

Volunteer Times

Summer 2017



Fat storage location and the risk of diabetes and heart disease

GoActive gets underway

Addressing the burden of takeaway food outlets

GLINT feasibility study finishes

A varied diet can prevent diabetes – but can you afford it?

VT Contents

	Page
Message from the Director	3
Fenland Phase 2 progress report	4
Addressing the burden of takeaway food outlets	5
Personalized information and healthy behaviour	6
Biobank Validation Study completes data collection	7
PROPELS progress report	8
Creating Active School Environments	10
GoActive Study gets underway	11
EPIC - Norfolk fifth health check begins	12
Mediterranean diet reduces cardiovascular disease	13
Inability to safely store fat increases diabetes risk	14-15
Varied diet can prevent diabetes – can you afford it?	16
GLINT feasibility study completed	17
ADDITION - a decade and counting	18
University of Cambridge award recognises impact	19
Join us in Great Snackington - at the MRC Festival	20

Message from Nick Wareham

MRC Epidemiology Unit Director

The past year has been a very productive one for scientists at the MRC Epidemiology Unit, with the studies you participate in contributing to several important advances in our understanding of type 2 diabetes and how to prevent it.

The novel insights that are made possible by the detailed data collected from volunteers in the Fenland and EPIC Norfolk studies was demonstrated by a paper in the prestigious journal *Nature Genetics*, where we showed that genetically determined differences in how people store fat in the body increase the risk of developing type 2 diabetes.

As well as improving our understanding of the causes of type 2 diabetes, our studies are helping us evaluate approaches to preventing it in at-risk individuals. Beyond that, we are identifying the barriers to healthy behaviour in the population as a whole, and are developing and evaluating approaches to overcoming them.

One of our priorities is to ensure that children and young people achieve the



physical activity levels that are vital for their future health. The GoActive study has begun in sixteen schools across Cambridge and Essex, evaluating an innovative programme to help teenagers increase and maintain physical activity levels. We will soon launch the CASE study to test the feasibility of an exciting 'active lessons' intervention that incorporates physical activity into lessons such as maths and English.

Once again, I would like to thank the many thousands of volunteers who have taken part in our studies. Your participation is crucial to the success of our research, and your continued support and enthusiasm are much appreciated.

A handwritten signature in black ink that reads "Nick Wareham". The signature is written in a cursive style and is positioned below the main body of text.

Fenland Study phase 2 nears 4,000 participants

In September 2014 we launched Phase 2 of the Fenland Study.

Recruitment to the first phase of the Fenland Study finished at the beginning of 2015, with 12,435 people from across Cambridgeshire participating.

We are now inviting participants who attended an initial Fenland Study visit between 2005 and 2015, to return for a second visit.

So far, 3,762 participants have been tested and we will continue to send out invites to the remainder. Please note that at least four years need to have elapsed between the first and the second visit, so you may not have received your invitation yet.

The information we are collecting in Phase 2 will be used to study the relationship between changes in objectively measured activity and dietary behaviours and body composition, and risk of developing type 2 diabetes and other relevant health conditions. It will also help us to understand the different influences on these factors and risks.

Participation in Phase 2 of the Study involves a single morning visit of four hours,

at one of our Research Units at either the Princess of Wales Hospital in Ely, the North Cambridgeshire Hospital in Wisbech or Addenbrooke's Hospital in Cambridge, whichever is most convenient.

Last summer we held three very successful public meetings in Cambridge, Ely, and Wisbech, which were attended by more than 500 Fenland volunteers. These meetings gave participants the opportunity to hear how their involvement has contributed to this important research. It was also valuable for the Fenland Study team to hear volunteers' perspectives, and to discuss with them the things we hope to learn in the future.

If you are one of the thousands of volunteers who have taken part in the Fenland Study over the past decade - thank you! You have already made a huge contribution to medical research, and we hope that you will be able to join us again for Phase 2 of the study.

More at www.mrc-epid.cam.ac.uk/research/studies/fenland/

Addressing the burden of takeaway food outlets

By combining data provided by six thousand Fenland Study participants with local authority data on takeaway restaurant location, Unit researchers have shown that neighbourhoods saturated with fast food outlets may be particularly unhealthy for people who are socioeconomically disadvantaged. And these researchers are working with policymakers to help address this health challenge.

