

Leicester-Loughborough
Diet, Lifestyle and Physical Activity
Biomedical Research Unit



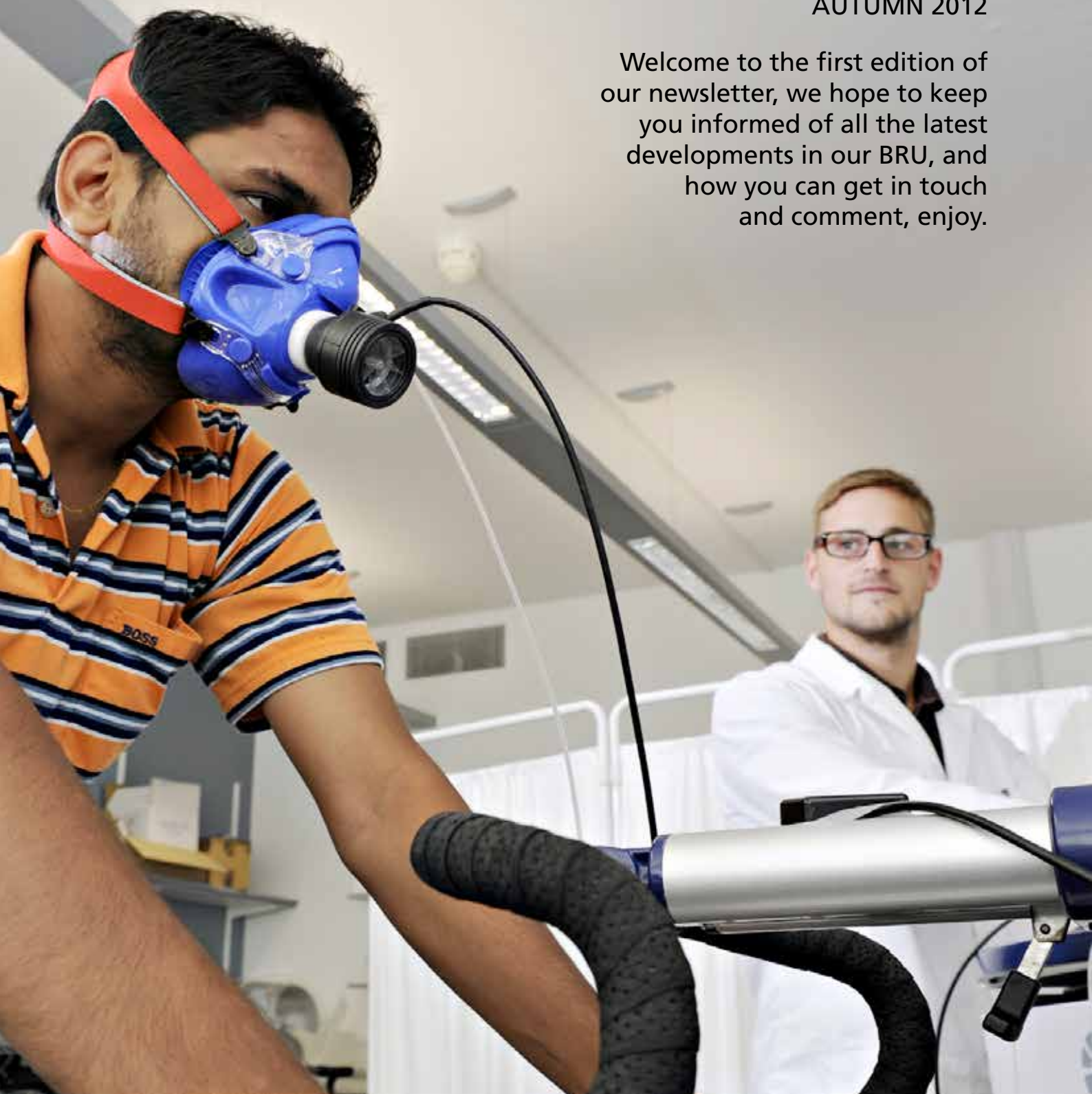
*National Institute for
Health Research*

www.ll.dlpa.bru.nihr.ac.uk

inFORM

AUTUMN 2012

Welcome to the first edition of our newsletter, we hope to keep you informed of all the latest developments in our BRU, and how you can get in touch and comment, enjoy.



