number of core measures would be funded from the renewal application and additional funding would be secured for further measures. These additional collections could take multiple forms and participants were asked to contribute to a discussion about how their interests might contribute to the (i) the shape of the core ALSPAC activity bid as part of the renewal, (ii) data collection in entire sections of the cohort (e.g. G0/G1/G2) built on the core infrastructure or (iii) the formation of nested studies based on specific parts of the study or using recruitment/clinic opportunities afforded by the prospective nature of ALSPAC (Figure 1).

There was a consensus across both workshops regarding which measures should be undertaken in the various cohort groups. Information gained at the workshops is being used in planning the renewal application.
2. Feedback from workshop attendees

The feedback from attendees was very similar across both workshops, with broad agreement about what new data and samples should be collected across the different cohort groups. These are summarised below, separated by cohort groups.

In addition to the summaries below, two tables have been assembled (Table 1 and Table 2) which summarise the current, in process and planned grants which overlap the current and next funding window for ALSPAC and which summarise specific areas of research activity and subject specific demand for ALSPAC and core infrastructure over the next 5 years.

2.1 G0 (original mothers)

Dr Abi Fraser (section lead for ALSPAC G0 - mothers) led the discussion on what should be included for this cohort group. The workshops identified the following priorities for G0 mothers:

- Bone measures e.g. DXA and pQCT (it was noted that ALSPAC already owns these machines)
- Cardiometabolic and cardiovascular measures e.g. BP, CIMT, echo and test of atherosclerosis
- Physical function adapted for an older generation, dynamic measures of movement (grip strength, times walk etc as per previous mother’s clinics)
- Cognitive measures
- Classification of biomarkers

Another important area was considered to be:

- Cognitive decline/function and the importance of cardiovascular health in the maintenance of cognitive health – for example using measures of cerebral blood flow via head cap (which could be done on other cohort participants also)

The workshops identified a number of areas that could be covered by remote and questionnaire data collection:

- Accurate family structure and connections to the other generations and recruitment events in the ALSPAC study via app/portal was felt to be crucial.
2.2 G0 (original fathers)

Professor Yoav Ben Shlomo (section lead for ALSPAC G0 - fathers) led the discussion on what should be included for this group. It was noted that fathers included the original study fathers (aged around 60 now) and G1 fathers also. The workshops identified the following priorities for G0 fathers:

- Questionnaire on family behaviours (same questions across all family members)
- Social mobility across generations
- Phenotypes of physical aging (which could possibly be carried out in the 1946 birth cohort (MRC NSHD, www.nshd.mrc.ac.uk/))
- Experiences of new fathers (i.e. the experience of becoming a father) including lifestyle and actigraphy, movement and sleep

In addition, several other priorities were identified at the London workshop:

- Improved demographic information and income and earnings data
- Better engagement with fathers to encourage participation in the study

2.3 G1 (original offspring)

Professor Nic Timpson (section lead for ALSPAC G1) led the discussion on what should be included for this cohort group. The workshops identified a number of priorities for the face to face ALSPAC@30 clinic for the G1 cohort (currently agreed mid to late twenties). The priority areas were considered to be:

- Biosample collection and the utility of a single blood sample collection at 30 years
- Body composition such as DXA scan
- Cardiovascular function (e.g. echocardiogram – following up previous data collection)
- Mental health (huge interest in the proper measurement and assessment of mental health)
- Vision and hearing
- Dental measures and oral health
- Linkage (maintenance of existing linkages and incorporation of novel sources e.g. transactional plus criminal and economic records)

Other important areas were considered to be:

- Musculoskeletal and movement via dynamic assessments
- Biological sample for microbiome analyses
- Liver ultrasound scan

The workshops identified a number of areas that could be covered by remote and questionnaire data collection:

- Lifestyle assessments
- Social and diet
- Actigraphy
- Cognition (e.g. cognitive challenge developed by the Cambridge cognition group)
- Mental health (on all generations)
- Parenthood
- Cardiometabolic health by gadget e.g. heart monitor measured in the 1946 birth cohort (MRC NSHD, www.nshd.mrc.ac.uk/)

2.4 G2 (children of the original offspring)

Professor Debbie Lawlor (section lead for G2) led the discussion on what should be included for this cohort group. The workshops identified the following priorities for G2 participants:
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- Hearing and vision
- Mental health and cognitive function across family members over time
- Occupation, income and earnings, how patterns have changed over pregnancy and lifetime
- Maintained emphasis on nested/sub studies collecting complex data – for example nutrition data and behaviour.

A discussion took place about this cohort group that is equally relevant to the other cohort groups. Whilst ALSPAC has dealt with this for many years and has concentrated on a balance between consistency in measurements versus the allowance of new measures, the natural query - is it better to stick with the same longitudinal measures that have been collected over time or choose new tests? – was raised. It was considered that in some cases, it might be possible to map new measures onto old data and this should be considered on a case by case basis.

2.5 Sub (or nested) studies

There was a consensus that sub studies should continue to be undertaken in all cohort groups. ALSPAC is developing a study app/portal which could be used to aid the initiation and collection of data for sub studies – providing an interactive and flexible space for the promotion of specific study designs. It was proposed that ALSPAC is ideally placed to investigate recruitment and engagement methods used for sub studies.

2.6 Linkage

There was a great deal of discussion about the collection of linkage data for all cohort groups and the development of this part of the study. It was acknowledged that whilst it is important to include new linkages over the next five years, it is equally important to consider what experience is required to undertake these linkages and what to do with the data once it is collected.

There was a discussion about the possibility of including sensor derived measures such as activities of daily living. It was noted that the SPHERE study (www.irc-sphere.ac.uk/) based in Bristol does this well and it may be possible to collaborate with this group in the future.

There was a great deal of interest in environmental exposures in pregnancy. The EU project Lifecycle has initiated work in this area and ALSPAC will be involved in this project. It was recommended that ALSPAC include costs to collect environmental data, both local and national, at two different time points in the renewal.

3 Next steps

Information gained at the workshops is being used in planning the renewal application. Meetings have been held with academic section leads and the scientific ideas generated from the workshops and elsewhere have helped to shape core components and budget lines for the renewal application.