As a nation we're spending more than ever on takeaway food, with £28 billion worth of takeaways now purchased annually. For the first time, Unit researchers observed consistent differences in takeaway food consumption and weight by education, which suggests that the availability of takeaways is amplifying existing social inequalities.

Individuals with the greatest exposure to takeaways consumed around a third more unhealthy takeaway food per day if they were in the least educated group, compared to the highest educated. Over a year, this would amount to the equivalent of over 4kg of additional unhealthy food. By comparison, individuals with the least exposure to takeaways consumed only a fifth more takeaway food if they were the least educated. Overall, those facing the double burden of least education and greatest takeaway exposure were three times more likely to be obese, compared to those highest educated and least exposed.

These findings suggest that policies to control the number of takeaways on our high streets might help to reduce overall levels of and inequalities in unhealthy diet and obesity. Our researchers have been building relationships with public health and planning professionals to bring evidence to bear on local planning decisions in this area. Researchers are also developing the Food Environment Assessment Tool (FEAT), which will support policymakers and communities in creating healthier food environments.

FEAT will be live at www.feat-tool.org.uk from early July 2017, and look out for stories about this work in the media over the summer.

More at www.mrc-epid.cam.ac.uk/blog/local-takeaways-create-double-burden-obesity/

Does personalised genetic information help people adopt healthier behaviour?

Being more physically active and having a healthy diet can reduce the chance of developing type 2 diabetes, including for those at higher risk because of a genetic predisposition. Because genetic tests aimed at predicting the risk of type 2 diabetes are widely available, there has been optimism that personalised genetic information will encourage people at risk to adopt healthier behaviours.

To investigate whether this is the case, researchers calculated the chance of developing type 2 diabetes for 569 healthy middle-aged adults in the Fenland study. These risk estimates were based either on the presence of 23 genetic markers known to be associated with type 2 diabetes, or on 'phenotypic' (i.e. physical) characteristics, such as sex, age and body mass index.

Participants were randomly assigned to three different groups. All groups received standard lifestyle advice, including general information about type 2 diabetes and information about how to reduce the risk of developing it. In addition to this information, one group of participants received a genetic risk estimate, while another received a phenotypic risk estimate.

After eight weeks, participants' physical activity, self-reported diet and weight, anxiety, worry, and beliefs about their risk were measured. The researchers found that receiving genetic or phenotypic risk estimate did not affect participants' physical activity or other relevant behaviours, in comparison with those receiving only standard lifestyle advice. And whilst individuals' perception and understanding of their own risk became more accurate, receiving this information did not seem to cause them worry or anxiety.

"These new results give further weight to the argument that approaches that target individual behaviour change, such as communicating genetic risk, are unlikely to be successful without efforts to remove barriers to healthier behaviours in the wider environment and society"

- Professor Simon Griffin, senior author

More at www.mrc-epid.cam.ac.uk/blog/type-2-diabetes-risk/

Biobank Validation Study completes data collection

UK Biobank is a major national health resource, which has recruited 500,000 people aged 40 - 69 between 2006 and 2010 from across the UK. Participants have undergone measures, provided blood, urine and saliva samples for future analysis, detailed information about themselves and agreed to have their health followed.

Over 100,000 UK Biobank volunteers have had their fitness and physical activity measured objectively using techniques that were specifically designed for use in this study. However, these techniques had not yet been validated against gold standard methods.

The Biobank Validation Study (BVS) was set up to validate the fitness and physical activity measurements used in the UK Biobank Study. A short bike test was used to assess fitness, and wrist-worn accelerometers were used to assess physical activity in everyday life. The aim of the validation study was to compare these measures with 'gold standard' measurements; a maximal fitness test and Doubly Labelled Water (DLW).

By October 2016, 191 participants (86 women and 105 men, aged 40-66 years) had completed the study. One of the objectives was to compare movement data from the dominant and non-dominant wrists, so everyone wore an activity monitor on each wrist for 8 days. Our results mean we can now more easily compare results between studies, regardless of which wrist the monitor was worn on. These include the Fenland Study, which used the non-dominant wrist.





