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Here in the UK we are sitting on a research goldmine: electronic health data. But to release the full potential of data from major studies and from NHS health records, they must be linked up and shared by scientists. From this we can gain powerful new insights into health and disease and ultimately save more lives.

The MRC invests £10.5m each year in cohort studies. E-health record linkage would extend the life of these cohorts, enable new science to be done and, importantly, ensure a better return on our investment.

By looking at data from e-health records of large numbers of people we can study a disease and its causes at the level of whole populations. We can assess the safety of drugs by identifying long term side-effects in ‘real life’ patient populations. And we can identify key risks to public health on a much larger scale.

In partnership with the nine biggest government and charity research funders in the UK, the MRC is coordinating a major initiative to help link up research centres’ e-health data to unlock its enormous research value. This complements the government’s £90m investment in stratified medicine, a field of research for which linkage and sharing of such data will be critical.

In this issue of Network you can read about some of the many ways the MRC is supporting and promoting the use of e-health data, from new guidance on the MRC data sharing policy to a discussion of the challenges to achieving safe and effective data sharing. These are key steps to ensuring that our research investments continue to be at the forefront of cutting-edge science.

Sir John Savill
The first drug in 15 years to offer an improvement in survival rates for ovarian cancer has been approved for use in Europe, following promising findings from a major MRC-sponsored trial.

Interim results from the large-scale ICON 7 trial showed that adding the drug bevacizumab to chemotherapy for ovarian cancer can slow down the disease and may improve overall survival in women at high risk of recurrence. The drug is now available to patients after approval by the European Medicines Agency in January.

Over 1,500 women participated in the study, which found that bevacizumab delayed progression of the disease by an average of two months compared with standard chemotherapy and by almost six months in women with the most aggressive cancers. However, whether the drug extends the overall life expectancy of ovarian cancer patients won’t be known until the final results are reported in 2013.

Professor Max Parmar, director of the MRC Clinical Trials Unit and co-author of the study, is tentatively optimistic about the results: “This suggests that bevacizumab could be considered as a treatment for women with an advanced form of the disease, or whose cancer has come back after chemotherapy treatment. However, the decision on whether to include the drug routinely should be delayed until we have further evidence on its impact on overall survival.”

Bevacizumab, made by pharmaceutical company Roche, works by blocking the development of new blood vessels and interfering with the tumour’s ability to grow and spread to other parts of the body. It belongs to the class of drugs called therapeutic antibodies, which partly owe their development to pioneering work done by MRC scientist Sir Greg Winter in the 1970s to ‘humanise’ monoclonal antibodies, making them more suitable for medical use.

UK Biobank, a database of medical and lifestyle information from half a million middle-aged British people, will open its doors to medical researchers worldwide this spring. Its aim is to unpick the factors involved in health and disease by monitoring the volunteers over the coming years.

Volunteers, aged 40 to 69, have submitted blood and urine samples, had their hearing and vision tested and answered detailed questionnaires on their lifestyles for the resource. Recruitment took just under five years. Information on deaths, cancers and hospital admissions will be added in 2012, followed by data from primary care in 2013.

The project’s principal investigator Professor Rory Collins says: “Scientists should consider UK Biobank as their resource. The intention is that UK Biobank is used as widely as possible to tackle a range of illnesses that cause pain, disability and death.”

UK Biobank was established by the MRC, the Wellcome Trust, the English, Scottish and Welsh governments and the Northwest Regional Development Agency. Any scientist can apply to use the data provided that their work is in the public interest. UK Biobank recently published details of its access procedures for scientists online; for more information visit www.ukbiobank.ac.uk
A landmark collaboration has given MRC scientists access to 22 of AstraZeneca’s compounds to advance understanding of a broad range of diseases.

Drug development is a long, complex and expensive process. The first step is the development of chemical compounds which have the potential to treat or prevent a specific disease, but many are put on hold after undergoing early trials for a variety of reasons. Some of these compounds are invaluable for medical research.

As part of the collaboration, the MRC has invited research proposals from across the UK academic community to use the compounds in new areas. The MRC is presently selecting the best scientific proposals, and will award up to £10 million in total to fund research across a broad range of diseases.

Commenting on the agreement, Science Minister David Willetts said: “This landmark agreement is a real boost for British science. It will give our world-leading research base new insights into disease and encourage the development of groundbreaking new treatments. This will keep the UK at the very forefront of biomedical research and drive growth and innovation in our life sciences industry.”

The deal is just one part of an exciting package of new MRC translational research initiatives announced by the Department for Business, Innovation and Skills in December, as part of the government’s Strategy for UK Life Sciences. Among the initiatives are:

- A new **£25m national programme in regenerative medicine**, co-supported by the MRC, EPSRC and BBSRC, complementing a £50m investment by the Technology Strategy Board in a Cell Therapy ‘Catapult’ centre in London, which will open in April.

- **£60m MRC investment in stratified medicine research** over four years, with the ultimate aim of understanding why groups of patients with the same diagnosis differ in response to treatment.

- **A £180m MRC/Technology Strategy Board Biomedical Catalyst Fund** – aligning the MRC’s translational funding with £90m new funding from the Technology Strategy Board to support the most promising healthcare and medicine innovations and link early stage research in universities with industry.

Read more at [www.mrc.ac.uk/Newspublications/News/MRC008394](http://www.mrc.ac.uk/Newspublications/News/MRC008394)
European neurodegeneration strategy launched

A Europe-wide research strategy has been launched to tackle the challenge of age-related neurodegenerative diseases such as Alzheimer’s and Parkinson’s diseases.

