Opinion:
Vaccines are vital
As the UK forges a new relationship with the EU it is vital that negotiations deliver the best possible outcome both for research and for patients in the UK and across the EU.

At the MRC we have long championed the importance of international collaboration for advancing medical research; from research in our units, centres and institutes and partnerships with other funders, to representing the UK on the governing bodies of many international biomedical research organisations, we have supported international health research collaboration for over 80 years.

A recent report, co-funded by eight leading UK medical research funders and charities, highlighted the value of this international collaboration for medical progress. Any limitations on this ability of researchers and institutions to work together could reduce the impact of science both in the UK and the EU.

The UK makes a significant contribution to the success of medical research across the EU and we are proud to play a leading role. I am particularly keen to do all I can to support the report’s conclusion that international collaboration in medical research must continue after Brexit, a point I will make at every opportunity.

We must do everything in our power to ensure that researchers can continue to work productively through international collaboration.

Sir John Savill
MRC Chief Executive

Read more about the report on page 4
New UK health data research institute seeks first research partners

The UK’s new health and biomedical data research institute, Health Data Research UK (HDR UK), is seeking research partners.

Between five and seven substantive sites are being sought to form the core of the new institute. The opportunity is open to applicants who submitted statements of interest earlier in 2017.

This is the first phase of investment to establish HDR UK. Competitions will follow to build capacity under a Future Leaders Programme and to address targeted data research challenges by investing in additional partnership sites.

Successful applicants will receive long-term funding awards and become part of a collaborative research community working together to deliver the institute’s priorities.

Director Professor Andrew Morris said: “My vision is to work across the UK to exploit the extraordinary capability of informatics and computational medicine to create a new type of research institute that leads the international agenda in health data science. By working in partnership with academia, NHS, Government, industry and the public, the institute will be a scientific driving force for new knowledge through data, bringing benefits to medicine and society.”

Find out more at: mrc.io/HDRUK-partners

Food for thought

Closer working across disciplines and in partnership with other funding organisations, policymakers and industry is needed to maintain the UK nutrition research field, according to a new review.

Undertaken by the MRC in partnership with the National Institute for Health Research (NIHR), the review aimed to ensure that UK researchers are well-placed to tackle important nutrition challenges now and into the future.

Good nutrition is vital for good health and the prevention, treatment and management of disease. Access to a sustainable and healthy diet is a key requirement throughout life and across the globe.

But the relationship between food, nutrition and health is complex and dynamic. It is affected by our biology as well as our environment, society, economy, culture and behaviour.

Despite the UK’s great achievements in nutrition research, many of the links between what we eat and changes in the human body remain a mystery. The review, and the proposed courses of action by the MRC and NIHR, promote closer working to help fill in these gaps.

Digest the report and responses at: mrc.io/nutrition-research-review
UK-EU collaboration benefits all

UK research benefits the health of patients and the public across the EU, according to a report co-funded by eight leading UK medical research funders and charities.

The report sets out the main ways that UK research contributes to medical progress and how this benefits EU science. It shows how scientists have greater impact when they collaborate internationally.

EU programmes have helped to strengthen scientific cooperation. The UK has been a major contributor to this, especially in medical research. From hosting research networks and providing leadership in pan-EU trials, to educating and training the next generation of scientists, the UK contributes in many different ways.

Successful industry partnerships, including many involving the MRC, enable the UK’s medical research community to collaborate with EU counterparts at the forefront of innovative treatments, meaning that products reach patients faster.

Read the report: mrc.io/collaboration-report

Bringing science to patients

LifeArc, the UK medical research charity previously known as MRC Technology (or MRCT), will invest up to £500m over the next five years to improve people’s lives.

LifeArc will seek to support innovations in antimicrobials, neuroscience, personalised cancer therapy and respiratory medicine.

Dr Dave Tapolczay, Chief Executive Officer of LifeArc, said: “LifeArc is a new name for an organisation that already has an impressive track record of pioneering new ways to turn the best science into patient treatments. The name LifeArc better reflects what we achieve in being the arc or bridge between great science and its application to help patients.”

Read more at: www.lifearc.org
UK Research and Innovation

UK Research and Innovation update

Ahead of its formal creation in April 2018, UK Research and Innovation (UKRI) has launched an interim website. The site is a source of news and information about the development of the organisation.