The PROMotion Of Physical activity through structured Education with differing Levels of ongoing Support for those with prediabetes (PROPELS): *randomised controlled trial in a diverse multi-ethnic community*

The aim of the PROPELS study is to investigate whether an education based intervention offered with different levels of support can be effective at preventing type 2 diabetes.

Back in 2013 the PROPELS study team invited people identified as having an elevated risk of developing type 2 diabetes to take part in the research. Following an initial clinic visit, 1368 participants across sites in Leicestershire and Cambridgeshire were randomly allocated to one of three groups:

- Group 1: Received an information leaflet about how to reduce their risk of developing type 2 diabetes and participants attend clinical visits at 12 months and at the end of the study.
- Group 2: Received the same as group 1 and participants were invited to attend an annual group education session until the end of the study.
- Group 3: Received the same as group 2, and in addition participants received follow up telephone calls from a diabetes educator every 6 months to support any lifestyle changes as well as ongoing support in the form of a text messaging service.

What has happened since then?

The research team has completed the baseline measurement and 12 months clinical reviews of participants, and the results have been shared with participants and their GPs. The next clinical visit will be at the end of study in 2018/19.

The participants in groups 2 and 3 have been invited to annual education sessions. Of those people eligible to attend the initial education group, 79 percent in Leicester and 82 percent in Cambridge did so. Since then, 57percent of participants in Leicester and 64 percent of

participants in Cambridge have attended their first follow up education group.

We are now nearing the end of the 24 month follow-up stage of the study and beginning the 36 month education sessions.

What do the participants think?

The participants have been very positive about the experience. this is just some of the feedback we have received from those attending the education group:

"learning about diabetes and how I can reduce my risk using my results was the best bit"

"being in a group picking up tips on how to motivate myself was great"

"the group was very informative and easy to understand. Nice informal surroundings made me feel at ease"

More at www.mrc-epid.cam.ac.uk/research/studies/propels/



Active Schools, Active Kids!

Two studies are finding out how we might help children to be more active during their school years. Physical activity is important for health and well-being in young people. However, many are not sufficiently active and they also sit for long periods – especially during the school day.

The CASE project, funded by the Department of Health, aims to increase our understanding of how secondary schools can help young people move more and sit less throughout the school day. It will help us find out what strategies would be most effective, acceptable and provide the best value for money.

The CASE project involves:

- identifying potential intervention strategies by reviewing the literature and analysing existing datasets.
- including adolescents, parents, teachers, school architects, commissioners and other experts in the prioritisation of promising interventions.
- testing the feasibility of two interventions in schools.

After consulting young people, parents, teachers, researchers and stakeholders about how to develop the programme, researchers have begun to test the feasibility of an exciting 'active lessons' intervention. Active lessons are a teaching technique that incorporates physical activity into academic content, and so can be used in lessons such as maths and English, which are not considered traditionally active.

The researchers plan to implement the programme on a short-term basis in a secondary school in Cambridgeshire. Teachers will receive training to incorporate activity into their lesson plans, after which they will deliver active lessons for 6 weeks. Quantitative and qualitative information from students, classroom teachers, and head teacher regarding the feasibility, acceptability, effectiveness and costs of the intervention will be collected. The results of this feasibility study will be made available on the CASE website once complete.

More at www.cedar.iph.cam.ac.uk/case/





GoActive Study gets underway across Cambridgeshire and Essex!

Our physical activity levels reduce during childhood and into adolescence, which can increase the risk of obesity, mental health problems, and poor bone development. These low levels are likely to continue throughout adulthood, leading to long-term health problems (including diabetes, heart disease and some cancers). Developing and implementing programmes that help teenagers to increase and maintain physical activity levels is therefore an important public health priority.

GoActive is an exciting new programme designed to increase physical activity in Year 9 students (aged 13-14). The GoActive programme includes the whole of Year 9, and encourages students to try new physical activities with their friends. We have recruited 16 schools in Essex and Cambridgeshire to take part in GoActive. Eight schools have been randomly selected to run GoActive, and the remaining eight act as comparison schools by continuing with their current curriculum.