Led by the MRC in collaboration with European partners, the EU Joint Programme in Neurodegenerative Disease Research (JPND) is the first of several joint initiatives designed to address the ‘grand challenges’ facing European society which are considered to be beyond the scope and resources of any one country.

Amongst the neurodegenerative diseases linked with age, dementias are responsible for the greatest burden of disease, with Alzheimer’s disease and related disorders affecting over seven million people in Europe. This figure is expected to double every 20 years as the population ages. It costs around €130 billion each year to care for people with dementia across Europe.

Rob Buckle, MRC Head of Neurosciences and Mental Health, said: “We are committed to increasing investment in UK neurodegeneration research. Working in partnership with European and other international partners will complement our position and increase the overall impact of funding in this area.”

The strategy sets out the common vision of the 25 European countries involved, spanning biomedical, health and socio-economic research, and follows consultations with key opinion leaders and stakeholder communities. The research priorities will be addressed within the next ten years through a range of long-term initiatives, the first of which is expected to begin in 2012.

Gambia unit unveils new science strategy

Researchers, policy-makers, government representatives and funding partners from around the globe gathered at the MRC unit in The Gambia in January for a symposium on the unit’s new scientific strategy.

Delegates enjoyed presentations on the overlapping themes of vaccinology, disease elimination and control and child survival, followed by a tour of the unit’s well-equipped labs and clinical services infrastructure.

Unit director Professor Tumani Corrah commented: “Our new strategy will enable us to save lives and improve health across the developing world. We have a 65-year history of translating our research findings into health benefits and that is not about to change.”

Sir John Savill added: “I’m buoyed up by the fantastic strategy for the unit and I can see immense added value from the synergy of the three themes, and from the additional funding the scientists here bring to the unit. This is a tremendous achievement.”

www.mrc.gm
Success for football fitness project

An MRC-supported initiative to help overweight football fans slim down and get fit has won a Society Award from Scottish newspaper The Herald.

The Football Fans in Training (FFIT) project aims to improve physical activity and diet among overweight middle-aged men in Scotland.

It runs 12-week coaching sessions at Scottish Premier League clubs with ongoing email reminders and a catch-up session after nine months. Results from the first two courses are impressive: 412 men have collectively shed 2.3 tonnes and 2,361 cm from their waistlines.

The project is co-led by Professor Kate Hunt at Glasgow’s MRC/CSO Social and Public Health Sciences Unit. She’s been delighted with the response from men, who are notoriously difficult to engage in healthy living activities:

“Almost all of the men who have taken part have been really enthusiastic about this programme. Results from our feasibility trial suggest that this enthusiasm may be effective not only in reducing weight, but also in improving mental health and self-esteem. In turn this reduces blood pressure and inspires men to take on healthier lifestyles.”

www.spl-ffit.co.uk

Farewell to primary care research unit

The MRC General Practice Research Framework (GPRF) will close at the end of March as a result of changes to primary care research funding in the UK.

Set up 1973, the GPRF started out as a collaboration of general practices working on an MRC trial in hypertension, and was later expanded into a national resource for primary care epidemiology research. It has led over 100 studies, making important findings in cardiovascular, musculoskeletal and infectious diseases and mental illness.

When the NIHR was established in 2006 it took on the remit of primary care research, while the MRC focused on methodological and aetiological studies. The supporting infrastructure for UK primary care research is now provided by primary care networks in the four UK nations.

GPRF director Professor Irwin Nazareth said the GPRF had helped to lay the foundations for the creation and development of the NIHR and other primary care research networks across the UK, and would leave a lasting legacy: “Over the years much of the research undertaken by the unit led to major advances in medicine and healthcare and this was only made possible by a core team of dedicated staff, some of whom had worked with the unit since its inception.”

The MRC will continue to support high-quality research taking place in primary care settings across the UK, complementing NIHR and devolved administration funding.
Sharing the fruits of research

A new data sharing policy focused on population and patient-based studies has been published by the MRC, a step towards harnessing the potential of electronic health data for research. The policy aims to maximise the research opportunities offered by MRC-funded study data, by properly preserving it for use by scientists in the future.

To tie in with the launch of the new policy, the opinion piece in this edition of Network is written by Professor Jean Golding, a seasoned population health researcher, who set up the Children of the 90s longitudinal study (see page 22).

Read the data sharing policy at: www.mrc.ac.uk/OurResearch/EthicsResearchGuidance/Datasharing/Policy

40 years of tropical epidemiology

The MRC-funded Tropical Epidemiology Group at the London School of Hygiene and Tropical celebrates its 40th Anniversary with a conference in London on 29-30 March.

The Group was established to improve the health of people in developing countries by identifying effective interventions. Today it hosts 25 researchers with expertise in epidemiology, statistics and public health in developing countries with a focus on HIV, tuberculosis and malaria.

For details and bookings visit www.lshtm.ac.uk/eph/ide/research/teg

Former UNAIDS chief to steer MRC global health strategy

Former UNAIDS director Professor Baron Peter Piot has been appointed as chair of the MRC Global Health Group, which informs the MRC’s global health strategy.

Professor Piot is a distinguished microbiologist who co-discovered the Ebola virus in Zaire in 1976. He is director of the London School of Hygiene and Tropical Medicine and was the founding executive director of UNAIDS, the joint United Nations programme on HIV/AIDS.

Living colour

Biomedical science fans can now get a daily fix of beautiful and curious scientific images from a new website launched by the MRC Clinical Sciences Centre in London.

Biomedical Picture of the Day is a not-for-profit educational resource which aims to engage everyone in the wonders of biomedicine. Images are provided free of charge by scientists across the globe and are accompanied by a story explaining the science behind the pictures – one for every day of the year.

www.bpod.mrc.ac.uk

MRC management reshuffle

The MRC senior management team has been restructured following the departure of chief operating officer John Jeans last summer. Dr Wendy Ewart has become deputy chief executive while maintaining her responsibilities as director of strategy.