UKRI will operate across the whole of the UK and will have a total budget of more than £6bn a year. It will bring together the seven Research Councils, Innovate UK and a new body, Research England, which will undertake the England-only research and knowledge exchange functions currently performed by the Higher Education Funding Council for England.

On 4 July, Professor Sir Mark Walport, Chief Executive Designate of UKRI, gave a speech in Westminster highlighting the organisation’s ambition to be the best research and innovation agency in the world.

Watch the speech and read updates at: www.ukri.org

Board and panel member vacancies

Are you interested in contributing to the funding decision-making process?

We invite applications from scientists with the relevant expertise and experience to become members of our boards and panels from April 2018. We are seeking to fill 20 vacancies on the four MRC research boards and 10 vacancies on four of the MRC panels.

The deadline to apply is 2 October 2017. Find out more: mrc.io/board-panel-vacancies

Science festival fun

From inspiring patient stories to frightening fungi, MRC scientists came out in force to make the 2017 MRC Festival of Medical Research an overwhelming success.

The second annual MRC Festival took place from 17 to 25 June. Over 40 MRC-funded units, centres and institutes showcased their work through 52 MRC Festival activities across England, Scotland, Wales, Uganda, The Gambia and online.

More than 600 MRC staff and students directly engaged over 11,000 members of the public about their research, with even more people reached online.

Highlights included an afternoon in a Board Game Café using games to explain how chance, choice and risk influence our health; the Falcons Rugby Club in Newcastle showing school students how exercise and nutrition can support healthy ageing; and a patient open day explaining the medical significance of research carried out at MRC Harwell.

Catch up on the action on Twitter by following #MRCFestival: mrc.io/mrcfestival-twitter
A foot in the science policy door

For the seventh year running, the MRC and the Academy of Medical Sciences are running a policy internship scheme for third and fourth-year MRC-funded PhD students.

The scheme offers students a three-month internship at the Academy offices in central London. Successful interns will join the Academy’s policy team to lead on a piece of policy work, such as a consultation response, and to assist with ongoing policy projects, delivering workshops and stakeholder and Parliamentary liaison.

The deadline for applications is midnight on 8 October. More details are available at: mrc.io/policy-internship

Making evidence accessible

A new report calls for improved communication of scientific evidence to help us make better-informed decisions about medicines.

The Academy of Medical Sciences published the report ‘Enhancing the use of scientific evidence to judge the potential benefits and harms of medicines’ in June.

It was triggered by recent high-profile controversies over the use of statins to prevent cardiovascular disease. This, and other case studies, highlighted the need for improved quality, trustworthiness and communication of scientific evidence, particularly in relation to the potential benefits and harms of medicines.

Many factors may influence our decision to take or refuse a medicine, including media exposure, prior experience, and beliefs about health, illness and treatments.

Several of the report’s 12 recommendations concern funders such as the MRC. Some, such as asking applicants to disclose declarations of interest and fostering academia-industry relationships, are already part of MRC policy. Other recommendations include asking applicants to share plans for involving patients and the public in their research, and developing a code of practice for grant awardees around how to describe the science that they fund in the media.

We will consider the recommendations in detail over the next few months, and how best to implement them.

Read more at: mrc.io/AMS-report
The UK Dementia Research Institute is open for recruitment

Discovery science applications are invited for programme leaders from across biomedical research

The UK DRI is an exciting new £250 million investment by the UK into dementia research that will transform the way we diagnose, treat and care for people with dementias.

Based across six world-leading UK universities, the UK DRI will focus on innovative early-stage science to advance our understanding of how dementias develop and progress.

We are now seeking ambitious, talented scientists from around the world to bring innovative cross-disciplinary ideas to tackle and beat dementia.

Find out more at ukdri.ac.uk/joinus
Clinical Fellow in Psychiatry
Dr Emmert Roberts

Addiction is an area where you can offer genuinely holistic care to patients.

Patients with addiction disorders are often marginalised by society and within the health service. Being able to give good quality care to people who would otherwise struggle to access the NHS is exceptionally rewarding. Patient care includes on-site sexual health, drug, alcohol and medical services.

