MRC | Epidemiology Unit

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The new look for Volunteer Times!

epigram

MRC Epidemiology Unit news – Autumn 2018

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The MRC Epidemiology Unit is studying the genetic, developmental and environmental determinants of obesity, type 2 diabetes and related metabolic disorders, and contributing to the prevention of these disorders.

Read more about all of the stories in epigram at **www.mrc-epid.cam.ac.uk/news**

Welcome

A message from Nick Wareham
MRC Epidemiology Unit Director

Welcome to *epigram*, the new look for *Volunteer Times*. This magazine is for everyone involved and interested in our work, especially our study volunteers. There are many thousands of you who have taken part in our research over the years, and we literally couldn't do our work without you.

With so much that's happened in the MRC Epidemiology Unit in the last year, it's hard to tell all of our stories, but we hope to give you a taste of the great range of research we conduct.

The influences on obesity and diabetes range from our genes all the way out to our towns and cities. In epigram you can read how genetic studies are helping to explain differences in disease between individuals and populations, and how genes can even point the way to potential drug treatments. You can find out about our work with young people to help them stay active, and with adults to keep the weight off. And whether it's taxes, takeaways or our transport infrastructure, this edition has stories about how the world around us influences our chances to be healthy every day.

We are growing as a Unit. When we began fifteen years ago, there were only a handful of us. In 2018, we have almost 160 researchers and research support staff. Our collaborations and initiatives are growing too, such as our recent registration of our Cambridge Epidemiology & Trials Unit, our contribution to the NIHR Cambridge Biomedical Research Centre, our scientific leadership of the National Diet and Nutrition Survey, and our international partnerships as part of the Global Diet and Activity Research Group and Network.

We are already looking forward to 2019, which will include our five-year funding review from our principal funder the Medical Research Council. This is an opportunity for us to take stock of what we have achieved, and what we need to do to continue to help answer the big questions in science and society.

The coming years present considerable challenges for health in the UK and around the world, and we look forward to playing our part in providing the evidence to help tackle them.

A growing Unit

New initiatives and partnerships strengthen our research

The Unit is continually striving to increase and improve its research capacity in order to improve understanding of obesity, type 2 diabetes and related metabolic disorders.

Unit researchers work with colleagues across the Cambridge Biomedical Campus as part of the **National Institute of Health Research (NIHR) Cambridge Biomedical Research Centre (BRC)**, where we are partners in the BRC theme in Diet, Nutrition and Lifestyle.

Since 2014 we have administered the **NIHR BRC-MRC BioRepository**, now managed by Tolulope Osunnuyi. The Biorepository provides research support for studies and trials across the Cambridge Biomedical Campus, and has some of the most advanced automated systems available for processing, storing and retrieving blood and other biological samples.

Our involvement with the BRC's Nutrition, Diet and Lifestyle theme has also broadened the scope of our research. For example, Lynsey Spillman, a clinical Dietitian at Addenbrooke's hospital who works with liver transplant patients, will soon join the BRC theme in Diet, Nutrition and Lifestyle to begin research on the diet-related health issues of liver transplant patients.

You can read a recent article about Lynsey's research in our website's news section.

Visit the Cambridge NIHR BRC website at **https://cambridgebrc.nihr.ac.uk**

Surveying the nation's diet

In January 2018 The National Centre for Social Research (NatCen) and the University of Cambridge were awarded the contract to provide the next four years of the **National Diet and Nutrition Survey (NDNS**) Rolling Programme. The University of Cambridge researchers, who are providing scientific leadership within the partnership, will be based in the BRC theme for Diet, Nutrition and Lifestyle.

The survey, funded by Public Health England and the Food Standards Agency, assesses the diet and nutrient of a random selection of more than 1,000 adults and children aged 18 months and above across the UK, and is used by policy makers, healthcare professionals, charities and academics to identify public health and food safety issues. This new contract builds on the successful delivery of the first 10 years of the survey, undertaken by NatCen and the MRC Elsie Widdowson Laboratory.

Data collected by NatCen's expert interviewers and nurses includes diaries of food intake as well as objective measurements such as blood samples to record nutrient levels. The NIHR BRC Nutritional Biomarker Laboratory is responsible for analysing the blood samples collected for levels of different biomarkers, which are naturally occurring molecules such as insulin or particular fats that can help understand the health of an individual.

Fortune telling molecules at Green Man

This summer scientists from the NIHR BRC Nutritional Biomarker Laboratory, took part in the Green Man festival in Wales , where they had a stall in the Einstein's Garden about biomarker research.

Laboratory head Albert Koulman said:

"Our stall was called the 'Fortune Telling Molecules' and we used a specially developed card game to explain to the public what biomarkers are as well as how biomarkers can relate to your risk of developing a particular disease.

We played this game with about 500 festival goers over the three-day festival and had great discussions about biomarkers and how lifestyle and diet can affect disease risk."

Dr Albert Koulman, head of the NIHR BRC Nutritional Biomarker Laboratory, and colleagues recently joined the Unit. The Laboratory uses state-of-the-art analytical technology to develop new methods to measure nutritional biomarkers, and is moving to new facilities on the Cambridge Biomedical Campus.