Between September 2016 and January 2017, more than 2800 students joined the study. Students had their physical measurements taken (e.g. height and weight), completed



questionnaires, and were asked to wear a wrist-worn activity monitor for 7 days. We will repeat the measurements when the students are in Year 10 (aged 14-15) to see if there are any differences between those in schools that were running GoActive and those in comparison schools.

For more information about the Go Active study please visit www.goactive-uk.com or follow us on Twitter at [@GoActiveCamb](https://twitter.com/GoActiveCamb)



EPIC - Norfolk fifth health check begins

The European Prospective Investigation into Cancer and Nutrition (EPIC) study is one of the largest cohort studies in the world, with more than half a million participants recruited across 10 European countries. It looks at how genetic, behavioural and environmental factors affect health and disease.

The data and samples collected from the 30,000 EPIC-Norfolk participants during the different phases of the study are used for current and future research. The most recent phase of the EPIC-Norfolk study, the fourth health check, was completed at the end of March 2016 with a total of 5,695 people attending our unit at the Norwich Community Hospital. The next phase, the fifth health check, has now begun, and we will be writing to participants with an invitation to take part.

It is important for us to be able to examine the differences between people who become ill and those who remain healthy. Studying everyone, including those people who have fallen ill and are no longer able to attend health examinations, enables us to do this. It will also allow analysis of data and samples as and when particular areas of interest become topical.

Information held and maintained by The Health and Social Care Information Centre (HSCIC) (now known as NHS Digital) and other central UK NHS bodies may be used to help contact you or provide information about your health status in future. This will include mental health data which we need to access in order to study dementia. This is a very important part of medical research and of informing future health policies.

You have the right to request that your data is not used beyond your own care and treatment. If you have told your GP that you do not want your data to be used by third parties but do not wish this decision to affect the updates EPIC receives regarding your health information, then please contact us on one of the numbers provided. This will ensure that you will continue to contribute to the study, even if you are no longer attending the health examinations. With your permission, we can make sure that the information you have given us over the years can still be used.

Mediterranean diet could lower the risk of cardiovascular disease in the UK

Britons eating a Mediterranean-type diet could lower their risk of developing cardiovascular disease including conditions such as heart attack and stroke, according to research from the EPIC-Norfolk Study. The researchers led by PhD student Tammy Tong found that healthy individuals with greater adherence to a Mediterranean-type diet had about an 11% lower relative risk of future cardiovascular disease compared to individuals who had poor adherence. This study is the first of its kind to be carried out in a UK population.

The Mediterranean diet is typically high in fruits, vegetables, whole grains, nuts and olive oil, while low in red meats and moderate in dairy, fish, poultry and wine. The UK National Institute for Health and Care Excellence recommends it for people already diagnosed with cardiovascular disease, to prevent further events such as heart attack and stroke.

The researchers collected data from 23,902 initially healthy EPIC-Norfolk participants, whose diets were measured using food frequency questionnaires. They were then followed up for an average of 12 to 17 years to investigate the association between adherence to the Mediterranean diet and the occurrence of new-onset CVD and deaths during that time.

The Mediterranean diet was defined using a 15 point score based on guideline recommendations from a Mediterranean dietary pyramid published by the Mediterranean Diet Foundation. In the study population of more than 23,000 adults, the lowest score was 3.2 and the highest score was 13.1, with half the population having a score below 8.4, highlighting the big differences in diet quality in this UK population.

“We estimate that one in 25 of all new cardiovascular disease cases or one in eight cardiovascular deaths in our UK based study population could potentially be avoided if this population increased their adherence to the Mediterranean diet.”

- Dr Nita Forouhi, senior author

More at www.mrc-epid.cam.ac.uk/blog/mediterranean-diet-cardiovascular-disease-

Inability to safely store fat increases risk of diabetes and heart disease

A key process in the development of diseases such as heart disease, stroke, and type 2 diabetes is the progressive resistance of the body to the actions of insulin, a hormone that controls the levels of blood sugar. When the body becomes resistant to insulin, levels of blood sugars and lipids rise, increasing the risk of diabetes and heart disease. However, it is not clear in most cases how insulin resistance arises and why some people become resistant, particularly when overweight, while others do not.

