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Collection of biological data on the Millennium Cohort Study

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Context

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Increasingly common to collect biological data on multi-purpose social surveys

Driven by:

- Scientific interest in the interplay between social and biological factors in explaining human behaviour (e.g. Kumari et al. 2006)
- Facilitated by technological developments making specimen collection more feasible for large-scale surveys (e.g. Lindau and McDade, 2007)
- Particular scientific value can be added from cohort / longitudinal studies (e.g. Manolio et al. 2006)

Data collection approaches

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- Typically biological samples have been collected by medically trained personnel
  - clinic setting e.g. ALSPAC, NDNS
  - nurse visit in a home setting e.g. NCDS, UKHLS, ELSA, HSE

- Major drawback is drop-out rates:

- 65% (UKHLS), 85% (ELSA) nurse follow-up

- 44% (NDNS) clinic visit

(Clemens, Given and Purdon, 2012)

Data collection approaches

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- Increasingly biological samples are being collected by interviewers in a home-setting, often with high success rates
  - e.g. UKHLS, GSEOP, HRS, Fragile Families
- Some surveys have used postal methods
  - e.g. ALSPAC, NCDS, WLS
- Relatively few large-scale surveys have collected biological samples from children using interviewers/postal methods

Biological samples on the Millennium Cohort Study

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- Oral fluid for infections and allergies at age 3
- Shed milk teeth for lead analysis at age 7
- Saliva samples for DNA extraction at age 11 pilot

Oral fluid at age 3

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Purpose:

- Explore whether common infections in early childhood protect against later allergies

Joint project with Institute of Child Health and Health Protection Agency

Procedure:

- Collected using mouth swab administered by parent
- Written parental consent required > specified no DNA, and no other research uses
- Sent to lab by interviewer

Oral fluid at age 3

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Response:

- 81% (12,473) returned a valid sample
- 88% (11,034) of returned samples had valid consent
- Black Caribbean and non-english speakers less likely, children with asthma more likely

Data quality and analysis

- Tested for anti-bodies to various common viruses
- 45% of samples had ‘low’ levels of oral fluid
- Used to look at prevalence of infections

Available for secondary analysis at UKDA

Shed milk teeth at age 7

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‘Every tooth tells a story’

Purpose:

- Explore exposure to environmental lead in young children

Joint project with Institute of Child Health and Health Protection Agency

Procedure:

- Sent back by post in sealed plastic bag and padded envelope with teeth chart, children received badge
- Consent from parent: no DNA, other research uses OK

Shed milk teeth at age 7

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Response:

- 4,168 teeth from 3, 031 children > largest study of its kind in the UK

Data quality and analysis

- Lead testing planned on a sub-sample of teeth later this year

Samples available for other research uses

Saliva samples at age 11

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Purpose:

- For DNA extraction
- Look at genetic influences on learning and growth, and epigenetics
- To be made available as a research resource
- Collect salivary DNA from both natural parents as well as child > *first study to collect from fathers as well as mothers and children*

Joint project with Universities of Bristol, Cambridge and Newcastle

Parent Consent and Information Leaflet

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Written consent required for own collection and from one parent with legal parental responsibility to approach child

Developed specific saliva information leaflet ⇒

Intended to explain: importance, relevance and uses of samples – and what NOT used for (paternity testing, police), as well as process, storage and (withdrawal of) consent

CHILD OF THE NEW CENTURY

AGE 11 SURVEY PILOT

Child of the new Century

WHAT ELSE WOULD WE LIKE YOU AND YOUR CHILD TO DO?

We are inviting you and your child to give a sample of your saliva in order that we can extract a sample of your DNA to be used for research about genes.

WHAT ARE GENES AND DNA?

Genes are the instructions which help determine the growth and development of all living things. For example, genes determine eye-colour. Genes are made up of sections of DNA, which is the language our bodies use to write these instructions. Genes are inherited from our parents and they are the biological way parents pass on traits to their children. Everyone has a slightly different set of genes - so they are like our own personal recipe book.

WHY IS IT IMPORTANT TO STUDY GENES?