Raising the bar in public health research

In August 2017 the Unit's strong record of leading trials to evaluate interventions to improve public health, and in particular to prevent obesity and type 2 diabetes, was recognized when the **Cambridge Epidemiology & Trials Unit (CETU)** received provisional registration status as a UK Clinical Research Collaboration Clinical Trials Unit (UKCRC CTU), joining a network of 46 Clinical Trials Units that have been assessed by an international panel of experts in clinical trials research.

CETU's research strategy focuses on investigator-led randomised controlled trials (RCTs), with expertise in evaluating interventions ranging from individual- and group-level behavioural interventions, through to large scale policy interventions.

The CETU benefits from an established portfolio of research studies and the collective scientific expertise and shared infrastructure of specialist operational teams.

Find out more about CETU at **www.mrc-epid.cam.ac.uk/cetu**

GOING GLOBAL

New partnerships to pursue public health research around the world

Life expectancy is rising for many across the globe. At the same time, low and middle income countries are experiencing increasing urbanisation, a changing diet and reducing physical activity.

This is leading to an increase in non-communicable diseases (NCDs), including diabetes and obesity. Around three quarters of all deaths worldwide from these diseases now occur in low and middle income countries. Because they mostly affect people of working age, they are hampering the ability of countries to thrive socially and economically.

New research partnerships are needed to gather the evidence that will help tackle these diseases, so the MRC Epidemiology Unit is partnering with researchers in Africa and the Caribbean to form the new **Global Diet and Activity Research Group and Network (GDAR).**

Funded through the NIHR Global Health Research initiative, GDAR is working to generate evidence on the different factors that lead to poor diet and physical inactivity and evaluate interventions that could lead to sustainable change and help to reduce poor health.

The priorities for research have been set jointly with our partners, with leadership for different aspects of the research shared across the whole network. By studying changes in specific areas, researchers are looking to find generalisable answers that could be applied across low and middle income settings.

GDAR is systematically reviewing the existing published evidence in this area, and identifying and appraising potential new data sources. Researchers are simultaneously mapping the policy environments and processes across African and Caribbean settings to enable better understanding of how policy decisions which affect NCDs are made.

GDAR
Global Diet and Activity Research

Partners in the GDAR network

- University of Yaoundé 1, Cameroon
- Centre for Global Health Research at the Kenyan Medical Research Institute
- University of the Witwatersrand, South Africa
- University of Cape Town, South Africa
- The Caribbean Institute for Health Research, University of the West Indies

And to capture the perspectives of the individuals affected by these rapid changes, an ethnographic study to understand the lived experiences that shape diet and physical activity is underway in a number of locations across Africa and the Caribbean.

Two projects are studying changes in the environment happening now. The first is an evaluation of a pledge by Coca-Cola in South Africa to stop supplying primary school outlets with sugary drinks. The second is an evaluation of impacts of a new hypermarket in Kisumu, Kenya on dietary behaviours, activity patterns and health.

Finally, researchers are working to develop and test School Environment Assessment Tools for use across the GDAR Network countries.

Find out more at **www.gdarnet.org**

Other global public health studies involving the Unit:

The **Community Food Production & Health (CFaH)** project – working in St Vincent and the Grenadines, and Fiji – is developing theory and methods for evaluating the impact of community food initiatives on NCD risk, social and economic wellbeing and the environment.

Towards an Integrated Global Transport and Health Assessment Tool (TIGTHAT) is laying the scientific foundations of a health impact assessment tool that will be applied to a wide variety of urban settings in low and middle income countries to estimate health impacts of transport choices.

Technology and diabetes risk, Chennai, India is a collaboration with the India Diabetes Research Foundation on a trial of a mobile phone based intervention designed to change people's behaviour and reduce their diabetes risk.

Danger in our genes?

Genetic research examines risk taking...and finds cholesterol clues

Type 2 diabetes has been known for some time to be strong heritable, with genetic factors explaining approximately 50% of its occurrence. However, unlike diseases such as Cystic Fibrosis that are caused by an error in one gene, the influence of genetic differences on type 2 diabetes risk is often subtle and complex.

Diabetes research has been transformed in the last two decades by the advent of ever more affordable DNA sequencing and analysis technology, allowing researchers to pinpoint differences in DNA across the human genome in thousands of people. This has enabled very large studies to be undertaken in several countries. For example, the UK Biobank study combines genetic and health data of half a million people.

Are you a risk taker?

A version of this question was posed to healthy adults from across the UK who enrolled in the UK Biobank study between 2006 and 2010. Roughly one-quarter responded yes.

While most of us are familiar with the feeling of compulsion to take risks, we do not all experience the urge to take risks in the same way – or to the same extent. This is important because, while the term "risk taker" might conjure images of an individual who enjoys free diving or mountain biking, risk taking often manifests itself in day-to-day decisions which can result in poor health over time.