Bruce Minty, finance director, becomes chief operating and finance officer with overall responsibility for major projects, corporate affairs, finance and human resources and line management of senior unit administrators.

The MRC’s Research Programmes Group will continue to report via Declan Mulkeen to John Savill, and Hugh Dunlop will move from his existing position as financial controller to become finance director.
The MRC is at the forefront of UK investment in regenerative medicine, an exciting field of research which aims to replace damaged or diseased cells and tissues or to correct genetic faults to cure inherited disease. Today the first patients are beginning to benefit from our scientists’ discoveries. In this new series of articles we speak to leading MRC-funded stem cell researchers to learn about progress to date and what the future holds. This edition looks at stem cell tissue engineering.
Professor Martin Birchall, a throat surgeon at University College, co-led the pioneering research team that carried out the first transplant of a human windpipe reconstructed using stem cells. Now, MRC funding is helping him to build on this success by developing the first clinical trials of a stem cell-derived larynx transplant. Sarah Harrop went to meet him.

As a top-flight surgeon, Martin Birchall is in popular demand; he squeezes this interview in between an early morning lecture and dashing off to advise a health minister on a speech.

Starting out as a head and neck cancer surgeon, Martin spent many years working on conventional tissue transplantation. But he became fascinated by its limitations: the need for patients to take drugs to suppress the immune system, the shortage of tissue donors and the simple fact that some tissues and organs are technically or ethically impossible to transplant.

So Martin’s research interests turned to the possibility of using adult stem cells to engineer tissues. Stem cells have the ability to turn into any type of human cell and, because they are extracted from the patient, there’s no risk of them being rejected by the patient’s immune system.

In 2008, Martin and his research team heard about a patient whose trachea (windpipe) was collapsing, for whom all conventional treatment options had been exhausted. Martin offered to try using early tissue engineering techniques he and his team had been developing in pigs to grow the patient a new trachea using her own stem cells. The transplant was a complete success and today the patient is raising a family, working full time and doing well.

“That was the first time that a transplant of an organ built from stem cells had ever been performed in a person and it seemed to work first time. It was a major breakthrough for science and technology,” says Martin.

**Restoring the voice**

Now, with £1.2m funding from the MRC and additional support from the Royal Free Charity, Martin is taking this research to the next level. This substantial sum will enable him to take the research from one-off treatments for patients in exceptional circumstances to developing the first clinical trial of tissue-engineered larynx (voicebox) transplants; a project known as RegenVox.

Losing the use of your larynx can be devastating – it not only affects speech, swallowing and breathing, but also sense of smell and the ability to cough or even to kiss. Scientists working on the project will use stem cells to partially re-build the larynx and restore its function, potentially helping over a thousand patients each year with serious larynx problems.

The procedure involves taking stem cells from the patient, such as those found in bone marrow. In the laboratory, the stem cells are coaxed to differentiate into cells of the desired type by exposing them to the chemical signals to which they’d normally respond inside the body. To encourage the cells to form into the shape of a trachea or larynx, the team seed the cells onto a framework made of collagen, a connective tissue protein found throughout the human body that defines its form and structure. Other techniques involve seeding the cells onto a nanocomposite (synthetic) scaffold, or a combination scaffold comprising both biologic and nanocomposite parts.
Alongside the newly-made cells, the team also mix in some of the original stem cells to form the blood vessels and other supporting tissues.

"Having found themselves in certain environments a stem cell will look around and say 'This has got the correct feel to it, the right stimuli, shape of a muscle, a piece of cartilage, a piece of bone' and will therefore differentiate in those ways. So, for example, if it's an environment with lots of other cartilage cells it'll become a cartilage cell too," explains Martin.

The first patients likely to benefit from this research will be those with traumatic damage to the larynx, and people with rare tracheal disorders. It will also help children who are born with a tightening in their airways - a condition called subglottic stenosis - which causes breathing difficulties.

"The current treatment for kids with subglottic stenosis requires taking some cartilage from the child's chest, leaving a scar. So this could provide a different way of building a new airway," Martin says.

**Bridging the gap**

Alongside this groundbreaking research, the team is compiling evidence of the safety and efficacy of the tissue engineered products which is needed to get the green light from the UK regulatory authorities to start clinical trials.

“The MRC's translational funding is absolutely critical at this stage,” says Martin. “It’s extraordinarily expensive to make that leap across this great chasm between the laboratory and the first clinical trials - without this level of funding we simply wouldn’t be able to do it. So with the help of the MRC, we will have accumulated all of these data by the end of 2012 and be ready to take these products into patients next year.”

The benefits of the funding are two-fold because they could also help to get other products off the ground: “The study we’re working on now is focused on partially rebuilding the larynx. But the data that comes out of it will be applicable to three main products – partial replacement of larynx, complete replacement of adult trachea and complete replacement of paediatric trachea as well. So we’re hoping that this MRC money will pump-prime not just one clinical trial but three simultaneously,” says Martin.

**Future directions**

The tissue engineering field is moving at a rapid pace, and over the next couple of decades we could begin to see the first lab-grown transplants of more complex organs such as lungs or hearts.

“We’re starting out with the most simple things, such as airways that don’t need to move, skin replacements, small areas of muscle – but that’s just the beginning. The biggest challenge is going to be producing organs that actually move and are innervated [contain nerves]. Last year at Yale University they built the first functioning lung, and it ventilated a rat for eight hours. And there’s a group in Israel I visited recently who have engineered a chunk of human heart about ten centimetres long, which actually beats,” explains Martin.

