Growing up in Australia’s Child Health CheckPoint

2014 PhD Projects

The Centre for Community Child Health
The Royal Children’s Hospital, Melbourne
The Murdoch Childrens Research Institute

www.lsac-childhealthcheckpoint.org.au
Dear student,

We are delighted you are considering undertaking a PhD within *Growing Up in Australia’s Child Health CheckPoint*. The Child Health CheckPoint offers new researchers involvement in Australia’s premier national children’s study. This booklet summarises some projects available for commencement in 2014 – many more are possible, depending on the student’s interests. We offer projects to students with funding stipends, e.g. via APA, university or international scholarships. All PhD students contribute actively to data collection and management relevant to their project. If you are interested or would like to find out more about the project, please email lsac.childhealthcheckpoint@mcri.edu.au.

Our supervisors are themselves top researchers spanning multiple disciplines, including
- Community child health
- Epidemiology
- Biostatistics
- IT
- Epigenetics
- Biobanking & biomarkers
- Health economics
- Health-related quality of life
- Use of time
- Mental health
- Respiratory health
- Cardiovascular health
- Obesity
- Inflammation & infection
- Physical activity and fitness
- Eye health
- Dental health
- Hearing
- Bone health

Contents

About the Longitudinal Study of Australian Children…………………….page 4
About the Child Health CheckPoint.......................................................page 5
About the Murdoch Childrens Research Institute...............................page 6

Project 1: Emerging social disparities in cardio-respiratory health by age 11-12 years .................................................................page 7

Project 2: The relationship between patterns and types of physical activity and sedentary behaviour, and fitness and fatness in 11-12 year old children ........................................................................................................page 9

Project 3: How are place and weather associated with how children use their time? .............................................................................page 11

Project 4: Use of time and health-related quality of life in children .page 12
Project 5: Physical activity, aerobic fitness and lung function ............page 14

Project 6: Children’s health and health-related quality of life..........page 16
Project 7: Prevalence, impact and heritability of hearing loss at age 11-12 years .....................................................................................page 17
Next Steps .............................................................................................page 18
The Longitudinal Study of Australian Children (LSAC), also known as Growing up in Australia, is Australia’s largest and only nationally-representative children’s longitudinal study. It is funded by the Australian Government, and governed by three Government agencies: The Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA), Australian Institute of Family Studies (AIFS) and Australian Bureau of Statistics (ABS).

The study was designed in 2002 to provide ‘a strong evidence base for policy development and service delivery on a wide range of issues relating to children’s development’. LSAC recruited two nationally-representative cohorts in 2004: the birth (‘B’) cohort aged 3-19 months, and the kindergarten (‘K’) cohort aged 4-5 years (not included in the Child Health Check-Point). In a two-stage clustered sampling design, 10% of all Australian postcodes were randomly selected, stratified by state and urban/rural. 5,107 infants were recruited (64% uptake), with 90%, 86%, 83% and 80% retained to Waves 2, 3, 4 and 5 respectively. The main method of data collection is a biennial home interview, supplemented with questionnaires (children, parents, teachers), time diaries, limited direct assessments and data linkage to a number of national administrative data sets. There is a broad focus including health and development, education, family and parenting characteristics and socioeconomic environment.

LSAC has ongoing funding and is already highly productive with over 100 peer-reviewed papers and 22 government reports.

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About the Child Health CheckPoint

The Child Health CheckPoint is a one-off physical health assessment offered to all of the younger children (in Growing Up in Australia, now aged 11-2 years). It aims to help researchers and policy-makers to better understand how a child’s first decade determines their health as they approach the teenage years. It will also help us understand what makes for healthy adolescents and adults later on, when combined with data from future waves of Growing Up in Australia.

The Child Health CheckPoint is an additional data collection wave in the longitudinal study, designed to comprehensively measure cardiovascular, respiratory and other aspects of physical health and to collect biomarkers at age 11-12 years. The younger of the two LSAC cohorts, the B (Baby) cohort, will be invited to participate.

The data collected in the Child Health CheckPoint will enrich the value of the existing LSAC study data and advance the interface between social science and biomedical research by enabling a more complete investigation of the physiological and psychosocial pathways influencing children’s health.