By analysing the genetic and health data provided by UK Biobank participants, researchers from the Unit's Growth and Development programme uncovered 26 gene variants specifically linked to risk taking. Some of these genes are richly expressed in the brain, and specifically in regions of the brain that had been previously linked to personality traits associated with risk taking. Other genes were associated with the immune system, which was more unexpected, though there is increasing evidence that the immune system is involved in mood and behavioural problems, such as depression.

Researchers found that the higher the number of risk-increasing gene variants an individual carries, the more calories, fat and protein they tend to consume daily. So while risk taking behaviour might not seem immediately relevant to the rapid increase in the number of people with obesity and type 2 diabetes, in an environment with easy availability of calorie-rich food and lack of physical exercise it may contribute to it.

However, the link between risk taking and obesity is complex. Some genetic variants involved in increased risk taking were found to be associated with a lower body mass index (BMI), indicating that several different mechanisms are at work. Further investigation of the 26 genetic variants will deepen understanding of the specific facets of risk-taking propensity and behaviour that contribute to, or reduce, obesity risk.

Genetic study hints at a new partner for statins

Research into our genetics not only tells us about our potential risk of taking risks or becoming unwell. It can also help identify potential new treatments and bolster the odds of successful drug development.

Statins are widely prescribed to reduce low-density lipoprotein (LDL) cholesterol, known as "bad cholesterol", and are effective at preventing heart disease – with between 500-1,000 fewer new cases for every 10,000 patients treated. Statins can also increase the risk of developing type 2 diabetes, with 50-100 new cases for every 10,000 patients treated, although this risk is outweighed by the cardiovascular benefits of these drugs.

Some who are treated with statins still go on to have heart attacks, which has been partly attributed to raised levels of triglycerides in their blood. Triglycerides are fats found in meats, nuts, dairy products and vegetable oils, and are also made in the liver from dietary carbohydrates. A protein called lipoprotein lipase (LPL) breaks down triglycerides in the blood, and several new drugs that enhance the activity of LPL are being developed, though they are yet to be tested in large-scale clinical trials.

Scientists from our Aetiology of Diabetes programme studied the genetics of some 400,000 people from UK Biobank, EPIC-InterAct, and EPIC-Norfolk studies. Using an approach called Mendelian Randomisation, which uses naturally occurring genetic differences that mimic the effects of a drug in a clinical trial, they compared the effects of statins and LPL-enhancing agents. For example, some people have a variation in their DNA that naturally increases the effectiveness of LPL, effectively mimicking the effect that would be caused if drugs were used to increase its activity.

Study participants who carried both triglyceride-lowering DNA variants in the LPL gene and cholesterol-lowering genetic variants in several other genes (including the target of statins) had a lower risk of heart disease compared with people with only one set of either of these DNA variants.

Researchers also found that LPL gene variants were associated with a lower risk of type 2 diabetes, suggesting that these new drugs might also improve the control of blood glucose when added to statins, mitigating some of the potential side effects of statins.

Dr Luca Lotta, Senior Clinical Investigator at the MRC Epidemiology Unit, said: "This result suggests that these new triglyceride-lowering agents could give additional benefits to patients when added to statins. This could prevent more heart attacks as well as reducing the risk of people on statins developing type 2 diabetes."

Let me Google that for you

Using Street View to estimate travel patterns

The World Health Organization estimates that physical inactivity is responsible for over three million premature deaths across the world, including over two and a half million in low and middle income countries.

Being active as part of daily journeys could offer a relatively easy way to integrate physical activity into daily life. However, in order to make our cities more conducive to active travel, we need data on the modes of transport currently being used.

Because up-to-date, accurate urban data is not available in many countries, researchers are turning to big data sources to estimate travel patterns in cities. Scientists from our Public Health Modelling programme recently explored for the first time the potential of using Google Street View images for this purpose.

"Google Street View has great potential for understanding how people travel in many countries."

Google Street View enables users to navigate through panoramic imagery of the streets. The researchers assessed 2,000 images recorded from 2010 to 2012 in 1,000 randomly selected locations in 34 British cities. They counted the number of pedestrians, cycles, motorcycles, cars, buses and vans and trucks in each image.

This data was then compared with levels of walking, cycling and other travel modes as reported in the 2011 Census, and in the Active People Survey from 2010 to 2012.

The researchers found a strong correlation between the different data sources for cycling, public transport and motorbike use. There was a moderate level of correlation for walking. They also found promising results from a pilot analysis on the ability to predict the gender distribution of cyclists.

Street View is available in at least 90 countries (and growing) across all continents. This opens up the possibility to estimate levels of cycling, and potentially other transport modes, across thousands of cities worldwide.

Dr James Woodcock principal investigator on the study, said: "If something is not measured then it is often ignored. It is surprising how little we know about how much cycling there is in many cities around the world. Google Street View has great potential for understanding how people travel in many countries."

Alternatives to using the car linked to weight and health benefits

Studies from the Unit this year have continued to demonstrate the health benefits of finding alternatives to the car.

Using data from the Fenland study, researchers examined the relationship between active commuting and body fatness.