Researchers will be able to use the DNA sample to look at whether you and your child have certain types of genes. Studying the relative importance of genes and other

Child Consent and Information Leaflet

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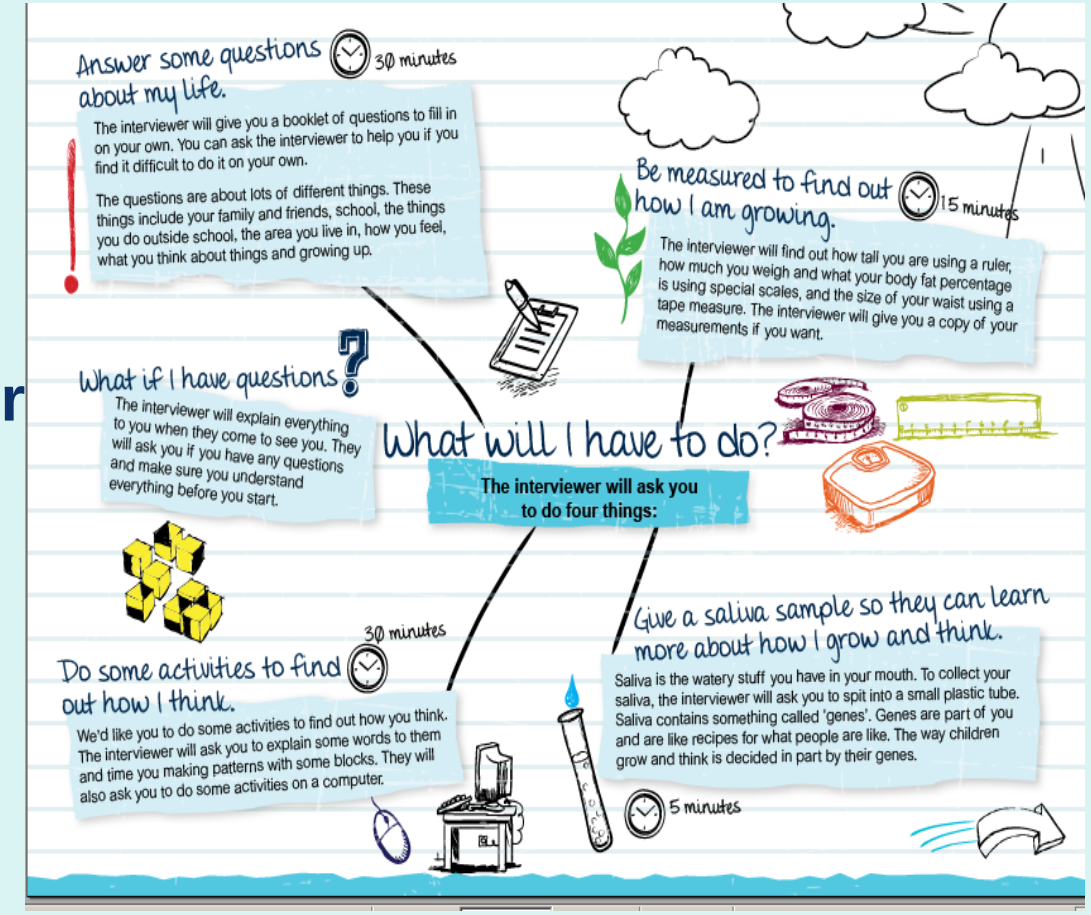
Verbal consent from child, confirmed in writing by interviewer

Information leaflet covered DNA with other elements of study ⇒

Explained process and voluntary nature of participation. Said something about future use but in less detail



Saliva sample collection kit

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Generally easily administered.

One interviewer appeared to not detach funnel and apply lid initially but self-corrected. Easily avoided with further training briefing

Process of spitting raised some concerns with children – but no higher refusal among girls than boys

