

**Postgraduate Study in the
Respiratory Epidemiology & Public Health Group,
National Heart & Lung Institute**

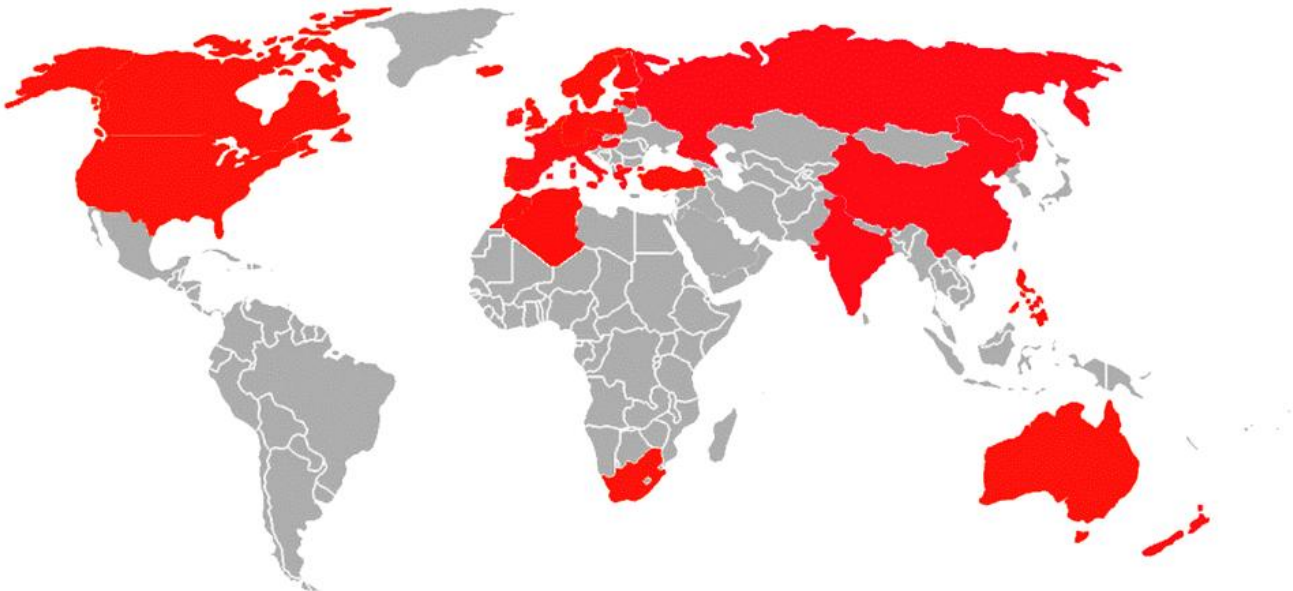


About the Respiratory Epidemiology & Public Health Group

The Respiratory Epidemiology and Public Health Group at Imperial College London, led by Professor Peter Burney, comprises a team of researchers with an international reputation in the field of epidemiology of **allergic disease, asthma and chronic obstructive pulmonary disease**, and incorporating expertise in medicine, public health, nutrition, genetic epidemiology and statistics. As well as working on the broad epidemiological patterns of disease, we have a particular interest in the effects of early life (including *in utero* exposure), nutrition, sex hormones and indoor, outdoor and occupational environment on disease incidence, severity and prognosis. We are also involved in research examining the influence of genes on susceptibility to environmental causes of disease. Our friendly team offers a varied and stimulating learning environment which encourages participation and professional development.

Our research is truly international, and the Group has a key role in a number of major collaborative studies. The European Community Respiratory Health Survey, coordinated by Professor Burney, has been the basis for updating policy on respiratory health both internationally and domestically. It has produced over 250 papers in peer-reviewed journals and is quoted more than 100 times in the WHO/NIH review of the Global Burden of Asthma. Our Group has recently taken over the coordinating role for the Burden of Lung Disease (BOLD) Initiative – an international survey of the prevalence of chronic obstructive pulmonary disease and its economic burden. The initial findings from BOLD have already appeared in the *Lancet*, and the study is set to be a worldwide platform for the ongoing study of COPD. The Group is also involved with GA²LEN, a European Network of Excellence for the study of asthma and allergies, and with EuroPrevall, a Europe-wide study of food allergy. Other research is focused at a more local level, looking at populations which are uniquely suited to addressing particular research questions. Recent projects have seen researchers carrying out fieldwork in London, Montserrat and South Africa, and the Group is always interested in developing new projects, whether involving primary data collection, the analysis of existing data, or new thinking in methodology and statistics.