At Maudsley Hospital I dedicated three days a week to clinical time and two days to research but through the MRC Addiction Research Clinical Fellowship I now dedicate more time to research. When I worked at a national specialist service at the Maudsley Hospital, I saw patients with depression and bipolar disorder whose treatment hadn’t worked.

My main research focus is alcohol-use disorders. I’m looking at how services, the patients who use them, and staff working in hospital departments, have been affected by changes to the commissioning of services over recent years in England.

I’ve enjoyed all of my training but I’d recommend taking time out from the constant conveyor belt of medical training. It makes for a more varied career and gives you an excellent sense of job perspective. It also provides you with some interesting stories to reel off in interviews and over dinner. Once I had to find a temporary home for 20 exotic parrots owned by one of my patients – it’s the kind of thing they don’t teach you at medical school.

When I was an academic foundation doctor, I spent four months researching stigma towards mental illness at the Mid-Atlantic Wellness Institute in Bermuda. I looked at attitudes towards mental illness in the island’s newspaper media. Despite improving trends across the rest of the world, we found that mental illness reporting in Bermuda showed a worrying tendency towards using a negative tone, with many articles relating to violent crime. We talked with the island’s media to develop a dialogue to change this for the better.

During a year out of medical training I worked at the National Clinical Guideline Centre. This involved working on two National Institute of Health and Care Excellence (NICE) guidelines, in osteoarthritis and acute heart failure. I also advised a NICE technology appraisal in hepatitis C. By judging the quality of evidence available I helped make national recommendations on treatment strategies.

In this role I learnt the fundamentals of systematic review. This is a skill useful to any clinical researcher to assess bias...
in research and combine data to inform evidence based-treatment recommendations. I’d recommend this experience to other clinicians, not least as I’d never worked in an office before.

I then worked for a year in one of the poorest mental health trusts in the country, at St Ann’s Hospital in Haringey. We struggled daily with a lack of available hospital beds and scarce resources in a London borough with a high burden of mental ill health. Through this experience I became interested in the way services are commissioned and how that can directly affect patients.

The skills I consider most valuable are time management and planning. The ability to not check my email when I’m on holiday is also very important!

My career advice is to approach everybody. Email them. Meet them for a coffee. Nothing bad will happen. People are overwhelmingly very pleased to talk to, mentor and advise early-career-stage clinicians and researchers. These conversations have been where some of my most exciting collaborations have been born.

The MRC Addiction Research Clinical training scheme is giving me the chance to develop skills in research methods in epidemiology and develop contacts within addiction sciences to further my career. The scheme includes a funded MSc in Epidemiology, followed by a PhD. I’m looking at whether access to specialist care for people with alcohol problems affects the likelihood of being hospitalised, or of suffering harm related to drinking alcohol.

Think about a career in addiction. It’s a vast speciality that includes epidemiology, clinical research, neuroimaging and a whole smorgasbord of exciting projects. It often slips people’s minds but in my opinion it’s the most rewarding and challenging speciality.

Find out more about the MRC Addiction Research Clinical training scheme: www.imperial.ac.uk/medicine/mrc-addiction-research-clinical-training
Ambitious research programme to tackle global issues

Leading experts from the UK and in developing countries across the world are joining forces to tackle serious global challenges in a new multi-disciplinary research programme.

In one of the most ambitious international research programmes ever created, £225m has been invested across 37 interdisciplinary projects overseen by Research Councils UK (RCUK). The Global Challenges Research Fund (GCRF) RCUK Collective Fund, which involved joint working across all the research councils, is supporting projects in the range of £2-8m over four years.

The projects aim to address challenges in fields such as health, humanitarian crises, conflict, the environment, the economy, domestic violence, society and technology.

The programme aims to build upon research knowledge in the UK, and strengthen capacity overseas, to help address challenges, informed by expressed need in the developing countries.

Jo Johnson, Minister for Universities, Science, Research and Innovation, said: “From healthcare to green energy, the successful projects highlight the strength of the UK’s research base and our leadership in helping developing countries tackle some of the greatest global issues of our time.”

Projects consist of UK and developing-country researchers working together as equal partners.

Find the full list of projects at: mrc.io/gcrf-rcuk-fund
Multi-million pound funding to boost structural biology revolution

A new multi-million pound commitment will boost the burgeoning field of cryo-electron microscopy (cryo-EM) in the UK.