They used detailed information about the health and lifestyle of 7,500 people living in Cambridgeshire, including travel, diet, physical activity, and body composition. This included using a type of x-ray called a DEXA scan (Dual Energy X-Ray Absorptiometry), which gives information about percentage of body fat, and how it is distributed in the body.

Amongst those living less than five miles from work, researchers found that those who cycled to work had lower body fatness compared to those who drove to work.

Amongst those living more than five miles from work, they found that, compared to those who drove all the way to work, those who incorporated some walking or cycling into their journey had lower body fatness.

They also found that people who walked or cycled for other types of journeys (such as shopping or errands) had lower body fatness compared to those who drove.

Another study this year found that people who are more active when commuting to work by walking or cycling could be cutting their risk of disease and death.

Researchers from the MRC Epidemiology Unit, London School of Hygiene and Tropical Medicine, and Imperial College London used data on over 350,000 participants, aged 37 to 73, from the UK Biobank, a national study designed to track the health of adults living mainly in cities in the UK.

Researchers compared people who only used the car for travel with those who undertook some walking, either alone or in combination with the car or public transport.

Among people who commuted, more active patterns of commuting compared with exclusive car use were associated with an 11% lower relative risk of developing heart disease or stroke and a 30% lower relative risk of death from heart disease or stroke.

The association was even stronger when researchers looked across all forms of travel, both commuting and everyday travel.

Researchers took a number of steps to rule out other factors that might explain the findings, such as what people eat or underlying illness.

For example, people who already have poor health might have to use the car more because they find it hard to get around. Researchers used statistical methods to adjust for this, and, in some cases, removed these people from the analysis.

WHAT PRICE A HEALTHY DIET?

For decades, the UK government has provided evidence based recommendations and guidelines for healthy eating, but British diets still fall short of these recommendations. Might the cost of food be partly responsible?

A study this year from the MRC Epidemiology Unit and Centre for Diet and Activity Research (CEDAR) tested whether diets achieving recommendations from the UK's Scientific Advisory Committee on Nutrition (SACN) was associated with higher food costs. The study linked four-day diet diaries in the National Diet and Nutrition Survey Rolling Programme (2008-2012) to a commercial food price database from a market research firm.

The likely cost that the consumer would have to pay for their diet was assessed in relation to whether or not the diets met eight food and nutrient based recommendations from SACN: fruit and vegetables, oily fish, red and processed meat, fibre, fat, saturated fat, sugars and salt. Researchers found that diets meeting the recommendations for fruit and vegetables, oily fish, sugars, fat, saturated fat and salt were estimated to be between 3% and 17% more expensive. Diets meeting the recommendation for red and processed meats were 4% less expensive, whilst meeting the recommendation for fibre was cost-neutral.

Meeting multiple recommendations was also associated with higher costs: on average, diets meeting six or more SACN recommendations were estimated to be 29% more costly than diets that met none of these recommendations.

This evidence means that the extra cost of meeting dietary recommendations may pose a barrier to the adoption of healthy diets.

A taxing question

But could higher prices also help steer people towards healthier choices?

In the UK, sugar sweetened beverages (SSBs) are thought to account for up to half of the excess calories consumed per day by children. Adults consume an average of 50 calories per day from SSBs. Cutting consumption of SSBs is therefore seen as important part of efforts to improve public health.

In April 2018, the Soft Drinks Industry Levy – commonly referred to as the 'Sugar Tax' – came into effect. The UK tax is unique in the world, imposing a levy on importers and manufacturers, according to the sugar content of soft drinks. This is intended to encourage companies to remove added sugar. If sugar is not reduced and price-rises are passed onto the consumer, this could also potentially affect purchasing decisions.

However, there is still limited evidence on the effectiveness of such measures on either the

sale or consumption of sugary drinks, and researchers also need to evaluate the wider effects of the initiative on health, society and on the economy.

"The tax could have all sorts of effects, not just on health. We need to consider it as an event in a complex system."

The NIHR Public Health Research Programme has funded a team, led by the Unit's Professor Martin White to study the impacts of the tax and track how these change over time. The £1.5million study runs for four years and the team includes researchers from the London School of Hygiene & Tropical Medicine and the University of Oxford.

Professor White said: "We have talked to people working in government, public health, the food industry and health advocacy groups. They think the tax will have all sorts of effects, and not just on health. We are therefore considering the tax as an event in a complex system. Studying a wide range of effects of the tax will help us be more certain about its true impacts."

Clues from Jamie's Italian

Professor White was also involved in an evaluation of sugar 'levy' introduced by Jamie's Italian restaurants.

From September 2015, Jamie's Italian restaurants added 10 pence per drink to the price of non-alcoholic sugary drinks, and introduced other activities such as re-designing menus, offering new lower-sugar drinks and creating publicity about the changes.

After adjusting for general trends in sales, the study found that these measures were associated with an 11% decline in sales of SSBs per customer 12 weeks after the levy was introduced. A decline in sales of 9.3% per customer was still observed six months after the levy was introduced. Reductions were greatest in restaurants with higher sugery drinks sales per customer.