Countries with whom we are currently collaborating on research projects:



Cover photos:

- Results of skin-prick testing for allergen sensitisation. Photo: Deborah Jarvis.
- Huts in Eastern Cape Province, South Africa: atopic disease is much less common here than in the urban Western Cape, but the reasons for this are not fully understood. Photo: James Calvert.
- The Soufrière Hills volcano on Montserrat. Following an eruption in 1995, the island's population are regularly exposed to levels of ash in the air that would be considered unsafe in the UK. Photo: Deborah Jarvis.
- Berries on sale in a Norwegian market. Berries are a characteristic feature of diet in Scandinavian countries. They contain high levels of antioxidants, which have been linked to improved respiratory health. Photo: Vanessa Garcia-Larsen.

How to Get More Information on Postgraduate Study

- You can visit our website to find out more about the Group and its members:
www1.imperial.ac.uk/medicine/about/divisions/nhli/respiration/popgenetics/reph
- In this brochure we have included abstracts from previous PhDs and MDs which members of the Group have supervised. A wide variety of new opportunities are available: if you are a graduate in a biomedical or health-related subject, environmental science, nutrition or statistics, and you want to apply your skills within the field of epidemiology and public health, then you could be the person we are looking for.
- Contact us! A list of some of our members is given below, with their research interests and email addresses. If you have your own ideas for research we are keen to hear from you – see our guide to writing a brief project proposal.

Professor Peter Burney, Head of Group
Respiratory epidemiology

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Dr Deborah Jarvis, Senior Lecturer
Respiratory epidemiology. Environmental risk factors for asthma, particularly gender and indoor pollution. Large international observational studies on risk factors for asthma

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Dr Bernet Kato. Biostatistician,
Respiratory epidemiology, statistical genetics and genomics, survey methodology, multilevel/hierarchical modeling and order constrained inference

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Dr Roger Newson, Lecturer
Medical statistics, confidence intervals for rank order statistics and their differences, non-parametric statistics, genetic epidemiology

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Dr Vanessa Garcia-Larsen, Research Associate
Nutritional epidemiology, asthma and nutrition, dietary questionnaires

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- You can also write to Professor Burney at the following address:

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Putting Together Your Own Project Proposal

We can help you draft a finished project proposal, and help you look for funding, but if you can put together your own initial proposal it will tell us more about you and your research interests. A full PhD proposal will often be a couple of pages in length but you could start smaller. You may find it helpful to structure your proposal (some suggestions for subheadings are given below, but you may want to choose your own), and you will probably want to include some references.

Title

Clear and concise.

Background

What has already been done in this area, and what led you to your research question?

Research question / Objectives

What is the purpose of your proposed study?

Methods

How will you address your objectives / answer your research question?

Importance / Impact

How will your results be used, and what is the potential impact of your findings?

Skills

What is your own background and what relevant skills or qualifications do you have?

Bear in mind that a PhD project should be a substantial piece of work. It is likely to involve a period of several months when you are doing fieldwork and collecting your own data (a more theoretical project, such as in applied statistics, would involve a significant amount of number-crunching and/or novel theoretical work).

Examples of Previous MD Theses

Respiratory Health and Gas Cooking: The European Community Respiratory Health Survey II

Deborah Jarvis, 2007

The use of unvented domestic gas appliances has been proposed as a modifiable risk factor for respiratory symptoms and decrements in lung function although the specific pollutant responsible for these effects is not clear.

In the European Community Respiratory Health Survey I (ECRHS I) wheeze was associated with the use of gas for cooking in young adults. Study participants were recontacted about eight years later and more detailed information on exposure to gas cooking appliances was collected as well as allergen levels in the home and indoor levels of some products of gas combustion.

Wheeze symptoms were associated with the use of gas, especially if a gas oven was present, the kitchen was poorly ventilated and bottled rather than mains gas was used. Homes with gas cooking appliances had higher levels of house dust mite allergen, but this neither explained nor modified the associations of wheeze with the use of gas cookers. Even though homes with gas cooking appliances had higher indoor nitrogen dioxide levels this did not explain the association of symptoms with the use of gas for cooking. There was some evidence that nitrous acid, rather than nitrogen dioxide, was associated with decrements in lung function but overall there was little evidence that low lung function, airway obstruction or bronchial reactivity was more common in those that cooked with gas compared to those cooking with electricity.

Although more studies are required to prove a causal link between poor respiratory health and the use of gas for cooking, this report provides further evidence that people who cook with gas have more respiratory symptoms than those who do not. This effect may be mediated by nitrous acid. Whatever the mechanism this study strongly suggests that these adverse health effects may be ameliorated by good kitchen ventilation.

Accident and emergency attendance for asthma in children living in the inner city

Lindsay Forbes, 2005

Asthma causes significant morbidity in British children despite the availability of effective treatment. Poorer children have more severe symptoms than more affluent children. The reasons for this are not clear; previous research suggests that this may be because poorer children are exposed to more harmful home environment (for example, tobacco smoke, damper homes, or more allergens); or because they receive less effective treatment (for example, less inhaled anti-inflammatory treatment, less frequent monitoring, or lower access to primary care in an emergency).

