ACT HEALTH VACATION STUDY PROGRAM

PROJECT SUMMARY

Project Title	**The effect of childhood blood lipid levels on endothelial function during adolescence: The Lifestyle of Our Kids longitudinal cohort study**
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Lead discipline (please select one)	
☐ **Nursing**	☐ **Health Economics**
☐ **Allied Health**	☐ **Biostatistics**
X Medicine	☐ **Value-based Healthcare**
☐ **Pre-clinical**	☐ **Epidemiology**

Outline of the project

This research project aims to investigate the effect of blood lipid levels on endothelial function in a healthy cohort of children observed over an 8-year period from childhood to early adolescence. We hypothesise that abnormal lipid levels during childhood reduces endothelial function during adolescence.

Data for blood lipid levels and endothelial function will be sourced from the Lifestyle of Our Kids (LOOK) longitudinal cohort study, a multi-disciplinary study based in Canberra. This study will be the first to evaluate the longitudinal effect of lipid levels on endothelial function, which has been shown to be a predictor of adverse cardiovascular events during adulthood. If an early association between blood lipid levels and endothelial function is established in this study, it would underscore the importance of lifestyle interventions to reduce adiposity and lipid levels, previously demonstrated in the LOOK intervention study (Figure 1), to attenuate the risk of developing endothelial dysfunction.

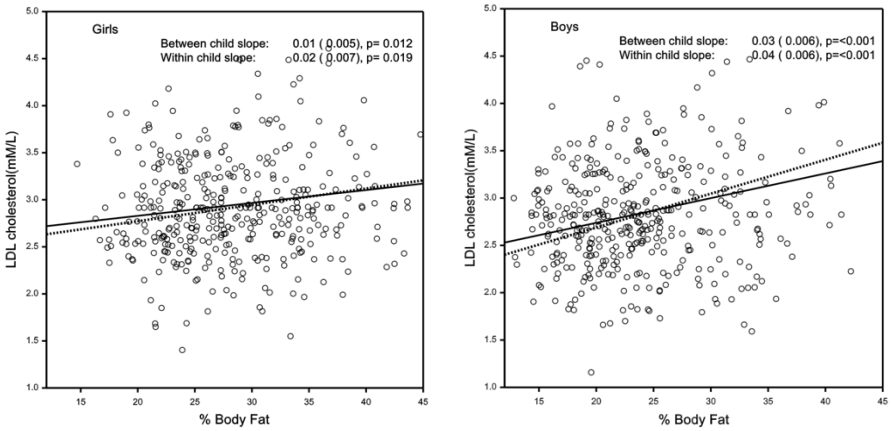

FIGURE 1—Cross-sectional (between-child) and longitudinal (within-child) relationships between LDL-cholesterol and percent body fat among girls (left panel) and boys (right panel). The solid line represents between-child relationship, whereas the broken line represents within-child relationship.

Proposed research methods

The Lifestyle of Our Kids (LOOK) study is an ongoing prospective cohort study that was initiated in 2005 as an interventional study to investigate the effects of general physical activity and an externally-provided specialist physical education program in schools on the physiological and psychological health and development of young children.

Between 2005 to 2013, 830 school children were followed up from age 7-8 years (grade 2) to age 15-16 years (grade 10). Participants were recruited from outer suburb primary schools in Canberra, and underwent repeated examinations to collect data for a wide range of parameters including cardiovascular structure and function, blood lipid markers (serum HDL, LDL and triglycerides), body composition, fitness levels, nutritional intake, as well as past medical history of the children and their families. These baseline and subsequent follow-up measurements were recorded in 2005, 2007, 2009 and 2013. Data from 2009 was used to interpolate values for 2011.

In this study, we will analyse a subset of the LOOK study cohort data to investigate the association between endothelial dysfunction measured in 2013 and blood lipid levels measured across childhood from 2005 to 2013. Of the 830 participants LOOK study participants, 747 (90%) obtained blood tests and thus had their baseline lipid levels measured in 2005. Of these 747 eligible participants, 208 (114 females, 94 males) had their endothelial function measured in 2013. Thus, 208 children will form the study population for this research project, where data for both blood lipid levels and endothelial function were available.

Data for analysis for this study has already been collected during the LOOK study visits, including assessment of –

- fasting blood lipid profile including low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C) and triglycerides. From these measures, total cholesterol (TC) and the TC/HDL-C ratio were calculated. Lipid "load" was calculated as time weighted averages of the four observations for total-, HDL-, and LDL-cholesterol and triglycerides;
- adiposity by dual energy X-ray absorptiometry (DXA);
- endothelial function measured using the EndoPAT 2000 (Itamar Medical, Israel), which allows non-invasive measurement of endothelial function;

Our statistical model will fit within the general framework of general linear mixed models. Restricted maximum likelihood will be used to estimate variance components and weighted least squares for estimating fixed effects. Statistical significance of effects will be assessed by calculating adjusted Wald statistics, and general model checking procedures will be routinely applied to identify aberrant data and to check model assumptions.

Preferred study discipline being undertaken by the student

Medicine

Potential benefits to the student and to the department
Benefits to the student: 1. Increase medical knowledge on topics of lipidology and endothelial function; 2. Increase skills in observational research methodology; 3. Increase knowledge on statistical analysis methodology and interpretation; 4. Increase skills in preparing a manuscript for publication; 5. Co-authorship on a peer-reviewed publication. Benefits to the department: 1. Increasing research output in the hospital; 2. Building research capacity and competence in the hospital; 3. Attracting potential post-graduate clinical and research trainees to the hospital.

Department within ACT Health Directorate / Canberra Health Services where the student will be based
Clinical Trials Unit

Please submit form to preclinical.research@act.gov.au