“So it’s absolutely within touching distance, getting these things into the clinic. I genuinely do see that tissue-engineered organs will replace conventional transplantation and extend its scope in the next 20 years.”

**Building the next generation**

Key to realising the benefits of investment in regenerative medicine research in the coming decades will be building up a cohort of skilled surgeons and scientists who are able to apply the findings coming from regenerative medicine research to helping patients. It’s here that the MRC will play a vital role in keeping the UK ahead of the game.

“It’s a highly multidisciplinary field involving engineers, chemists, clinicians, business people, scientists, stem cell researchers and they need to have a vast range of skills,” says Martin.

“I think it’s there I see the MRC can have the biggest impact, because at the end of the day it is all about people. If you don’t have the right people doing the work, with the right aims, skills and motivations, you won’t get anywhere. Here in the UK we’re incredibly blessed with all of those things and the MRCs at the forefront of supporting these young people going through.”
The MRC, alongside other research councils and the Technology Strategy Board, is launching a new Strategy for UK Regenerative Medicine Research in late March. There is also funding available through a new national programme in regenerative medicine co-supported by the MRC, Engineering and Physical Sciences Research Council and the Biotechnology and Biological Sciences Research Council. Check the MRC website for updates: www.mrc.ac.uk

New for 2012...the MRC Max Perutz Science Writing Award will not only be open to MRC-funded PhD students, but also all MRC early-career researchers.

Now in its 15th year, the prestigious Max Perutz Award is expanding to encourage and recognise outstanding communication among MRC scientists.

The 2012 competition opens on 1 May and welcomes entries from all MRC-funded PhD students and early-career researchers*

The judges will be looking for an article of up to 800 words that best answers the question, Why does my research matter? The winner will receive a £1,500 cash prize.

More information will be available on the MRC website nearer the competition opening date. www.mrc.ac.uk/Sciencesociety/Awards

* Researchers with a maximum of six years experience following completion of their first PhD.
Breastfeeding linked to infant temperament

‘Breast is best’ as the public health message goes, but research shows that while this advice holds true, breast-fed babies can be more irritable than their bottle-fed counterparts.

An MRC Epidemiology Unit study of 316 babies showed that those who were breast-fed cried more and were harder to soothe than babies who were fed formula. But the study authors believe that rather than being a sign of stress, this irritability is a natural part of communication between mothers and babies.

Lead researcher Dr Ken Ong says these findings should not deter mothers from breast-feeding: “Bottle-fed babies may appear more content, but research suggests that these infants may be over-nourished and gain weight too quickly.

“Rather than being put off breast feeding, parents should have more realistic expectations of normal infant behaviour and should receive better understanding and support to cope with difficult infant behaviours if needed.”

Published online at: www.plosone.org, January 2012

An itinerant childhood may harm adult health

Moving house frequently as a child makes you more likely to suffer poor health in adulthood, new findings show.

A study funded by the MRC and the Scottish Government tracked 850 people over 20 years to see if there was a link between moving house from birth to age 18 on physical health, psychological distress, and health behaviours such as smoking, heavy drinking and illegal drug use.

At age 18, those participants who moved at least were more likely to have reduced overall health. Compared with those who stayed in the same house, the most frequent movers - those who had moved at least three times before age 18 - were twice as likely to have used illegal drugs and nearly three times as likely to have had suicidal thoughts. However, some of these negative health outcomes were reduced by the time the participants reached age 36.

The research was led by Dr Denise Brown, of the MRC/CSO Social and Public Health Sciences Unit in Glasgow. She said: “This research suggests that support should be given to children during a family relocation to ensure that important social ties and relationships with healthcare professionals are not broken.”

Published online ahead of print at http://jech.bmj.com, February 2012
Smoking hastens slide into dementia

Ageing male smokers lose cognitive skills such as memory earlier than non-smokers, research suggests.

Scientists from University College London studied information collected across 25 years from over 5,000 men and 2,000 women. The people were part of the MRC-funded Whitehall II study of thousands of British civil servants.

During the transition from mid-life to old age, the men in the study who smoked showed a faster decline in cognitive abilities - skills such as memory, attention and verbal fluency - than those who had never smoked. Men who carried on smoking throughout the 25-year period showed the greatest decline, but even those who had quit during the decade before the first cognitive tests declined faster than those who had always shunned cigarettes. No such link was seen in women in the study, possibly because of their tendency to smoke smaller amounts of tobacco.

Dr Séverine Sabia, who led the research, explains: “Smoking is increasingly being linked with dementia in the elderly, contributing to the burgeoning number of dementia cases as our population ages. Public health messages about smoking must continue to target all ages, especially since our findings may actually underestimate the link because of the higher likelihood of death and study drop-out among smokers in the study.”

Published online ahead of print at www.archgenpsychiatry.com, February 2012

Helping the liver to heal itself

MRC-funded scientists in Edinburgh have discovered how to boost production of key cells needed to repair damaged liver tissue. The findings open up possible new ways of healing liver damage from diseases like cirrhosis and chronic hepatitis.

In studies in mice, the scientists discovered how different types of liver cell are formed from precursor cells called liver progenitor cells. These cells either go on to form cells called hepatocytes – which are involved in clearing toxins from the body and repairing damaged liver tissue – or bile duct cells. When the liver is damaged it produces too many bile duct cells and not enough hepatocytes.

By altering expression of certain genes in liver progenitor cells in mice and in human liver tissue in the lab, the scientists were able to increase production of hepatocytes. This new understanding of how liver cells are formed could help to develop drugs to boost production of liver-regenerating hepatocytes.