Welcome to the first edition of the NIHR Leicester-Loughborough Diet, lifestyle and physical activity biomedical research unit newsletter. We started life in April 2012 and have been busy recruiting staff and buying equipment in anticipation of the new and exciting research that we will be conducting over the next 5 years. Our team comprises of researchers, technical staff, doctors, nurses, administrators and laboratory scientists. We are a partnership between Leicester diabetes centre at University Hospitals of Leicester NHS Trust and the School of sport and exercise sciences at Loughborough University.

The Leicester-Loughborough Diet, Lifestyle and Physical Activity BRU (LL.DLPA.BRU) is part of the National Institute for Health Research (NIHR) family, more specifically belongs to the group of Biomedical Research Units and centres. The NIHR Biomedical Research Units (BRUs) undertake translational clinical research in priority areas of high disease burden and clinical need.

The BRUs are based in leading NHS organisations and Universities enabling some of the best health researchers and clinicians to work together to develop new treatments for the benefit of patients. The BRUs:

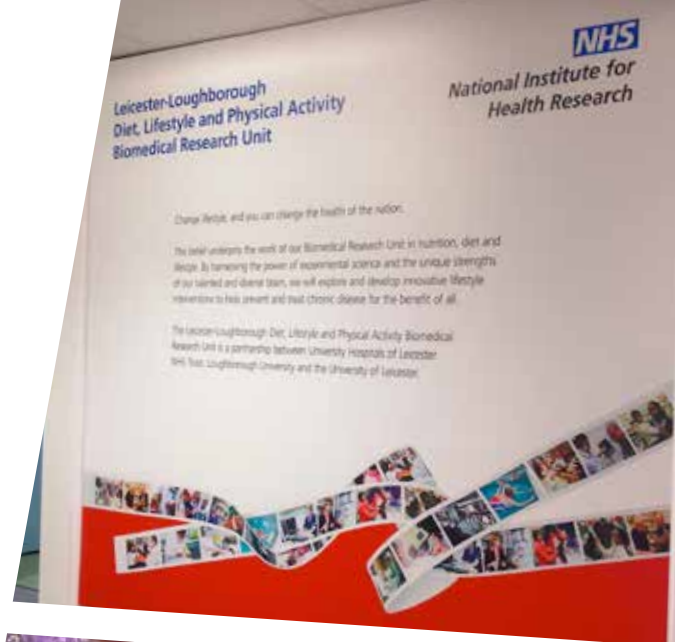
- drive innovation in the prevention, diagnosis and treatment of ill-health
- translate advances in medical research into benefits for patients

The BRUs are focused on translational clinical research, taking new ideas from the laboratory bench to the patient's bedside to improve health.

There are a total of 20 NIHR BRC / BRUs across the UK, and they are focused around priority disease areas:

- Lifestyle, Diet and Nutrition
- Cardiovascular Disease
- Respiratory Disease
- Gastrointestinal Disease
- Musculoskeletal Disease
- Deafness and Hearing problems
- Dementia

Welcome



We have 2 very exciting research themes within our unit exploring:

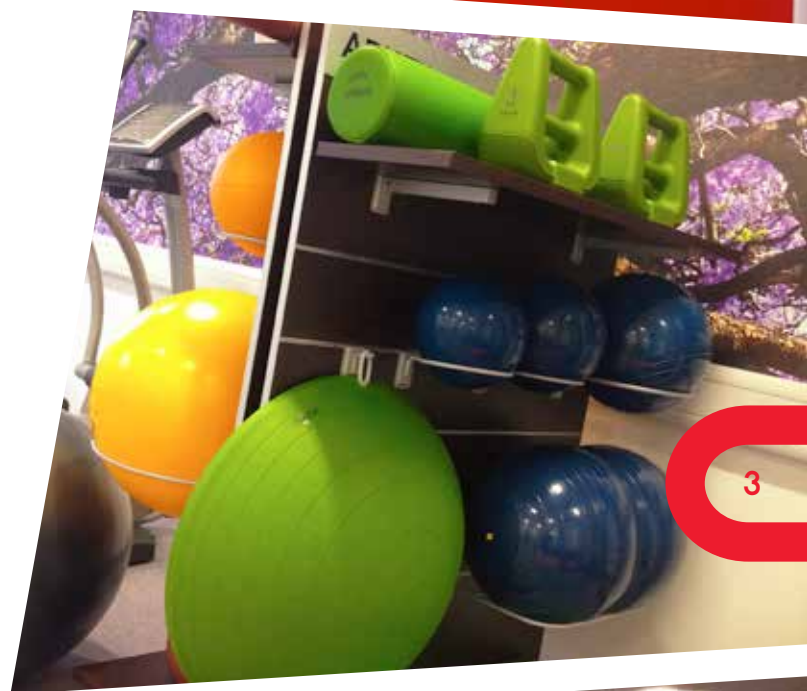
1. Physical activity and sedentary behaviour in the prevention and management of chronic disease
2. Physical activity, appetite regulation, nutrition and metabolic health in chronic diseases

At the university hospitals of Leicester we are particularly excited as we are the only NHS trust outside of London to host 3 Biomedical Research Units in addition to Diet, lifestyle and physical activity UHL also hosts a respiratory and cardiovascular disease BRU.

We hope that you enjoy our newsletter and become regular readers, as you will see over the next few pages, we want to inFORM you of the type of health and activity research we are conducting, and the kind of people who are part of the team.

If you would like to know more please feel free to get in touch with us, we'd love to hear from you, we have included contact details on the back page.

Tim Skelton
BRU Manager
Tim.skelton@uhl-tr.nhs.uk



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The Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit: **Summary**

The Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit (BRU) is a unique partnership between the University Hospitals of Leicester NHS Trust, the University of Leicester and Loughborough University. It brings together a diverse group of international experts dedicated to contributing to the long-term health of the nation by targeting a vital but underutilised therapy - lifestyle. Over the last couple of decades we have witnessed unprecedented levels of many chronic diseases, particularly type 2 diabetes and related metabolic disorders.

4 On a global level these chronic diseases now account for more death and disability than infectious diseases and have resulted in a huge economic burden to society and national health care systems. Within the NHS, type 2 diabetes alone is projected to account for 17% of the entire health care budget by 2035. Fundamentally, type 2 diabetes and other related chronic diseases are caused by modern industrialised environments, where high-fat high-calorie processed foods are omnipresent and the need for purposeful physical activity has been all but engineered out of daily life. Modern society is therefore characterised by high levels of obesity and near universal sedentarism.

Consequently, developing effective lifestyle interventions aimed at the prevention and treatment of chronic disease is fundamental to successfully tackling this ever-burgeoning health care problem. However, all too often within routine clinical care, lifestyle is only paid lip service; the main focus of preventative and treatment strategies continues to revolve around pharmacotherapy. Although there are several explanations for this, at the core is the unavoidable fact that lifestyle has traditionally lacked the investment in translational research that has typified pharmaceutical interventions, meaning clinicians and health care commissioners lack the ability provide tailored evidence-based lifestyle therapies to their patients.

Therefore, radical action is needed if the current epidemic of chronic disease is to be stemmed. Our BRU will work towards redressing this imbalance, and establish excellence in experimental lifestyle research aimed at developing innovative approaches to promoting a healthy lifestyle in the optimisation of the prevention and management of chronic disease.



This will be achieved through two research themes.

Our first theme is aimed at targeting priority areas of research within the full spectrum of movement research, from sitting-related sedentary behaviour to vigorous-intensity physical activity. For example, we are investigating whether simply enabling people to sit less and stand more throughout their daily lives is effective at reducing the risk of developing type 2 diabetes and other chronic diseases. If found to be effective, this may provide an alternative approach to promoting health in individuals who are unable or unwilling to undertake purposeful exercise. Theme 1 will also target the opposite end of spectrum by utilising short bursts of high intensity aerobic exercise as a therapeutic tool to improve metabolic health.