Further research with a longer follow-up is needed to assess whether this change will be sustained, and the study only looked at one restaurant chain. Nevertheless, the results do suggest that a small levy on sugary drinks sold in restaurants, coupled with other activities, may have the potential to change consumer behaviour.

The study was led by the London School of Hygiene & Tropical Medicine with the University of Cambridge, and funded by the National Institute for Health Research.

Can we afford to prevent diabetes? Can we afford not to?

The Unit's Prevention of Diabetes programme is a multidisciplinary team of epidemiologists, clinicians, psychologists, and data scientists that are developing and evaluating strategies to reduce the growth in obesity and type 2 diabetes, and the medical complications that result from them.

An important part of their work is evaluating interventions that encourage or support healthy behaviours – such as exercising more and eating more healthily – in people who have either been recently diagnosed with type 2 diabetes or are at risk of developing it. With more than three million people in the UK diagnosed with type 2 diabetes, interventions also need to be good value for money. So, as well as assessing the clinical effectiveness of interventions, researchers also evaluate their cost effectiveness.

Delaying Diabetes

Research suggests that type 2 diabetes can be prevented or delayed through changes in lifestyle, and two studies led by the Prevention programme are evaluating strategies to support these lifestyle changes.

In 2013 the **PROPELS** study team invited 1,368 people identified as having a higher risk of developing type 2 diabetes to take part an evaluation of different levels of support for lifestyle change.

The participants across sites in Leicestershire and Cambridgeshire were randomly allocated to one of three groups. The first group received an information leaflet and attended clinical visits at 12 months and at the end of the study, the second group also attended an annual group education sessions for four years until the end of the study, while the third group received the same treatment as the second, plus follow-up telephone calls from a diabetes educator every six months and ongoing support in the form of a text messaging service.

In February this year the PROPELS study team started the final four-year clinic follow up, which is due to finish in January 2019, and the outcome will be reported as soon as possible after that.

Watching weight

12-week referrals to commercially available open-group behavioural weight management programmes such as Weight Watchers or Slimming World are often used by the NHS, in part because they can be used on a large scale. However, there is debate about whether a 12 week programme is enough to have a long term impact, or whether a longer referral would be more cost effective in the long run.

The **WRAP trial** evaluated whether 52 week referral is more effective for weight loss and better value for money for the NHS over two years. The trial recruited 1,267 people who were overweight or obese from 23 GP practices. The researchers compared a brief intervention (self-help booklet), a three month Weight Watchers programme, and a 12 month Weight Watchers programme.

Both Weight Watchers programmes helped people to lose more weight than the brief

intervention, and the 12 month programme was most effective for weight loss over two years of follow up. Subsequent modelling of the results indicated that both three and 12 month programmes could reduce frequency of disease and health care costs over 25 years.

"For the first time we've shown that extending a 12-week weight loss programme to a full year leads to greater weight loss over a longer period, and a lower risk of diabetes."

Dr Amy Ahern, Principal Investigator of the WRAP trial said: "We've seen before that a 12-week programme can help people lose weight, but for the first time we've shown that extending this to a full year leads to greater weight loss over a longer period and a lower risk of diabetes."

Although the initial costs of the year-long programme are greater, it's very likely that it will be good value for money over the long term because of the reduction in weight-related illnesses. The results from the one-year programme are comparable to what has been seen in previous trials that used much more costly interventions, usually involving multiple contacts with health professionals."

To give a better estimate of the longer term impact of these programmes on weight and weight-related illnesses, the WRAP team are now inviting the original participants to take part in **WRAP Up**, the 5-year and 10-year follow up of the WRAP trial, and 99 have already done so.

Participants will visit their local GP practice where changes in body weight, diabetes, and health care use will be recorded. Some WRAP participants will also be interviewed about their experience of taking part in the trial and to discuss what helps and hinders weight loss maintenance.

Preventing complications

Achieving good glucose control is important in those who have been diagnosed with type 2 diabetes, and weight management is often a key part of that. The **GLoW (Glucose Lowering through Weight management) trial** will evaluate whether a tailored behavioural weight management programme that combines diabetes education and dietitian support with 6 months of attendance at a weekly Weight Watchers group session achieves better glucose control than education alone. It will also examine whether any improvements in health and wellbeing justify the higher cost of the programme.

The GLoW team plan to recruit 576 people from GP practices across the East of England with overweight and obesity who have been diagnosed with type 2 diabetes within the last three years, who will then be randomly allocated to either standard care or the new tailored programme.

Over the next year clinical outcomes (such as blood glucose and body weight), diet and physical activity behaviours, and use of medications and other health care resources will be recorded. The findings from this trial will help inform the decisions of commissioners of NHS services for weight management and diabetes about the most cost-effective use of limited health-care resources.

The NHS Health Check programme

Modelling the benefits and potential improvements to the scheme

The NHS Health Check programme was introduced in 2009 in England to systematically assess all adults in mid-life for cardiovascular disease risk factors. New research led by scientists at the MRC Epidemiology Unit found that it prevents around 300 premature deaths in England each year.