Lead scientist Professor Stuart Forbes, of the University of Edinburgh’s MRC Centre for Regenerative Medicine, commented: “Increasing numbers of patients are in need of liver transplants, but the supply of donated organs is not keeping pace with the demand. If we can find ways to encourage the liver to heal itself then we could ease the pressure on waiting lists for liver transplants.”

Published online ahead of print at www.nature.com/nm, March 2012
This year sees the twenty-first birthday of the Avon Longitudinal Study of Parents and Children, a Bristol birth cohort more commonly known as ‘Children of the 90s’, which is part-funded by the MRC. Dylan Williams looks at the history of a unique cohort that has advanced our understanding of the biological, social and environmental factors that influence human health.

In 1991, while many of us were watching the dissolution of the Soviet Union and listening to Nirvana’s ground-breaking album Nevermind, scientists in Bristol were embarking on an exciting new exploration of human health.

‘Children of the 90s’ was pioneered by Professor Jean Golding OBE – an experienced epidemiologist at the University of Bristol who had significant experience of managing and designing large cohort studies. In creating Children of the 90s, Professor Golding was guided not just by a curiosity about the early life origins of diseases but by a frustration at the shortcomings of existing research cohorts.

“I was convinced that far more detail about the medical, environmental and psychosocial features that might influence a person’s health and development should be collected. I also thought that the study should be very broad-based because it was likely that different features would interact and contribute towards the different outcomes,” explains Professor Golding. “And from the beginning we also knew that genetics would be a key focus of the study.”

More than 14,000 pregnant women volunteered to take part between April 1991 and December 1992. From blood tests to weight checks, the health and development of the mothers and their children have been followed in great detail ever since. This has provided a wealth of new knowledge, from the fact that eating oily fish while pregnant improves the child’s eye sight to the discovery of a gene associated with a tendency to be overweight.

The findings have led to advances in many areas of medicine, often supporting or refuting existing evidence, but also driving and improving public health policy. For example, Children of the 90s research confirmed the benefits of babies sleeping on their backs and also showed that this sleeping position has no unintended harmful effects. As a result, cot death rates fell rapidly from around 1,200 to 300 a year in the UK.

The children who have grown up alongside the project feel they’ve gained from their involvement, too. “As I’ve grown older, Children of the 90s has become so much more than just a medical research study,” enthuses participant Joe Griffiths; “It provides a sense of belonging, as only people of our age are involved and it is confined to this particular area of the country. I’m proud to simply be a part of it.”

Another participant, Sunjay Singh, worked in the study’s labs during university holidays: “I knew it was a very well respected study within the scientific community and that work experience in such an institute...”
would be extremely valuable. But my insight drastically improved after working there. I didn’t fully appreciate its size, influence and significance.”

Lynn Molloy, who became the study’s executive director in 2006, was impressed by Children of the 90s’ reputation amongst the local community: “I was amazed by how well-known it is in Bristol,” she says. “It seemed to be a part of everyday life, and people are very proud that Bristol houses such a world-renowned study.”

Under the directorship of Professor George Davey-Smith (see profile overleaf), Children of the 90s is now moving into new territory.

“The study is expanding to include other family members” says Lynn. “Also, fathers - both biological and non-biological - are being invited for assessments covering a range of measures relevant to the health and wellbeing of middle-aged men.”

But perhaps the most exciting development will be the opportunity to look at health trends in the offspring of the cohort members. This next phase of the study will collect data on pregnant study participants (or on the partners of male participants) and their babies during the neonatal period and early years. If all goes to plan, in another 21 years we could be celebrating the coming of age of a new generation.

Some findings from Children of the 90s
- Women who take the contraceptive pill for a long time get pregnant more quickly than the average when they stop taking it.
- Babies of mothers who smoke cannabis tend to be smaller at birth.
- Children brought up in very hygienic homes are more likely to develop asthma.
- Eating fish in pregnancy improves a child’s IQ and communication skills.
- Anxiety of the mother in pregnancy is associated with an increased risk of behavioural problems in the child.

Dylan Williams is a PhD student at the MRC Centre for Causal Analyses in Translational Epidemiology at the University of Bristol.
Q&A – Meet the Children of the 90s’ director

Professor George Davey Smith is the director of the Children of the 90s and the MRC Centre for Causal Analyses in Translational Epidemiology in Bristol. He talked to Katherine Nightingale about his vision for the future of the study, and the challenges and opportunities presented as the participants become adults.

Are you doing any kinds of research with Children of the 90s now that you didn’t think you’d be able to do when you first joined the project?
We didn’t envisage that whole genome sequencing would be possible, so the idea that we will have full genome sequences for nearly 2,000 of the children, for example, is quite remarkable.

We’re also carrying out more intensive investigations in some of the cohort now — things that we couldn’t afford to do on 6,000 or 7,000 young people. For instance, a few hundred are having MRI scans of their brain at the moment.

We’re also using digital data collection to capture development and parent–child interactions in the next generation. Jean Golding obtained videos of a thousand of the original mums and their babies interacting. But now digital recording is cheap, so we’re planning to ask parents to record data at significant times, like the first time the baby crawls. That way we can capture vast amounts of data, and store it for analysis in the future at a low cost.

Is it hard to keep track of the original children?
It’s a very busy period of people’s lives. Many of them are leaving home, going to university and starting work. So we’re developing ways of keeping track of people through online questionnaires that they can complete in their own time.

We’re also thinking of ways to capture data remotely and through data linkage, by obtaining informed consent for linking to GP and hospital records.

There must be positives to the original cohort growing older too?
Well, they’ve stopped growing, so we’ll be able to get final height measurements and their optimum lung function to use as a baseline for lung function decline, and other such peak measures on which to base future trajectories.