A total of £11.3m for cryo-EM facilities has been awarded to the universities of Glasgow, Oxford and Leicester.

The funding, awarded by the MRC after working in partnership with Wellcome, will establish two new consortia – one across Scotland, led by the MRC Centre for Virus Research at the University of Glasgow, and another in the Midlands, led by the University of Leicester. It will also support a new dangerous pathogens containment facility in Oxford. These awards complement the recent £20m Wellcome investment in cryo-EM.

The name ‘cryo’ refers to the way researchers keep their samples still, by flash-freezing them in extremely cold (cryogenic) temperatures.

Developments to super-powerful cryo-electron microscopes have dramatically improved the quality and range of biological structures that can be revealed. Researchers can now view molecules at near-atomic level, in far greater detail than before. This detail allows them to understand how the molecular machines in our bodies work and determine the building blocks of proteins, pathogens and cells.

Cryo-EM will ultimately allow researchers to better understand how diseases, like Alzheimer’s disease, affect the brain, and how specific molecules involved in causing disease might be targeted with drugs or vaccines.

Read more at: mrc.io/cryoEM-funding
New bowel cancer drug reaches patients

Bowel cancer patients are being treated with a new drug, based on a discovery made at the lab bench just two years ago.

In November 2015, yeast cell researchers at the CRUK/MRC Oxford Institute for Radiation Oncology discovered an ‘Achilles heel’ in certain cancer cells. They discovered that those with a mutation in a gene called SETD2 could be specifically killed by an experimental drug made by AstraZeneca, which blocks a protein in the body called WEE1.

The team developed a test to detect the presence or absence of normal SETD2 in human cells. Around 10% of bowel cancers and 50% of kidney cancers were found to have mutated SETD2 and therefore susceptibility to the drug.

Bowel cancer patients whose tumours lack SETD2 are being enrolled into a new part of an existing clinical trial, FOCUS4, to test the drug’s efficacy.

Professor Tim Humphrey led the research: “To see our work in yeast potentially make a difference to patients in the clinic is very encouraging and shows the value of working together in a larger team of scientists within an institute.”

Read more about the trial at: www.focus4trial.org

Artificial bile ducts transplanted into mice

Lab-grown bile ducts have been transplanted into mice, offering future hope for childhood liver diseases which require an organ transplant.

The University of Cambridge researchers took healthy cells from bile ducts, called cholangiocytes, and grew these into functioning 3D duct structures known as biliary organoids. When transplanted into mice, the organoids assembled themselves into bile duct-like structures.

Collaborating with engineering colleagues, the team then tested whether the biliary organoids could be grown on a 3D structure made from a tissue called collagen, which could be shaped into a tube.

After four weeks, the cells fully covered the miniature scaffolding, resulting in artificial tubes resembling a normal, functioning bile duct. These artificial ducts were successfully used to replace damaged bile ducts in mice.

Lead researcher Dr Fotios Sampaziotis said: “The capacity of these cholangiocyte organoids to grow successfully on biodegradable scaffolds, organise into functional cells and rescue bile duct function illustrates the power of tissue engineering and regenerative medicine.”

Published online at: www.nature.com/nm, 3 July 2017.
Alzheimer’s protein structure solved

Scientists have unlocked the structure of tau filaments, one of two types of abnormal brain proteins behind Alzheimer’s disease.

Researchers at the MRC Laboratory of Molecular Biology, led by Dr Sjors Scheres and Dr Michel Goedert, extracted tau filaments from the brain of a person who had died with the disease and imaged them using cryo-electron microscopy. They used specialised software they had developed to calculate the structure of the filaments in sufficient detail to deduce the arrangement of the atoms inside them.

Tau filaments, which form inside brain cells, have been implicated in the disease for nearly 30 years but their precise structure was unknown until now.

The structures established by the team could also suggest how tau protein may form different filaments in other neurodegenerative diseases.

Dr Scheres explains: “Knowing which parts of tau are important for filament formation is relevant for the development of drugs. For example, many pharmaceutical companies are currently using different parts of tau in tests to measure the effect of different drugs on filament formation; this new knowledge should significantly increase the accuracy of such tests.”

Published online at: www.nature.com, 5 July 2017.

Low-cost drugs package reduces HIV deaths

A low-cost drugs package, given in addition to antiretroviral therapy (ART), could save the lives of people with HIV who start treatment late into their disease, according to a trial led by the MRC Clinical Trials Unit at UCL.