The researchers developed a model to simulate the population of England aged 40 years and over using data from the Health Survey for England and the English Longitudinal Study of Aging. They used recent performance data from the Health Check programme, published data on the uptake and effectiveness of the treatments offered, to estimate the benefits of the current programme compared to a healthcare system without Health Checks.

The researchers estimate that for every million people aged 40-45 years, the NHS Health Check programme could prevent 390 (95% CI 290-500) premature deaths before age 80 and result in an additional 1370 (95% CI 1100-1690) people being free of ischemic heart disease, stroke, dementia and lung cancer at age 80.

These numbers correspond to 300 fewer premature deaths and 1,000 more people living free of these diseases in England each year, and the benefits were greatest for people living in the most deprived areas of England, suggesting the programme is reducing health inequalities.

Their analysis also suggests that there is significant scope to increase the benefits by making feasible changes to the programme. A 'maximum potential' strategy that combines extending eligibility to those with pre-existing hypertension, extending the upper age of eligibility to 79 years, increasing uptake of health checks by 30%, and increasing treatment rates amongst eligible patients 2.5-fold could result in a 3-fold increase in benefits compared to the current programme.

Dr James Woodcock, a senior author on the paper said:

"We know in many parts of the country there has been a major effort to ensure people living in more deprived areas who are at higher risk of heart disease are offered and attend a health check, our work suggests this strategy has been successful and the programme is contributing to reducing inequalities in health "

New developments in Fenland phase 2

As participants near six thousand we find new ways to enrich the data

Phase 2 of the Fenland Study began in September 2014 when we started inviting the original 12,435 participants to return for a second visit. Four years later and 5,936 volunteers have been tested again, and we will continue to send out invitations to the remainder.

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

The information we are collecting in Phase 2 will be used to study the relationship between changes in objectively measured physical activity and diet, and the proportion and location of fat, bone, and muscle in the body, and subsequent risk of developing type 2 diabetes and other relevant health conditions. It will also help us to understand what causes changes in all these.

This year, we are excited to be piloting a new web interface called the Annotation Tool. This secure online tool will display a participants' activity trace from the monitors that they wear after their visit and allow participants to explore and "annotate" their own data. From this tool we hope to gain valuable additional information about the type of activity and context.

We would like to thank the thousands of participants who have participated in both phases of the Fenland Study so far and greatly appreciate their continued support in our study.

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

EPIC-Norfolk study celebrates 25th anniversary

The EPIC- Norfolk Research team celebrated the 25th anniversary of the study on Friday 14th September 2018, with a symposium at Churchill College, Cambridge.

Attendees at the symposium included study participants, past and present EPIC-Norfolk researchers and study support staff, scientific collaborators from across Europe, representatives from research funding agencies, NHS managers, and students – all having some involvement with EPIC-Norfolk over the past 25 years.

The European Prospective Investigation into Cancer and Nutrition (EPIC) was established in 1993 and is one of the largest cohort studies worldwide with more than half a million participants from ten European countries. It is coordinated by Professor Elio Riboli, who is now Chair in Cancer Epidemiology and Prevention at Imperial College.

The EPIC-Norfolk study is one of the British collaborating centres that was established in 1993 by Professors Nicholas Day, Kay-Tee Khaw and Sheila Bingham. In 2000 Professor Nick Wareham of the MRC Epidemiology Unit joined as Principal Investigator (PI) and will continue as PI for EPIC-Norfolk when Professor Khaw retires in December 2018.

There are over 30,000 participants in EPIC-Norfolk, who were aged between 40 and 79

Dairy fat and Diabetes

Dairy products are an important source of high quality protein, vitamins and minerals. However, they are also a source of saturated fat, which dietary guidelines currently advise people not to consume in high quantities, instead recommending they replace these with lower fat options.

In 2014 Dr Laura O'Connor and colleagues published a paper in the scientific journal *Diabetologia* examining the relationship between consumption of dairy products , as measured in the EPIC -Norfolk study using a 7-day food diary, and diagnosis with type 2 diabetes in the subsequent 11 years. Their analysis indicated that once important factors like healthier lifestyles, obesity levels, and total calorie intake were taken into account, high-fat dairy or low-fat dairy was not associated with new-onset diabetes. Furthermore, consumption of low-fat fermented dairy products (such as Greek yoghurt, and low-fat cottage cheese) was associated with a lower risk of developing type 2 diabetes.

Subsequent research in other populations has supported these results suggests that saturated fat in dairy may not be as bad for us as we once thought, though there isn't enough evidence, just yet, to change dietary guidelines in the UK.

when they joined the study and who all then lived in Norwich and the surrounding towns and rural areas. They have been contributing information about their diet, lifestyle and health through questionnaires and at upt to five health checks for over two decades,in some cases despite having moved outside Norfolk in the intervening years.