And of course, some of the participants are starting to have kids of their own. We are recruiting the next generation — the ‘Grandchildren of the 90s’ as it were.

What does the future hold for Children of the 90s?
A big priority is the fathers. One dad I spoke to had the perception that we just want his DNA so we could look at what he’d passed on to his kids. We’ve just started to do the first clinical examinations of the fathers and we’re trying to see the research now as a study of family health; the wellbeing and the development of family members together.

I have a particular interest in epigenetics [the study of changes in physical characteristics or gene expression which are not caused by alterations in DNA sequence] and we’re expanding that area rapidly. We’ve recently obtained funding to look at methylation of the whole genome over time. The particular power of Children of the 90s is that we have umbilical cord blood, a sample of blood at age seven and then at age 15 to 17. And we have blood from the mothers during pregnancy and 17 years later too.

So researchers who are interested in epigenetic patterns of a particular gene can examine how this changes over time, for example. In addition we’ll be able to relate such patterns to the health of the children and mothers at those time points.
Genetic analysis pioneer awarded Millennium Medal

Molecular biologist Professor Sir Edwin Southern has been awarded the 2011 MRC Millennium Medal, recognising his impact on genetic analysis.

Sir Ed has dedicated his life to DNA research. In 1975 he invented the ‘Southern blot’, a technique for identifying whether specific sequences are contained in a sample of DNA.

This later led to the invention of both DNA fingerprinting (used in forensic science) and DNA microarray technology (also known as the DNA chip). DNA chips use many probes to detect the presence of certain genes in a sample, or to determine changes in gene expression levels. They can be used to monitor a patient’s response to treatment at the genetic level or to identify potential drug targets.

Collecting his medal, Sir Ed said: “From my time working at the MRC Mammalian Genome Unit in Edinburgh, I know first hand how the MRC’s approach to its scientists allows the freedom to explore. It is this freedom that led to my development of the blotting process.”

New year, new honours

Congratulations go to MRC scientists and colleagues, past and present, who were acknowledged in the 2012 New Year’s Honours. Knighthoods went to Dr Venkatraman Ramakrishnan of the MRC Laboratory of Molecular Biology, for services to molecular biology; Professor Brian Greenwood of the London School of Hygiene and Tropical Medicine and former director of the MRC unit in The Gambia, for services to malaria research in Africa; Cambridge University’s Professor Patrick Sissons, former member and deputy chair of the MRC Physiological Medicine and Infections Board, for services to research and education in clinical medicine; and MRC grant holders Professor Mark Pepys of University College London Medical School, for services to biomedicine, and Professor Stephen Bloom of Imperial College London, for services to medical science.

Professor Trevor Robbins, director of the MRC Centre for Behavioural and Clinical Neuroscience Institute, University of Cambridge, received a CBE.

OBEs went to Mr Lester Firkins co-chair of the MRC Prion-1 clinical trial and manager of the UK coordination protocol for variant Creutzfeldt Jakob Disease (vCJD); Professor Jean Golding, former director of the Avon Longitudinal Study of Parents and Children; and Professor Dianne Berry of the University of Reading, a former member of the MRC Neurosciences and Mental Health Board.

Mr John Wills, assistant director of the MRC National Institute for Medical Research, was awarded an MBE.

Biostatistics unit welcomes new director

Professor Sylvia Richardson is to take the helm at the MRC Biostatistics Unit in Cambridge in April. She succeeds acting director Professor Vern Farewell, who has led the unit since the departure of Professor Simon Thompson in 2011.

Formerly chair in biostatistics at Imperial College London, Professor Richardson has made important contributions to the statistical modelling and analysis of complex biomedical data. Her recent research has focused on large data problems such as those arising in genomics.

She commented: “I am extremely pleased to take up this appointment at a time when important developments in biomedical sciences and public health are creating great demands for new statistical methods.”
Mark Gardiner, MRC Harwell

In the first of a new section on careers in the MRC we speak to Mark Gardiner at the Mary Lyon Centre at MRC Harwell in Oxfordshire, an international centre for mouse genetics. Mark’s job is to oversee the smooth running of the facility, setting the stage for research.

Career in brief
• First job: Junior animal technician at a clinical research organisation
• Current job: Facilities Resource and Training Manager, MRC Harwell (2001 to present)
• Career highlight: Winning the AAALAC International Technician Fellowship Award in 2011

“What I like about this job is that I have lots of ‘hats’ to wear and any two days are never the same. I’m as enthusiastic now as when I started twenty years ago.

My job is about pulling everything together to allow the science to progress smoothly and efficiently, without delays. I oversee training, health and safety and logistics; as well as maintaining the barrier system between the lab and the outside world, to keep out infections.

Today, for example, I’ve interviewed potential new recruits for a cleaning post, visited our engineering workshop to discuss some ideas for a new project, set up an exam for a member of staff and given visitors a tour of the centre and a talk on animal welfare needs.

The best thing about working here is the people – they make it for me. There’s a real team mentality, from the maintenance staff who keep everything clean and prevent infection and the technicians who look after the mice, through to the scientists who are advancing our knowledge of the genes that cause diseases like diabetes and deafness. Everyone here is working towards producing good science.

I always liked animals and I’d have loved to have been a vet - but I would never have got the grades to go to university. However this line of work has some parallels. We’re not vets by any means but the health and welfare of the animals is still a priority for everyone in the centre. We only recruit people who have a passion for animal welfare and a real aptitude for working with animals.

My first job, aged 18, was junior animal technician at a contract research organisation. If you take an interest in your work and are flexible and helpful whenever possible, you can progress through the ranks fairly quickly. I was promoted from a junior post to the equivalent of being a team leader in three years.