Using accident and emergency attendance and reattendance for acute care as markers of more severe asthma, we attempted to identify risk factors for more severe symptoms in children with asthma living in South East London.

We found that children of lower socioeconomic status were at higher risk of accident and emergency attendance for asthma. However, we found that none of the factors in the home environment or quality of care could account for this. Also, none of the variables we studied was associated with reattendance for acute care. We found some evidence that having a written management plan and more frequent appointments in primary and secondary care were associated with accident and emergency attendance, even after controlling for more severe disease. We also found some evidence that parental psychological responses to asthma attacks and attitudes towards the relative benefits of general practice and accident and emergency may influence accident and emergency attendance, though the study design was not ideal for examining the influence of these variables.

The findings suggest that reducing attendance at accident and emergency in children with asthma in the inner city is unlikely to be achieved by making improvements to the home environment or improving the quality of care. Research on reducing accident and emergency use should focus on identifying what influences parents to choose to use accident and emergency or other services when their child has an asthma attack, and evaluating how best to provide emergency services for children with asthma.

Examples of Previous PhD Theses

Asthma and atopy in rural and urban Xhosa schoolchildren

James Calvert, 2003

A cross-sectional survey established the prevalence of exercise induced bronchospasm (EIB) in Xhosa communities in urban and rural South Africa. A nested case-control study investigated the causes for differences between these areas.

Children were randomly selected from 6 urban and 18 rural schools.

Urban (N=1632) and rural (N=1672) children aged 8-13 years took part in exercise tests. EIB was defined as a 15% fall in FEV1 and/or a 26% fall in F25-75 following 6 minutes free running.

The prevalence of EIB was higher in urban (14.9%) than rural (8.7%) areas ($p < 0.0001$) but there was no evidence for further variation in prevalence between schools within each area.

Children responding positively to the exercise challenge and a randomly selected sample of children who responded negatively were recruited into a case-control study (390 controls, 383 cases). Analysis used weighted logistic regression. The difference in risk of EIB between urban and rural subjects was completely explained by atopy (OR for upper tertile of skin wheal diameter 2.32; 95% CI 1.25–4.28; $p = 0.01$), infection with ascaris (OR 1.71; 95% CI 1.12–2.62; $p = 0.02$) and increasing fatness (OR 2.02; 95% CI 1.10–3.70). Increasing educational level of the head of household and number of consumer items owned were also independently associated with increasing risk of EIB. Increasing body mass index (BMI) was also associated with a greater strength of association between specific IgE and the corresponding skin test (*D. pteronyssinus*: OR for a +ve skin test in presence of specific IgE: fatter subjects OR 34.6, 95% CI 0.9–109.3, $p < 0.0001$; thinner subjects OR 8.05, 95% CI 2.74–23.6, $p = 0.001$).

Despite the large differences in poverty between urban and rural communities results were not substantially altered by further adjustment for economic factors.

Increased prosperity and food security with a consequent improvement in nutritional status may lead to an increase in the prevalence of atopy and asthma/EIB in South Africa. This will have consequences for population morbidity and health expenditure.

Confidence intervals for the intraclass correlation coefficient in cluster randomised trials

Obioha Ukoummunne, 2004

The intraclass correlation coefficient ρ plays a key role in the sample size calculation for cluster randomised trials. Estimates of ρ obtained from previous studies, and used to plan new trials, are often imprecise. It is informative to quantify the level of imprecision. The assignment of confidence intervals to ρ is straightforward only for balanced Normal data. This thesis compares analytical and bootstrap confidence interval methods. Their performance is evaluated for Normal, non-Normal continuous and dichotomous outcomes from balanced and unbalanced studies. A new bootstrap method, based on the application of the bootstrap- t to a variance stabilising transformation of ρ , is developed and evaluated.

A Monte Carlo design is used to compare the methods. Clustered datasets are simulated for combinations of values on the design parameters: number of clusters, number of individuals per cluster, true value of ρ and, for dichotomous outcomes, true prevalence of the outcome. The methods are also applied to data from cluster randomised trials.

This thesis finds that analytical methods for assigning confidence intervals to ρ may provide poor levels of coverage for non-Normal continuous and dichotomous outcomes, especially when the true value of ρ is high. Standard bootstrap methods generally provide poor levels of coverage for all types of outcomes when there are fewer than 50 clusters. Application of the bootstrap- t method to the variance stabilising transformation of ρ yields confidence intervals that have close to nominal coverage levels for continuous outcomes, but do not always provide good coverage for dichotomous outcomes. Better methods are required for assigning confidence intervals to ρ for dichotomous outcomes. The thesis provides knowledge on the performance of confidence interval methods for ρ , guidance on the best method to use for different study design configurations and a new bootstrap method for non-Normal continuous outcomes that provides close to nominal coverage.