What the respondents and interviewers had to do

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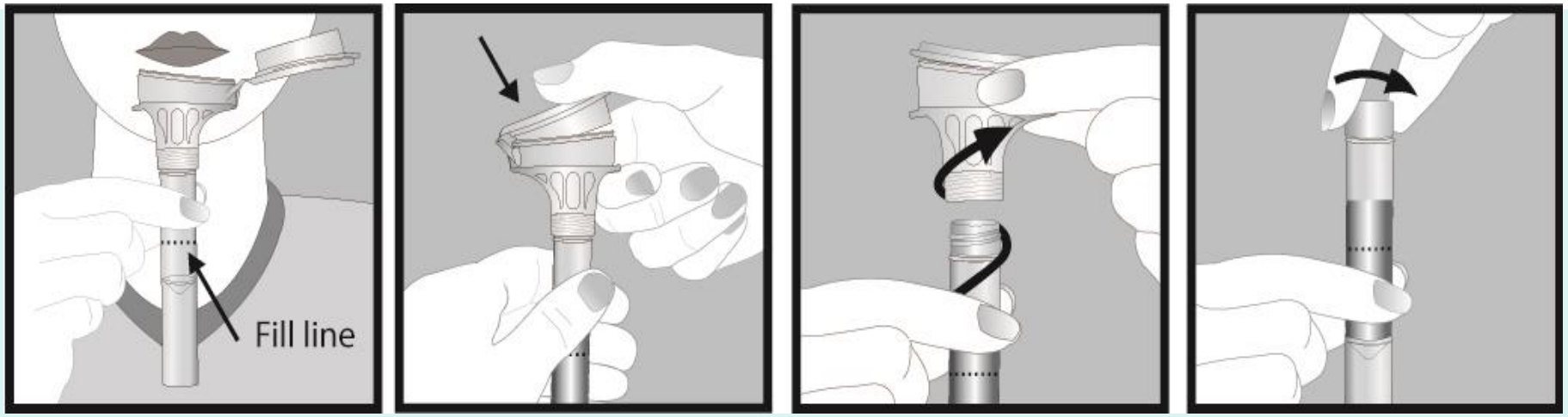

1. Spit until the amount of saliva (not bubbles) reaches the fill line.

2. Close lid by pushing down hard on the funnel lid.

3. Unscrew the tube from the funnel.

4. Close tube tightly with small cap and mix.

Samples posted back to lab by interviewers with barcode labels and in clear plastic bag

Pilot sample response

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	Number interviewed	Number collected	%
Children	46	34	74
Mothers	45	33	73
Fathers	25	19	76

Response was promising:

Families with no existing link to study or history of data collection therefore lower than hoped for main study (where expected 85% from children)

Response rate from eligible, responding fathers also good. But because large proportion of families do not contain two natural parents, the total % of triads was only a bit over 40% of families.

Pilot yields

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DNA yield	Number collected	Mean total yield (µg)	Range (µg)	% with total yield > 20 µg
Children	34	58.81	0.03-238.2	82.9%
Mothers	33	119.6	0.1- 390.4	81.8%
Fathers	19	99.6	4.0 – 254.7	89.5%

Pilot yields were generally high.
They were only low where evidence that one interviewer (confirmed in debrief) had initially misunderstood how to seal the tube.
Excluding these particular samples 93-100% provided yields > 20µg
Some samples were contaminated – indicating instruction not to eat, drink or smoke for 30 minutes prior to sample collection was not always followed

Saliva samples at age 11

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- Pilot demonstrated feasibility > but wasn't included in main stage for funding reasons
- Plan to include at age 14

- Calderwood, L. and Rose, N. (2013) Collecting saliva samples for DNA extraction from children and parents: Evidence from the UK Millennium Cohort Study. CLS Working Paper 2013/3. London: Centre for Longitudinal Studies

References

Clemens, S., Given, L., and Purdon, S. (2012), Methods of collecting biological data: considerations, challenges and implications. Presentation to the 67th Annual Meeting of the American Association of Public Opinion Research in Orlando, Florida.

Jaszczak, A., Lundeen, K., and Smith, S. (2009). Using nonmedically trained interviewers to collect biomeasures in a national In-home survey. Field Methods, 21, 1: 26-48. doi:10.1177/1525822X08323988.

Kumari, M., Wadsworth, M., Blake, M., Bynner, J. And Wagner, G.G. (2006), Biomarkers in the proposed UK Longitudinal Household Study. Longview.

Lindau, S.T. and McDade, T.W. (2007). Minimally-invasive and innovative methods for biomeasure collection in population-based research. In M.Weinstein, J.W.Vaupel and K.W. Wachter (eds.) Biosocial surveys. Washington D.C., National Academies Press.

Manolio, T.A., Bailey-Wilson, J.E., and Collins, F.S. (2006). Genes, environment and the value of prospective cohort studies. Nature Reviews: Genetics, 7: 812-820.

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