An international team led by researchers at the University of Cambridge studied over two million genetic variants in almost 200,000 people, and identified 53 regions of the genome associated with insulin resistance and higher diabetes and heart disease risk; only 10 of which had previously been linked to insulin resistance.

They then carried out a follow-up study with over 12,000 participants in the **Fenland** and **EPIC-Norfolk** studies, each of whom underwent a body scan that shows fat deposits in different regions of the body. They found that having a greater number of

the 53 genetic variants for insulin resistance was associated with having lower amounts of fat under the skin, particularly in the lower half of the body.

A higher number of the 53 genetic risk variants was also linked with familial partial lipodystrophy type 1, a rare but severe form of insulin resistance characterized by loss of fat tissue in the arms and legs. Patients with lipodystrophy are unable to adequately develop fat tissue, and often develop diabetes and heart disease as a result.

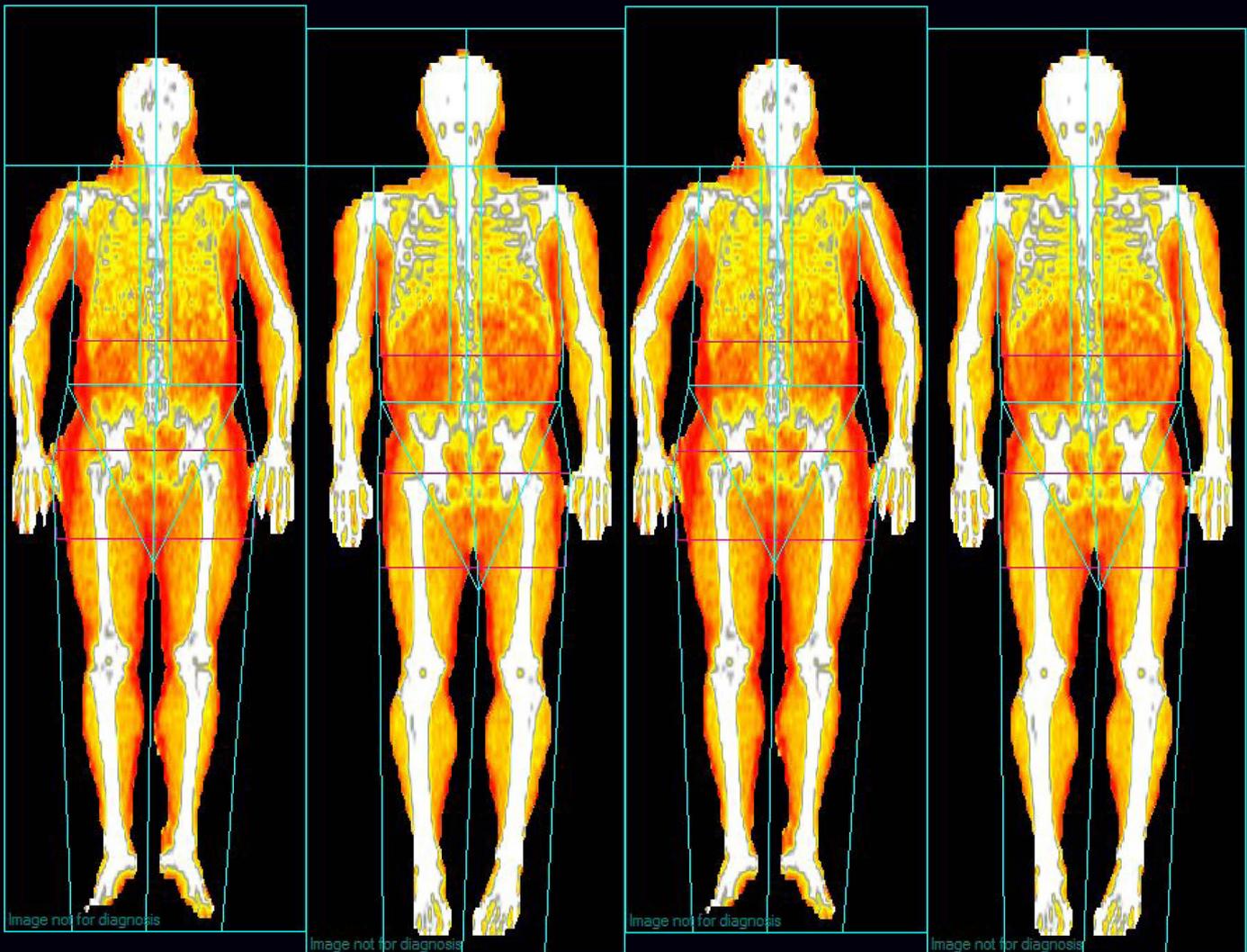
This suggests that among individuals who have similar levels of eating and physical exercise, those who are less able store the surplus energy as fat in the peripheral body are at a higher risk of developing insulin resistance, diabetes and cardiovascular disease than those who are able to do so.