At the latest count, data from the EPIC-Norfolk study has been used in more than 1,630 scientific publications, providing information on the impact of a wide randge range of factors such as genetic variationsm, diet and nutrition, and physical activity, on health outcomes such as obeity, diabetes, cancer, cardio-vascular disease, visual health, cognition, functional health and hospitalisation. This work has resulted in many important insights that have improved our understading of the causes of disease and ill health, several of which have been reported in national and international news, or have contributed to changes in practice and policy in the UK and other countries.

The aim of the symposium was to acknowledge the essential contributions from the many partners without whom EPIC-Norfolk would not have been possible. These included research staff, collaborators, funding agencies who provided support for research as well as the general practices and health agencies in Norfolk who provided the infrastructure for recruitment and longer term follow-up of the participants.

We were extremely privileged to have Professor Elio Riboli as a guest speaker. Professor Riboli gave an overview of the history of EPIC, the rationale behind the wider European study and how it was set up. He was followed by Professor

Kay-Tee Khaw, who gave an overview of the project reflecting on its successes, achievements and contribution to science over the past 25 years.

The symposium programme explored many aspects of the research study, and included specialist talks by the current study team and researchers as well as from selected collaborators.

Professor Nick Wareham concluded the meeting by giving his vision on building further on what has been achieved and the future direction of the study.

The EPIC-Norfolk research team would like to thank all our participants for their generosity and for giving up their time and effort for this study. Our participants have made a huge contribution towards a better understanding of the factors that play a protective role or add to risk of many diseases of later life.

Find out more at **www.srl.cam.ac.uk/epic/**

GoActive, get FRESH!

Studies at school and home to help young people stay active

Despite the benefits of physical activity for health, recent figures suggest that seven out of ten boys and eight out of ten girls do not meet the physical activity recommendation of 60 minutes of physical activity each day.

Activity levels also reduce from childhood into adolescence, and these low levels are likely to continue into adulthood. All this increases the risk for young people of obesity, mental health problems, and poor bone development. And as we get older it increases the risk of long-term health problems including diabetes, heart disease and some cancers.

The good news is that, by getting our kids more active, we can help them grow, learn, and have fun. We're amassing clues about what motivates young people to be more active, and based on the latest evidence, the MRC Epidemiology Unit is testing different interventions to see if they can make kids – and their families – more active.

Play time – GoActive completes data collection

GoActive is a new programme designed to increase physical activity in Year 9 students (aged 13-14), by encouraging students to try new physical activities with their friends. To find out whether GoActive helps increase physical activity of year 9 students when in school, researchers recruited 16 schools in Essex and Cambridgeshire to take part in GoActive.

Eight schools were randomly selected to run GoActive, and the remaining eight acted as comparison schools by continuing with their current curriculum.

Between September 2016 and January 2017, more than 2,800 students joined the study. Students had their physical measurements taken, completed questionnaires, and were

asked to wear a wrist-worn activity monitor for 7 days. The measurements were repeated at 6 weeks, 14-16 weeks and 10 months to see if there were any differences between those in schools that were running GoActive and those in comparison schools.

All 16 secondary schools and 76% of students took part in the 10 month measurement visit, which is a very high retention rate for school-based research. Thank you to all the staff and students for their support and enthusiasm for GoActive! Our researchers are now preparing the data collected for analysis.

www.goactive-uk.com

Twitter: @GoActiveCamb

FRESH

Families Reporting Every Step to Health

Get FRESH – families active together

Away from school, another programme – FRESH – is testing how best to encourage families to be more physically active together, which could have benefits for parents, their children, and the family as a whole.

The unique element of FRESH is that the whole family is included inboth the intervention and evaluation.

The FRESH intervention consists of a selection of challenges that can be downloaded from the FRESH website. These challenges can be tailored to a family's activity level, so each family can choose to be as active as they like.

The Pilot study, funded by the National Institute for Health Research, works with families living in Norfolk and Suffolk. It's focussed on optimising the FRESH programme to make sure it's attractive for families, by testing the programme and trialling recruitment and measurement procedures.

The measurment procedures include measures of fitness, height, weight and blood pressure, along with completion of questionnaires and a 'family holiday' activity. Finally, all family members wear an accelerometer and a GPS monitor to allow us to investigate how much activity they engage in as a family.

The results of this project will be available next year and will inform a decision to conduct a larger scale evaluation of the programme.

Impact on the agenda

We want our evidence to be used improve health, whether it's through influencing policy, changing practice, or by supporting public awareness and understanding. So, as well as spending time on our science, we engage in a range of activities aimed at making an impact. Here are just a few examples from the last year.

TAG, you're it

Our research has been influencing official transport guidance. The UK Department for Transport has published proposed changes for their Transport Appraisal Guidance (TAG) for active travel, based on Unit and CEDAR research which brings together the latest understanding of the various benefits of cycling and walking.

The new guidance specifies the appraisal process for projects that support walking and cycling in England. The previous guidance, introduced in 2014, was based on the former World Health Organization Health Economic Assessment Tool (HEAT) methods and only looked at the health benefits for the working age population.