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The Murdoch Childrens Research Institute (MCRI) is based at the Royal Children’s Hospital, Melbourne. As the largest child health research institute in Australia, we are well positioned to make major discoveries to improve child health. With over 70 large research teams, we have the critical mass needed in modern day research to solve problems more rapidly.

At MCRI we work with our campus partners The Royal Children’s Hospital and the University of Melbourne’s Department of Paediatrics to improve the health and wellbeing of children.

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Project 1:

Emerging social disparities in cardio-respiratory health by age 11-12 years

Supervisors: Dr Fiona Mensah, Professor Melissa Wake,
Dr Susan Clifford

Duration: 3 years commencing 2014

Aims/objectives: The Child Health CheckPoint study will provide a comprehensive snapshot of physiological functioning and adaptations at age 11-12. Using these data the objectives of the PhD will be to:

- Examine patterns of cardio- respiratory health relating to family socioeconomic position and area based deprivation, mapping the extent and steepness of social gradients across a range of physiological measures.

- Explore clustering between the measures of cardiovascular and respiratory health and identify children with high risk profiles for future cardiovascular and respiratory disease.

- Examine social gradients in risk profiles for future cardiovascular and respiratory disease.

Cardiovascular and chronic lower respiratory diseases are among Australia’s leading causes of death. Both disease areas are characterised by marked social gradients, and morbidity and mortality that should be avoidable. Patterns of childhood disparities in cardiovascular and respiratory health are not well delineated, and how early-life socioeconomic circumstances might influence these disparities is unclear. These key evidence gaps are due to limited childhood physiological data from population studies exploring antecedents of adult disease.
The Longitudinal Study of Australian Children (LSAC) is a rich data resource providing a platform to examine child health and development. It is funded by the Australian government to collect data in 8 biennial waves from 2004 to 2018. Collecting a wealth of information from parents, teachers and the children themselves, LSAC is Australia’s largest and only nationally-representative children’s longitudinal study, delineating children’s social, economic, physical and cultural environment and early pathways in health, learning and development.

We will undertake an additional physical health and biomarkers module, the “Child Health CheckPoint” at age 11-12 years in the younger of the two LSAC sub-cohorts, the B (Baby) cohort. In this we will implement a suite of state-of-the-art measures and collection of biomarkers that has not previously been feasible in large scale child health studies. These will comprehensively measure cardiovascular, respiratory and other aspects of physical health and enrich the value of the existing study data. Collection of this suite of measures will advance the interface between social science and biomedical research by enabling an extensive investigation of the physiological and psychosocial pathways influencing children’s health.

The Child Health CheckPoint will take place in late 2014-end 2015. The Ph.D. will include contributing to the design and administration of the suite of physiological measures in the Child Health CheckPoint in collaboration with the study team and conducting quantitative analyses of the study data to address the study objectives. All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.

Dr Fiona Mensah; Fiona.mensah@mcri.edu.au
Project 2:

The relationship between patterns and types of physical activity and sedentary behaviour, and fitness and fatness in 11-12 year old children.

Supervisors: Prof Tim Olds, others to be confirmed

Duration: 3 years commencing 2014.

Aims/objectives: The objectives of this PhD will be to:

- Examine the associations between *patterns* and *types* of physical activity (PA), adjusted for the overall *amount* of physical activity, and fitness and fatness in children; and

- Examine the associations between *patterns* and *types* of sedentary behaviour (SB), adjusted for the overall *amount* of sedentary behaviour, and fitness and fatness in children.

There are established associations between the amounts of PA and SB children accumulate and their cardiorespiratory fitness and fatness. However, little is known about associations between *characteristics* of PA and SB affect fitness and fatness. These characteristics include:

- **Patterns of accumulation**: Does it matter whether children accumulate physical activity on one or two days, as opposed to most days of the week? Is the number of bouts important? Within one day, does it make any difference whether they accumulate SB in a few long bouts or in many short bouts?