Our second proposed theme will complement the first theme by concentrating on specific aspects of obesity management and treatment through the role of lifestyle factors and nutrition and their combinations in appetite regulation, weight management and metabolic health. This will include investigating how physical activity and diet can be used to control appetite and promote weight loss through influencing the role of gut-hormones and other satiety signals. We will also investigate how lifestyle can be used to augment bariatric surgery in the treatment of extreme obesity.





Profile: James King
Senior Research Associate

My main research interest surrounds the influence of exercise on metabolism in relation to the prevention and management of chronic disease, particularly obesity and type 2 diabetes. My research background has centred heavily on the interaction between exercise, appetite control and energy balance.

Specifically, my PhD examined how exercise, as compared with dietary restriction, impacts up on key hormonal regulators of appetite and energy metabolism. Within this research area, I'm keen to better understand how exercise can most appropriately be used to facilitate weight healthy body weight control.

Becoming overweight is the primary cause of several chronic metabolic conditions with the link being especially strong with type 2 diabetes. Thus, linking with my PhD work, I am also interested in how changes in body weight or more particularly, changes within the body fat tissue itself, influence metabolic health. Understanding how exercise, with and without accompanying changes in diet, influence the physiological and metabolic properties of body fat cells is also a key area of interest for me.

In the past my research has centred on 'basic science' related work, trying to understand the fundamentals as they occur in healthy individuals. The Leicester-Loughborough BRU will enable me to progress this work into clinical populations so that we can see whether our findings transfer into populations who are in need of intervention. Ultimately this will provide us with new knowledge and will enable us to better target interventions to these population groups.

Profile: The ACUTE Study

What is the title of the research?

Does breaking sedentary time improve glucose regulation in women with impaired glucose tolerance?

What is the purpose / aim of the research?

The number of people diagnosed with type 2 diabetes is increasing rapidly and about 2.9 million people in the UK currently have diabetes. Having type 2 diabetes puts people at high risk of having heart problems, kidney failure, and complications resulting from nerve damage in the eyes and feet. With this in mind, our research team is interested in developing new ways to prevent diabetes.

The aim of this study is to find out whether the amount of time people spend sitting and replacing it with standing and light intensity activity (walking) reduces sugar and fat levels, therefore reducing the risk of diabetes.

What do we already know as a result of research carried out in this area, and how does this study build on this?

There is increasing evidence suggesting that prolonged sitting time (sedentary time) may actually increase the risk of diabetes and other chronic diseases. Importantly, adults can meet public health guidelines on physical activity (150 minutes of moderate activity per week), but if they still sit for prolonged periods, their metabolic health is compromised.

Going from sitting to standing and carrying out light-intensity activities (such as casual walking) may reduce diabetes risk. However no one had investigated the effect of standing and walking on sugar and fat levels in individuals with a high risk of type 2 diabetes.

Can anyone take part?

This study will only include 3- sedentary females who are aged between 50 and 74. Eligible participants will be recruited from existing studies carried out within the Leicester Diabetes Centre.

When will the study be starting?

The plan is for the study to start in early 2013 and we estimate it will take 6 months to complete.





The Influence of HIT on Body Composition,
Appetite and Inflammation

Current exercise guidelines recommend that you are active every day and also do muscle strengthening exercises twice per week – a goal most people fail to achieve because they “do not have time”. Compared to hours of ‘traditional’ aerobic training, time-efficient high intensity interval exercise training (HIT) induces similar or superior changes in a number of health-related markers related to the heart, blood vessels, lungs, muscle and fat tissue and has even been reported to be more enjoyable than continuous aerobic exercise.

HIT has been used in the sporting world for many years due to the known improvements in exercise performance when included in training programmes, but has also been shown to be suitable in a variety of healthy and patient populations in more recent years. With this in mind, this study plans to explore HIT and the health benefits it may induce over a 6 week period in overweight and obese, but otherwise healthy, males and females. This HIT programme demands ~50-75% less time than traditional aerobic training and will build upon previous research to further examine the benefits of HIT on risk factors of cardiovascular disease and diabetes.