These findings may lead to improvements in the way we prevent and treat insulin resistance and its complications. The researchers are now collaborating with other academic as well as industry partners with the aim of finding drugs that may reduce the risk of diabetes and heart attack by targeting the identified pathways.

More at www.mrc-epid.cam.ac.uk/blog/fat-storage-diabetes-heart-disease-risk/

“People who carry the genetic risk variants that we’ve identified store less fat in peripheral areas, but this does not mean that they are free from risk of disease, because when their energy intake exceeds expenditure, excess fat is more likely to be stored in unhealthy deposits. The key to avoiding the adverse effects is the maintenance of energy balance by limiting energy intake and maximising expenditure through physical activity.”

- Professor Nick Wareham



A varied diet can prevent diabetes – but can you afford it?

A healthy diet is critical for preventing and managing type 2 diabetes. Type 2 diabetes affects around 415 million adults globally; a figure that is expected to rise to 643million by 2040, mostly in low- and middle-income countries. The theory goes that consuming a variety of foods ensures that a person receives all the necessary vitamins, minerals and phytochemicals that are needed for the body to function and stay healthy. But, what do we really mean by a varied diet and what is its relationship with diabetes?

In a study of almost 25,000 adults participating in the EPIC Norfolk study, who provided detailed information about their eating habits, people with a greater diversity of foods in their diet showed a 30% lower relative risk of developing type 2 diabetes over a ten-year period. These results could not be explained by other potential risk factors, such as body weight, occupation, income and education.

While most epidemiological studies don't have information about consumer food costs, in this study the researchers were able to link the dietary data to retail food prices. We found that diets containing all recommended food groups were on average nearly a fifth more costly than diets containing three food groups or fewer. And diets with more variety within each of the food groups were more costly than diets that contained less variety within each food group.

So, while diverse diets may help prevent chronic diseases, health policymakers will need to acknowledge that the adoption of more varied diets, particularly those containing the most variety of vegetables and fruits, may be substantially more costly and may worsen existing socioeconomic inequalities in diet. Ultimately, the government, the private sector and civil society need to bring policy coherence across the food system, including agriculture, business and health. Easy, affordable access to a varied diet will benefit everyone's health now and in the future.

More at www.mrc-epid.cam.ac.uk/blog/varied-diet-can-prevent-diabetes-can-afford/

GLINT feasibility study completed

The Glucose Lowering in Non-diabetic hyperglycaemia Trial (GLINT) is a multi-centre trial.

GLINT aims to study the effect of metformin compared to placebo in people with elevated blood glucose levels (known as non-diabetic hyperglycaemia, or NDH) who are at high risk of developing a cardiovascular disease (CVD) such as stroke or heart attack. Elevated blood glucose levels are associated with increased risk of CVD. Metformin is a drug commonly prescribed to people with type 2 diabetes and it is known to reduce CVD risk in this group. GLINT evaluate whether metformin could prevent development of CVD in people at high CVD risk who do not have diabetes.

In collaboration with the Diabetes Trials Unit in Oxford and the Leicester Diabetes Centre, the MRC Epidemiology Unit led a feasibility study set in Cambridge and Leicester to test the practicalities of various aspects of the trial before performing it on a larger scale. A total of 249 participants were recruited, 122 via the Unit and 127 via our collaborating site in Leicester. We are very grateful to the participants who signed up for the study.