After that I managed three different multidisciplinary Biotechnology and Biological Sciences Research Council units, in infectious animal diseases like scrapie and BSE, before coming to MRC Harwell ten years ago.

My original role was to help get the new animal house – the Mary Lyon Centre - up and running. One of the biggest challenges I’ve faced in my career was developing the new barrier routines we have here to protect the mice from infectious agents outside. Previously, all a scientist needed to do to enter the old mouse facility at Harwell was throw on a lab coat and walk in. Now, anyone entering the facility has to have a complete change of clothing (trousers, tunic, mob cap, gloves and shoes) and go through an air shower to kill any pathogens or allergens. All equipment coming in has to be sterilised.

It was a big change for the scientific staff, and change takes time - something that scientists often don’t have. They are under pressure to get results and delays might have knock-on effects for their next grant. That’s why I aim to be flexible and stay open to new ideas and new ways of working.

We’re a very open unit and have visitors throughout the year: scientists, TV film crews, schools visits – even the Women’s Institute have been in to look around. Many have
the same reaction as they walk in to the facility: “Wow, I didn’t think it was going to be like this.”

I find school visits particularly rewarding. There’s a perception that young people just aren’t interested in science; that they only care about their X-box games or TV. But from my perspective, our younger visitors have really got involved and asked some very intelligent questions. Ultimately they’re the ones who could be the scientists of the future; we need to keep them engaged.

This is a wonderful career for someone with an aptitude for working with animals and an interest in science. You’ll meet some really great people, including interesting scientists and you’ll be working in a hub which moves excellent science forward.”

As told to Sarah Harrop.

Listen to a new podcast of Mark giving a tour of the Mary Lyon Centre at www.youtube.com/user/MRCcomms

Update:
the EU animals directive

A new European Union directive on the protection of animals used for scientific purposes (2010/63/EU) will be formally adopted by all EU member states by January 2013. To meet the deadline, the directive must be transposed into UK law by 10 November 2012, and the legislation is likely to be debated in the House of Commons and the House of Lords in May and June 2012.

The directive is a revised version of the 1986 Directive 86/609/EEC. It is designed to further promote improvements in the welfare of laboratory animals and in reducing, refining and replacing the use of animals in research. It takes into account important scientific progress that has been made since 1986 including the availability of new techniques such as use of transgenic animals, xenotransplantation and cloning.

For updates, see: www.understandinganimalresearch.org.uk/policy_issues/european_regulation
Long live lifelong health

Designers, biologists, social scientists, engineers, architects and healthcare professionals gathered at Newcastle University in November to showcase some of the interdisciplinary research that they’re doing as part of the Life Long Health and Wellbeing (LLHW) programme.

LLHW is a major cross-council initiative led by the MRC. It was established to meet the challenges of our ageing population through supporting research into the factors that influence health and wellbeing in old age.

One of the projects showcased at the event, ‘Envisage’, is an example of two very different disciplines – design and biomechanics – working together to promote independence in later life. It uses new visualisation software to pinpoint where the stresses and strains of muscles and joints occur in the body during everyday activities to help improve rehabilitation services and treatments. Led by Professor Phil Rowe, Professor of Rehabilitation at the Bioengineering Unit at the University of Strathclyde, Envisage recently won a 2011 Nexxus Innovation Award.

Meanwhile, bringing together the fields of cellular gerontology, psychology, human kinetics and nutrition, Professor John Mathers and his team are exploring interventions which transform the health and wellbeing of the recently retired, or those approaching retirement, such as adopting a more Mediterranean-style diet.

Other LLHW projects are investigating how ageing affects cognition and how mental ability in youth affects health and longevity; developing and delivering interventions for the self-management of chronic pain; understanding the mechanisms involved in brain ageing at a molecular and cellular level; and exploring the importance of vitality by changing diet and levels of activity.

Find out more at [www.mrc.ac.uk/llhw](http://www.mrc.ac.uk/llhw)

£4m boost for MRC-Asthma UK centre

The MRC and GlaxoSmithKline (GSK) have agreed to co-fund a £4m programme of asthma research at the MRC-Asthma UK Centre in Allergic Mechanisms of Asthma.

The research will investigate the interplay between allergy and viral infection in acute asthma attacks, which can be life-threatening and are often resistant to treatment. The UK has the highest prevalence of asthma in young adults in Europe: the condition affects one in 12 of the population.

Professor Sebastian Johnston of Imperial College London and Dr Roberto Solari of GSK will lead three teams of scientists at Imperial, King’s College London and GSK to initiate new collaborations to explore the mechanisms of the disease and identify potential targets for the development of new treatments.

Professor Johnston, who is director of the MRC-Asthma UK Centre in Allergic Mechanisms of Asthma, enthused: “This is a wonderful opportunity to combine the unique clinical models we have developed at Imperial with truly cutting edge science at King’s and drug discovery expertise at GSK into a new alliance to boost efforts to develop new therapies for this huge unmet medical need.”

Dr Solari, from GSK Respiratory Drug Discovery, added: “Gaining further understanding of the role viral infections might have in the development of allergic asthma could offer potential to unlock science that will help to develop future treatments and improve the lives of patients.”
Experimental medicine challenge grants launched

The MRC has launched a £20 million annual funding scheme - the Experimental Medicine Challenge Grants - to stimulate clinical and translational research.

The initiative will support ambitious, challenge-led programmes of research to gain insight into human disease mechanisms and possible new therapeutic approaches.

The MRC strongly encourages collaboration between institutions and across different disciplines, as well as projects linking with industry. Awards will range from £2m to £4m, reflecting the ambitious nature of the research, although particularly innovative smaller studies will also be considered.