We will determine the effects of HIT on body composition and appetite regulation as HIT has previously induced reductions in fat mass despite relatively low energy expenditure during exercise. It is plausible that this type of exercise may suppress appetite despite an increase in energy expended.

Elevated inflammation is associated with obesity and is a risk factor of many chronic diseases.

We have previously shown that high intensity intermittent exercise (1 hour per session) can reduce some inflammatory proteins in blood and fat tissue after only 2 weeks. This study will endeavour to see if similar adaptations can be induced using a time-efficient HIT protocol that takes 15 minutes to complete. We will also determine the participant’s enjoyment whilst taking part in this type of exercise to establish if HIT is feasible for the general public.

This is part of a larger multi-site study, Metapredict (6 sites), that aims to investigate the effects of HIT in an overweight, inactive population to look for genetic predictors for changes in aerobic capacity and insulin resistance - two of the most powerful measures of future risk of cardiovascular and metabolic disease. Some individuals demonstrate almost no measurable response to exercise training and furthermore ~10-15% of individuals may actually demonstrate an adverse response to exercise training. Therefore, a further aim of this project is to identify genomic and/or molecular predictors for this lack of positive benefit so that individualised health care strategies and lifestyle changes can be produced to blunt the progression of metabolic diseases such as obesity, diabetes and cardiovascular disease.

With this in mind, we aim to deliver practical, evidence-based recommendations for individualised, time-efficient, low cost exercise prescription that will contribute to the prevention or treatment of chronic diseases related to physical inactivity.

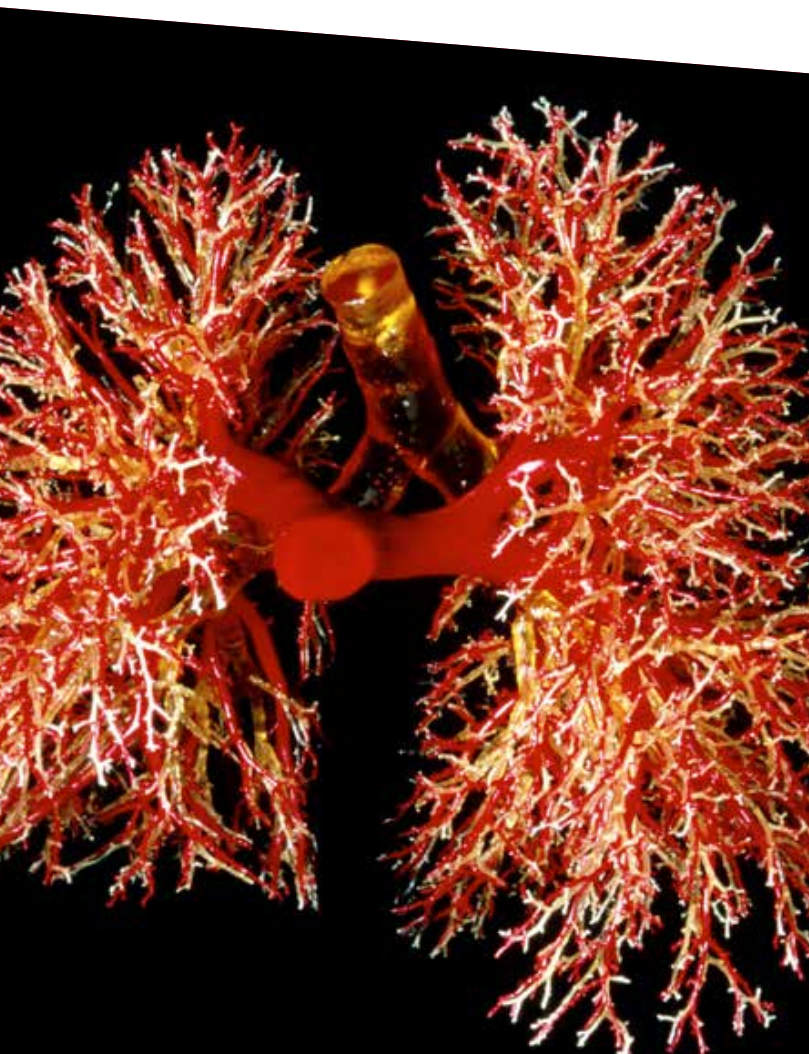
For more information please go to: www.metapredict.eu

Government Investment in Lung Research in Leicester

Respiratory Research at Glenfield Hospital has become one of 20 Biomedical Research Units within England. Professor Andrew Wardlaw, Director of the BRU, led the application and after tough open competition the department has now become part of a multi million pound investment by the National Institute for Health Research (NIHR) to help prevent, diagnose and treat lung disease with the aim of translating medical research into benefits for patients.