- **Types of PA and SB**: Does it matter whether children accumulate PA in the form of organised sport, active play, or active transport, if the amount of PA (total minutes and overall energy expenditure) is the same? Does it make any difference if children's SB is in the form of watching TV or reading and studying?
The Longitudinal Study of Australian Children (LSAC) is Australia’s largest longitudinal study of children. A research team, funded by the National Health and Medical Research Council, is undertaking an additional physical health and biomarkers module as part of LSAC, the “Child Health CheckPoint”, at age 11-12 years, in late 2014-2015. Among the measurements in this module are comprehensive use-of-time recalls, 7-day 24-hour accelerometer data, submaximal fitness tests and anthropometric measures of body fat using bioelectrical impedance analysis. These data can be used to address the study question.

For this project, the Ph.D. candidate will be contributing to the implementation of the suite of measures in the Child Health CheckPoint, in collaboration with the study team, and conducting quantitative analyses of the study data to address the study objectives. All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.

Prof Tim Olds; tim.olds@unisa.edu.au
Project 3:

How are place and weather associated with how children use their time?

Supervisors: Prof Tim Olds, others to be confirmed

Duration: 3 years commencing 2014.

Aims/objectives: The objective of this PhD will be to examine the associations between (a) geographical location and (b) weather conditions, and how children use their time.

Anecdotally, both place and weather affect use of time in fairly obvious ways. A number of studies have found strong associations between temperature, hours of sunshine and physical activity (PA) in both adults and children, and there are marked seasonal rhythms in screen time and sleep. Place will also affect behaviour: active transport is more common in urban than in remote areas, for example. Little is known about how place and weather affect other aspects of use of time, such as study, chores, and social interactions.

The Longitudinal Study of Australian Children (LSAC) is Australia’s largest longitudinal study of children. A research team, funded by the National Health and Medical Research Council, is undertaking an additional physical health and biomarkers module as part of LSAC, the “Child Health CheckPoint”, at age 11-12 years, in late 2014-2015. This module offers a unique opportunity to explore how place, weather and use of time interact. Among the measurements in this module are comprehensive use-of-time recalls and 7-day 24-hour accelerometer data. Together with extensive socio-demographic information, these data can be used to address the study question.

All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.
Project 4:

Use of time and health-related quality of life in children

Supervisors: Prof Tim Olds, A/Prof Lisa Gold

Duration: 3 years commencing 2014.

Project aims/objective: The objective of this PhD will be to examine the associations between how children use their time and their health-related quality of life (HRQoL).

HRQoL goes beyond direct measures of population health, such as life expectancy, and focuses on the impact health status has on quality of life, positive emotions and well-being. Previous studies have shown that fatness and household income are associated with children’s HRQoL, as are some aspects of time use such as physical activity (PA; positive) and screen time (negative). Some studies suggest that sleep may also be important. Little is known about other aspects of use of time such as chores, social interactions and school-related activities. Furthermore, socio-demographic factors such as socio-economic status, family structure and weight status can affect both use of time and HRQoL, making it hard to disentangle which factors are really important.

The Longitudinal Study of Australian Children (LSAC) is Australia’s largest longitudinal study of children. A research team, funded by the National Health and Medical Research Council, is undertaking an additional physical health and biomarkers module as part of LSAC, the “Child Health CheckPoint”, at age 11-12 years, in late 2014-2015. This module offers a unique opportunity to explore the relationships between use of time and HRQoL. The main wave of LSAC has child HRQoL and extensive socio-demographic data. Among the measurements in this new module are comprehensive use-of-time recalls, 7-day 24-hour accelerometer data, and parent HRQoL data. These data can be used to address the study question.
For this project, the Ph.D. candidate will be contributing to the implementation of the suite of measures in the Child Health CheckPoint, in collaboration with the study team, and conducting quantitative analyses of the data to address the study objectives. All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.
Project 5:

Physical activity, aerobic fitness and lung function

Supervisors: A/Prof Sarath Ranganathan; Dr Liam Welsh

Duration: 3 years commencing 2014

Aims/objectives: Among adults, regular physical activity is associated with a lower risk of overweight and obesity, hypertension, cardiovascular disease and diabetes. Moreover, there is a well-established positive association between physical activity and aerobic fitness in adults. However, the relationship between physical activity and aerobic fitness is less definitive in children and adolescents with a number of studies showing only weak to moderate associations.