In late-stage HIV infection, the virus has inflicted significant damage on the immune system. It destroys a vital type of immune blood cell, called CD4, causing increased risk of life-threatening infections.

In the REALITY trial, all participants had less than 100 CD4 cells per cubic millimetre of blood, compared to the healthy range of between 500 and 1,500.

The researchers, funded by the MRC Joint Global Health Trials scheme, used a combination of drugs targeting different infections. These were given alongside ART for the first 12 weeks of treatment. Six months after starting treatment, the package saved at least three lives for every 100 people.

Professor Di Gibb, from the MRC Clinical Trials Unit, said: “We found that this drugs package prevented early deaths among people starting HIV treatment late, and also reduced the numbers of severe AIDS illnesses and hospital admissions.”

Published online at: www.nejm.org, 20 July 2017.
Raising the research quality bar

Reproducibility isn’t something that can be solved without considering the bigger research picture. So as part of efforts to improve the quality of research, we’ve collected tips and resources from across the MRC community to help. Isabel Baker reports.

Methods are us

Good science needs good methods. Good methods ensure that health research and policy are built on the best possible evidence. Using robust, bullet-proof methods that are reliable and repeatable can also improve efficiency. Efficiency is important, as it’s not just taxpayers’ money at stake; valuable samples from humans and animals can often be used only once, and time donated by volunteers is precious.

Making the biomedical and healthcare research process more efficient is the job of the MRC-NIHR Methodology Research Programme. It encourages uptake of best practice by funding, and writing, accessible guidelines. Recent examples are a framework to help researchers with stratified medicine research and guidelines for choosing effect size for clinical trials. The programme also supports studies to improve new methods across all research areas, to ensure new evidence is accessible to as many people as possible.

As well as improving methods, it’s important to learn how to apply existing ones well. A new annual five-day residential workshop on ‘Advanced Methods for Reproducible Science’, co-led by the Universities of Bristol and Oxford, aims to teach early-career researchers skills and methods to improve the quality and reproducibility of their work. It will run again in 2018 and 2019.

PhD student Monika Frysz, of the MRC Integrative Epidemiology Unit, attended the 2017 workshop. She learnt not only about the scale of the problem of reproducibility but also about initiatives and tools in place to help tackle it. “One of the most beneficial sessions included practical tools for code sharing, software version control and introduction to a free software for classical and Bayesian statistics. The course was filled with fascinating talks and plenty of time for discussion with like-minded scientists!”
The devil’s in the design

“But we’ve always done it like this!” just won’t cut it. If you want funding, we need to understand what you’re proposing to do and, most importantly, why you’ve designed it that way. Last year the MRC added extra space to our grant application form for this reason. We’ve now updated our guidance to make it clear exactly what we need from you.

“Good science needs good methods.”

It’s your chance to convince us, and your peers reviewing grant applications, that your research design is robust. The simple message is: if you can’t tell us why you’re doing what you’re doing, we can’t fund your research. Check out the updated guidance for applicants on our website (Section 2.2.3.4). There’s extra guidance for applications involving animals in there too (summary at Section 4.1.8).

There are free tools out there to help. The NC3Rs Experimental Design Assistant is a website to support researchers planning animal experiments. And the Systematic Review Facility, developed by the CAMARADES systematic review group and funded by the NC3Rs, is an online platform to help with systematic reviews of pre-clinical studies.

Quality control

Do you have confidence in the quality and origin of your research materials? This is important to help nip reproducibility issues in the bud. We’ve supported lots of useful resources and facilities covering animal, cell and human research.

Study mouse genetics? MRC Harwell has more than 3,000 different mouse strains available for researchers to use and add to. Mice and data stored as part of the International Mouse Phenotyping Consortium are freely available for researchers. This project is aiming to ‘knock out’ and define every protein-coding gene in the mouse genome.

And their bespoke genetically-modified mouse programme uses the latest advances in gene editing techniques to create mice strains for research.

Use stem cells in your research? Earlier this year the UK Stem Cell Bank at the National Institute for Biological Standards and Control released European-approved, quality-controlled stem cell lines. These aim to support development of new cell-based medicines to help bring therapies to clinical trial.