The NIHR Leicester Respiratory Biomedical Research Unit is a partnership between the University of Leicester and the University Hospitals of Leicester NHS Trust and funded by the NIHR. The NIHR is part of the Department of Health who provide support and facilities in the NHS for research that results in high-quality care for patients and the public. The Unit will focus on promoting the development of new and effective therapies for the treatment of severe asthma and chronic obstructive pulmonary disease (COPD). The funding will provide infrastructure such as clinical space and specialist staff allowing our researchers to undertake first class investigations into lung disease. Key research areas will include airway inflammation, lung damage, genetics of lung disease, the musculoskeletal system and the development of novel treatments.

NIHR Leicester Respiratory Biomedical Research Unit
Glenfield Hospital
Groby Road
Leicester
LE3 9QP
Tel: 0116 250 2704



National Institute for Health Research

The National Institute for Health Research (NIHR) is funded through the Department of Health to improve the health and wealth of the nation through research. Since its establishment in April 2006, the NIHR has transformed research in the NHS. It has increased the volume of applied health research for the benefit of patients and the public, driven faster translation of basic science discoveries into tangible benefits for patients and the economy and developed and supported the people who conduct and contribute to applied health research. The NIHR plays a key role in the Government's strategy for economic growth, attracting investment by the life-sciences industries through its world-class infrastructure for health research. Together, the NIHR people, programmes, centres of excellence, and systems represent the most integrated health research system in the world.
www.nihr.ac.uk

University of Loughborough

Loughborough is one of the country's leading universities, with an international reputation for research that matters, excellence in teaching and strong links with industry.

Loughborough is also the UK's premier university for sport and its underpinning academic disciplines. It has perhaps the best integrated sports development environment in the world and is home to some of the country's leading coaches, sports scientists and support staff. It also has the country's largest concentration of world-class training facilities across a wide range of sports.

Loughborough has been selected by the British Olympic Association as the Official Preparation Camp Headquarters for Team GB prior to the London 2012 Olympic Games. The University has also signed a partnership with the Japanese Olympic Committee that will see both organisations working together until the London 2012 Olympic Games.
www.lboro.ac.uk

University Hospitals of Leicester NHS Trust


We are one of the biggest and busiest NHS trusts in the country, incorporating the Leicester General, Glenfield and Royal Infirmary hospitals. We have our very own Children's Hospital and run one of the country's leading heart centres.

Our team is made up of more than 10,000 staff providing a range of services primarily for the one million residents of Leicester, Leicestershire and Rutland. Our nationally and internationally-renowned specialist treatment and services in cardio-respiratory diseases, cancer and renal disorders reach a further two to three million patients from the rest of the country.

We work with partners at the University of Leicester and De Montfort University providing world-class teaching to nurture and develop the next generation of doctors, nurses and other healthcare professionals, many of whom go on to spend their working lives with us.

We pride ourselves on being at the forefront of many research programmes and new surgical procedures, in areas such as diabetes, genetics, cancer and cardio-respiratory diseases. In 2010 we earned £21.4 million in research grants for the 825 clinical trials we led, bringing benefits to thousands of our patients.
www.leicestershospitals.nhs.uk

NIHR Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit

University Hospitals of Leicester 
NHS Trust

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University

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 Leicester Diabetes Centre
Committed to Growing International Research, Education & Innovation

www.ll.dlpa.bru.nihr.ac.uk

 @ll_dlpa_bru

nihr.ll.dlpa.bru@uhl-tr.nhs.uk

Tel: 0116 258 4214

Leicester Diabetes Centre - Air
Leicester General Hospital
Leicester LE5 4PW

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