Since many paediatric studies have only used self-reporting methods to assess physical activity it has been postulated that physical activity may not have been accurately assessed and in fact significantly underestimated. However, more recent investigations employing objective methods such as heart rate monitoring and accelerometry have also returned conflicting outcomes. This has given rise to several other explanations including i) the possibility that children generally have a high level of aerobic fitness and physical activity, leaving other factors such as age, gender and lung function to explain individual variations in aerobic fitness, ii) the intensity and duration of habitual physical activity in children is insufficient to bring about significant changes in aerobic fitness, iii) aerobic fitness is largely genetically determined, and iv) there is only a weak relationship between fitness and physical activity in children.
While debate continues on the nature of the relationship between activity and fitness in children and adolescents, regular physical activity has consistently been associated with a number of health benefits including improved ventilatory capacity, lowered serum cholesterol, lower blood lipids, and lowered risk for cardiovascular disease. Conversely, low levels of exercise have been associated with an increased prevalence of overweight and obesity, increased serum cholesterol, increased lipid profile and blood pressure.

Given the aforementioned health outcomes and the suggestion that exercise behaviour in childhood tracks into adolescence and adulthood, a better description of the relationships between habitual physical activity and aerobic fitness is clearly required. Moreover, the specific influences that lung function, age and gender has on these relationships also needs elucidation.

In this study we will evaluate the association between lung function, aerobic fitness, body composition and measures of physical activity. Lung function in pre-pubertal children is determine in utero or soon after birth. We hypothesise that lung function is associated with decreased fat-free mass and lower physical activity. These data will inform future studies aiming to assess whether predictors for overweight and the metabolic syndrome can be identified during early life and interventions used to change children’s trajectories towards poor cardio-respiratory health outcomes. All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.
**Project 6:**

**Children’s health and health-related quality of life**

**Supervisors:** Prof Melissa Wake; A/Prof Lisa Gold; Prof Tim Olds

**Duration:** 3 years

**Aims/objectives:** Health economics analyses guide decision-making for effective and equitable health care allocation. However, typically these require knowledge of how health-related quality of life (HRQoL) varies by different health states at the population level – information that is lacking for children. In 2015, the Longitudinal Study of Australian Children is conducting a Physical & Biomarkers Module involving a nationally-representative sample of 3,4000 11-12 year olds. This PhD will quantify how children’s HRQoL varies by (i) state-of-the-art objective measures of cardiovascular, respiratory, hearing, vision, oral and other aspects of health; (ii) self-reported health status and pain; (iii) paired parent HRQoL and health measures.

All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.

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Project 7:

**Prevalence, impact and heritability of hearing loss at age 11-12 years**

**Supervisors:** Prof Melissa Wake; Prof David Moore (Cincinnati Children’s Hospital); A/Prof Lisa Gold

**Duration:** 3

**Aims/objectives:** Hearing loss is the most prevalent disability in older adults, with substantial impacts on cognitive and social function and thence societal costs. Subtle deficits may begin in childhood and may be rising with headphone use on personal digital devices. In 2015, the Longitudinal Study of Australian Children is conducting a Physical & Biomarkers Module involving a nationally-representative sample of 3-4000 11-12 year olds. This PhD will examine (i) prevalence of slight and mild hearing loss; (ii) impacts on speech perception, language and health-related HRQoL; (iii) its heritability, via paired parent measures; and (depending on time) (iv) academic and other outcomes.

All Child Health CheckPoint PhD candidates contribute to data collection, contributing at least 2.5 days per week throughout 2015. This project is available to students with funding stipends, e.g. via APA, university or international scholarships.
Next Steps

If you would like to hear more about any of the projects listed in this booklet, please contact the supervisor listed under each project title. You may also find it helpful to read general advice about PhDs in each of the universities where our current potential supervisors are based:

University of Melbourne
http://gradresearch.unimelb.edu.au/handbooks/phd/index.html

Deakin University

University of South Australia

To keep in touch and up to date with the Child Health CheckPoint please visit www.lsac-childhealthcheckpoint.org.au. An updated list of PhD projects will be listed here