Forming part of the MRC’s £354m investment in translational research over the next four years, the scheme provides opportunities to strengthen the UK’s academic-industrial collaborative links, contributing to economic growth. Initially it will run annually for three years.

Outline applications are invited until 19 April 2012. Investigators from UK academic institutions, NHS Trusts and MRC Units are eligible to apply. For further details, see: www.mrc.ac.uk/Fundingopportunities/Grants/EMCG or contact tom.foulkes@headoffice.mrc.ac.uk

Helping fellows link up with industry

New mechanisms have been put in place to help MRC fellows develop successful partnerships with industry. The MRC will now offer all new fellows face-to-face advice from an expert panel and the chance to incorporate industry collaboration when they apply for a fellowship. Existing fellows can ‘top up’ their fellowship with an industry collaboration.

The MRC Fellowship Partnership Awards will help researchers further their careers by encouraging them to build mutually beneficial relationships with industry. By sharing and developing their ideas with industry partners, MRC fellows will also be better equipped to translate their research into benefits for patients.

Dr Richard Peck, global head of clinical pharmacology at Roche Products Ltd and a member the MRC Training and Careers Group, explained: “These new support mechanisms aim to encourage early career researchers who are keen to start building links with industry but don’t know how, and those who wish to capitalise on industry collaboration opportunities during their existing MRC fellowships.

“Scientists from many fields of research, basic and clinical, will be able to engage with industry now that all of the MRC’s fellowship panels accept proposals with industry collaborations.”

Dr Matt Jones, an MRC fellow at the University of Bristol who collaborates extensively with industry, added: “By offering fellows access to funds for collaborations either from the outset of a new fellowship or during the later part of an existing fellowship, the MRC is providing researchers with the flexibility to embark on industry partnerships at the best time for them.

The advice stage will give much-needed guidance and help fellows with great ideas but not necessarily the confidence or experience to initiate a collaboration independently.”

For further information, visit www.mrc.ac.uk/careerandindustry or email fellows@headoffice.mrc.ac.uk

For the latest MRC funding opportunities, please see: www.mrc.ac.uk/Fundingopportunities/Deadlines
Professor Jean Golding set up the Children of the 90s longitudinal study, which this year celebrates its 21st anniversary. As the MRC launches new data-sharing guidelines, a step towards fulfilling its e-health ambitions, she discusses the complexities of data sharing - and why it’s a good thing.

As someone who was responsible for designing and for many years running a large pre-birth cohort, I have had to confront my feelings frequently concerning data sharing. On the one hand, it’s flattering that other researchers want to share in analysing the data that have been collected. But, conversely, there is the suspicion that the nature of the data are not being appreciated, authorship is not being shared and the ‘intruders’ are insufficiently sensitive in regard to appropriate interpretation.

I imagine it’s a little like being an author whose novel has been developed into a film, but with a new screenplay that they believe totally ignores the fundamental message of the original story and the subtleties of the characterisations. It is difficult to appreciate the bigger picture – that the film version of the book may result in a greater readership of the author’s other works - but that may well be the reality. And so it is with data sharing.

Designing, developing and piloting research studies and collecting data from them, and presenting these studies to potential funders, can be all-engrossing but lacking in reward and riddled with uncertainty. With a longitudinal study a scientist also has to have an eye to the future of the project - what information should be collected now that will be of use in 20 years time? How can we persuade the research community and funders of the appropriateness of doing this? But the most important questions concern the participants in the study.

Data collection in a longitudinal study is fundamentally different to a one-off study of a group of volunteers to answer a particular research question. In the latter there’s no need to worry whether the participant will want to continue to take part. But in longitudinal studies, we need more continuity: ensuring that the person has taken part and that they have also enjoyed doing so and are willing to contribute to future sessions. Such participation relies on trust in the research and the researchers and a belief that the study is worthwhile and will produce important results that will improve health.

Most important, though, are the thorny issues of privacy and confidentiality. In this world of computer hackers, the last thing we want is to have a system which can be easily breached by someone from outside the research community. Nor do we want participants to see the data of others. But at the same time, to maximise the number and quality of research results, it is vital that as many co-researchers as possible collaborate and share information.

So what are the pitfalls of data sharing and how can they be avoided? Where collaborators are given access to the data, it is important that they are expert in statistical analysis, able to formulate a research question, analyse the relevant data and write it up. This should be straightforward, but it is possible that they might misinterpret the information that they are analysing. So the data collected must be described in detail without ambiguity, and any potential problems in the information must be highlighted.

Yes, this approach is laborious, and until recently it has not been easy to get funding to do it. Nevertheless it should be a priority because it’s only by doing this that others can use the data satisfactorily. And it’s only by sharing data that the full benefits of research can be reaped and translated in ways that will be used to benefit humankind.

New guidance on the MRC data sharing policy is available on the MRC website at: www.mrc.ac.uk/Ourresearch/Ethicsresearchguidance/datasharing/Policy
Network is for anyone who has an interest in the work of the MRC, including scientists, doctors and health professionals involved in medical research, government departments and parliamentarians, and university staff and students. The aim is to provide a quick, easy-to-read summary of activities across the MRC, from research news through to funding, grant schemes and policy issues, with pointers to more in-depth information on websites and in other publications.

We are very keen to receive feedback on Network and suggestions for new features from our readers. So if you have any comments, please let us know. Just email: newsletter@headoffice.mrc.ac.uk

Network is produced by the MRC Corporate Affairs Group.

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Designer: Vin Kumar

A limited number of copies are available in print. Network can also be downloaded as a pdf at: www.mrc.ac.uk/network

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