The GLINT feasibility study has now been completed, and the results and conclusions have been submitted to the trial funder, the National Institute for Health Research (NIHR) - Health Technology Assessment programme. The results will not be published until later this year, as the report needs to be reviewed by external doctors and researchers before the data can be made public.

We can let you know now that we plan to continue with the trial, having made a few adjustments to the study design, based on the lessons we learned during the feasibility study. The updated study proposal has been presented to the funder.

The full-scale trial will recruit around 20,000 eligible people from across the UK and follow them up for a minimum of six years. The results of GLINT will inform national primary prevention strategies for type 2 diabetes and CVD, and provide information on whether metformin may have a role in cancer prevention too.

More at www.mrc-epid.cam.ac.uk/research/studies/glint

ADDITION - a decade and counting

The ADDITION study has now been running for well over a decade. Starting in 2001, we invited 33,539 people from GP surgeries in Cambridgeshire, Essex, Hertfordshire and West Suffolk for a finger prick blood test to screen for diabetes. 24,654 people kindly volunteered, and of these 867 people were diagnosed with diabetes.

Half of these 867 participants were in GP practices which delivered standard care for diabetes following national guidelines.

The other half were in practices which had received additional training and educational resources to encourage them to provide more intensive treatment designed to reduce the risk of cardiovascular disease for their patients.

We are making steady progress with the 10 year follow up of participants in order to assess the longer term effects of screening and treatment, with about 50% of questionnaires that were sent out completed and returned, and 90% followed up through Medical Records.

More at www.mrc-epid.cam.ac.uk/research/studies/addition/



University of Cambridge award recognises our impact

In June 2016 Dr Nita Forouhi and Dr Fumiaki Imamura, from the Unit's Nutritional Epidemiology Programme, won the University of Cambridge Vice Chancellor's Award for Impact for their work building evidence, awareness and policy impact in sugar, fat and health.

Their work identifies modifiable risk factors that could help reduce the health burden of poor diet. To ensure that their work has an impact on people's health, they are engaging with national and international policy and guidance bodies, as well as using the media to improve wider understanding. The Unit had a strong presence at the awards, with five nominations overall highlighting work across a range of topics and engagements, locally, nationally and internationally.



Evaluating the impact of new policies

In 2015, Unit and Centre for Diet and Activity Research (CEDAR) researchers presented evidence on the health benefits of fiscal measures to reduce sugar consumption to the House of Commons Health Committee. The Committee's subsequent report *Brave and Bold Action* supported the idea of a tax, and in March 2016 the Chancellor announced a levy on manufacturers of sugar-sweetened beverages.

We responded by leading, with partners from other Universities, plans for a major study to evaluate whether, how, and in whom the levy has an effect on health. This will be the first study to consider the impact on product reformulation, the processes by which the tax came about, as well as wider changes in public, political, societal and industry attitudes.

We are also contributing to an evaluation of Jamie Oliver's 10p restaurant charge on sugar-sweetened beverages; and are collaborating with researchers abroad to evaluate the impact of similar taxes elsewhere, notably in Barbados.

More at: www.mrc-epid.cam.ac.uk/take-part/practice



Join us in Great Snackington!

Food, health, and our neighbourhoods

As part of the MRC Festival of Medical Research, we've teamed up with a local artist to create the town of Great Snackington, where temptation lurks at every turn.

Come along and explore it with us. Can you navigate the maze of shops, food stores, and people of the town to find the healthy meal? And what will you learn about how the places we live, work, and play can influence what we eat.

When: Saturday 17 June 2017, 11:00 - 16:00.

Where: Market Square, Cambridge CB2 3QJ

No need to book, just drop by our stall beside the Guildhall

Contact us

For enquiries about studies or to let us know of a change to your contact details please get in touch using the number or email below:

Telephone: 01223 330315

Email: studyhelp@mrc-epid.cam.ac.uk

For specific studies please use the following contact details on the webpage:

www.mrc-epid.cam.ac.uk/take-part/study-contacts

For general information about our studies please see:

www.mrc-epid.cam.ac.uk/research/studies