The new calculations use the latest statistical relationships between health benefits and walking & cycling, and also take into account age and gender differences in background mortality, distance travelled, and speed.

This allows users of the guidance to calculate scenarios that, for example, are aimed specifically at older adults.

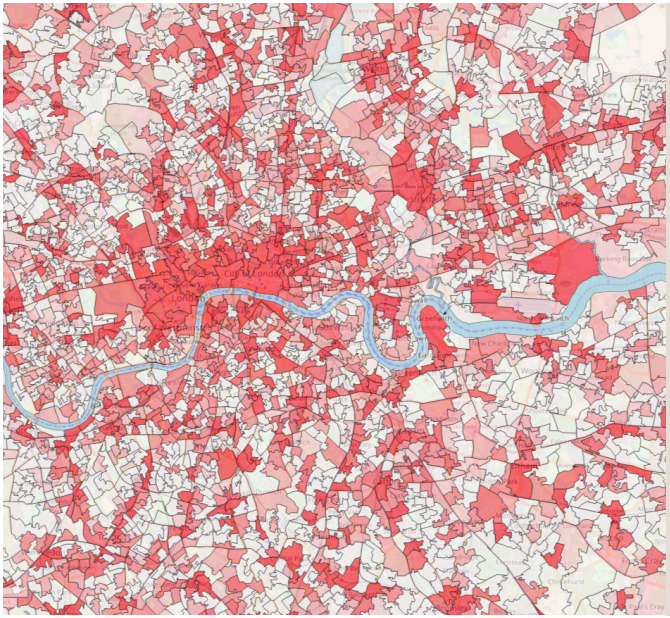
Expert evidence

In spring 2018, the House of Commons Health and Social Care Committee conducted its latest inquiry into childhood obesity. The Unit and CEDAR submitted written evidence, including on the effects of unhealthy food at checkouts, the takeaway food environment, and physical activity initiatives in schools.

Dietary Public Healh researchers Dr Jean Adams and Dr Thomas Burgoine were invited to give oral evidence as expert witnesses. The final report – *Childhood obesity: Time for Action* – cited our research and reflected a number of our perspectives, in particular on the health effects of fast food takeaways.

The Government subsequently published chapter 2 of its *Childhood Obesity Plan*. New measures announced include proposals to prevent shops from displaying unhealthy food at checkouts; consulting on the introduction of new TV and online advertising restrictions; consulting on calorie labelling in restaurants, cafes and takeaways; and promoting a new ambition for every primary school to adopt a daily 'active mile' initiative.

Find out more about our work with policy via **www.mrc-epid.cam.ac.uk/take-part/policy**



Find our Feat

The **Food Environment assessment tool (Feat)** is a new resource underpinned by the latest scientific evidence about how food access in our neighbourhoods affects our dietary choices, body weight and health.

Feat was developed using data from Ordnance Survey, and is designed around the needs of professionals in public health, environmental health and planning roles, locally and nationally.

It allows for detailed exploration of the geography of food retail access across England, allowing you to map, measure and monitor access to food outlets at a neighbourhood level, including changes over time.

Access Feat at **www.feat-tool.org.uk**

Making headlines

Unit scientists have continued to engage with the media, appearing in local, national and international news outlets on topics as diverse as active travel, fast food takeaways, screening for atrial fibrillation, and the genetics of social isolation and risk taking.

Find out more about our work with the media, together with a selection of our headlines, at **www.mrc-epid.cam.ac.uk/news/unit-media-coverage**

Researcher voices

You can read our researchers in their own words (and pictures). Scientists from across the Unit's programmes have been blogging, entering science writing awards, and even making short films. Topics have included childhood obesity in South Africa, changing the way we travel to improve our health, whether we've #AdEnough of junk food, and how we measure energy expenditure across a typical Tuesday.

Find all of these blogs and more at **www.mrc-epid.cam.ac.uk/news/researcher-voices**

Welcome to the Snackingtons!

In the twin villages of Great and Little Snackington, much like communities everywhere, food is an important part of everyday life.

But does where we live, work and play shape what we eat? Navigate the maze of shops, food stores, and people and learn about how our food choices are shaped by where we live, work and play, and how the world is our laboratory!

Explore more at **www.mrc-epid.cam.ac.uk/snackington**

UNIVERSITY OF CAMBRIDGE

CAMBRIDGE FESTIVAL OF IDEAS

Improving our diets: more freedom or more control?

6pm, Tuesday 23 October 2018, McCrum Theatre, Corpus Christi College

Governments try to improve our diets by labelling, taxes and influencing what shops are on the high street. The right approach is not just a matter of what works, but involves questions about government and personal rights and responsibilities.

Join public health and policy experts for a lively discussion to explore the role of evidence and ethics in helping us decide how and when to intervene.

Find out more at **www.mrc-epid.cam.ac.uk/event/freedom-or-control**

Contact us

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

Telephone: **01223 330315** Email: **studyhelp@mrc-epid.cam.ac.uk**

For specific studies, please use the details at **www.mrc-epid.cam.ac.uk/take-part/study-contacts**

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