Work with human participants, their tissues or data? In an ever-evolving regulatory environment it’s important to keep up to date. The MRC Regulatory Support Centre provides support with navigating the complex regulatory, ethics and governance landscape.

“Good science needs good methods.”
Opening up

Sharing your data and results speeds up the pace of science, helping to advance biomedical research and healthcare. This means registering your clinical trials, publishing your results in open access journals and allowing other researchers access to your data.

All types of clinical and public health intervention studies involving human participants can, and should, be publicly registered, not just those defined as clinical trials. All types of studies can be registered on the Open Science Framework. In the last five years, 94% of MRC-funded clinical trials were registered but we need your help to increase this number.

Preprints are another good way of sharing science and knowledge across the world – we accept them in grant applications and five-yearly funding reviews. Find out how they can help your research by reading how others are using them on our blog.

We’ve had policies on open access and data sharing for a while now and expect all researchers to follow them. A good example is the MRC Cognition and Brain Sciences Unit’s open science web page. So if you haven’t already, open up – and tell us how you’re doing it so we can pass the knowledge on!

Know of a handy tool or tip? Share it with us @The_MRC

Links to all of the resources referred to in this article are available in the online version of this article on our MRC Insight blog: mrc.io/raising-research-quality

Visit our web pages to find out more:
www.mrc.ac.uk/research/policies-and-guidance-for-researchers
Special merit in regenerative medicine

Congratulations to Dr Zoe Hewitt and Dr Jenny Puetzer on receiving special merit awards from the UK Regenerative Medicine Platform (UKRMP).

The prize-winners are rewarded for promoting interdisciplinary team science across the regenerative medicine community, key to the ethos of the UKRMP. The awards recognise their proactive and creative research leadership, making the most of new methods and opportunities.

Dr Zoe Hewitt of the University of Sheffield, Project Manager at the Pluripotent Stem Cell Platform Hub, has led joint working with other Hubs to ensure that stem cell research informs safety decisions of advanced therapies for patients. She has organised international activities and a joint conference with the British Society for Gene and Cell Therapy.

Dr Jenny Puetzer, post-doc at Imperial College London and member of the Acellular Technologies Hub, has led the design and promotion of innovative new materials for the clinic. These include specialised materials designed to drive stem cells to repair and replace cartilage, bone and tissue damaged in eye injuries. The materials have been adopted by Hub users across the Platform thanks to her guidance.

The UKRMP is a £25m initiative, established four years ago by the MRC, BBSRC and EPSRC, to address the key translational challenges of regenerative medicine.

Read more at www.ukrmp.org.uk

New EMBO members

MRC scientists have been named in the European Molecular Biology Organisation’s list of new members:

Professor Irene Miguel-Aliaga, Group Leader, MRC London Institute of Medical Sciences
Dr Sjors Scheres, Group Leader, MRC Laboratory of Molecular Biology
Professor Charles Swanton, Group Leader, The Francis Crick Institute

For more information visit: mrc.io/2rE32Mc

New director for Research Complex at Harwell

Professor James Naismith has taken over from acting director Professor Peter Lee to lead the Research Complex at Harwell (RCaH).

Jim took over on 1 June. A structural biologist, his research involves using X-ray crystallography as a technique to decipher the make-up and function of molecular machines (proteins) in our bodies.

Six funders support RCaH: BBSRC, EPSRC, MRC, NERC, STFC and Diamond Light Source. The research complex provides the environment and facilities for scientists in the life and physical sciences to do research across traditional boundaries.
Vaccines are vital

More than 200 years on from the discovery of the first vaccine against smallpox, Professor Peter Openshaw, Professor of Experimental Medicine at Imperial College London and President of the British Society for Immunology, says we cannot afford to be complacent about vaccines.

As a clinician working in research, I want to improve peoples’ health. The NHS was set up to focus on treating people with disease. But how much better would it be if we could prevent people from getting sick in the first place?

This is where vaccines come in. As vaccinologists, we use our scientific knowledge to design new or improved vaccines to stimulate the immune system. This creates natural protection against infections and prevents disease.

New and improved vaccines

The current vaccines we have are excellent and safe but many could be better. There are also new ways to use vaccines and lots of diseases which do not yet have effective vaccines.

The science of vaccinology advances monthly. There are hundreds of new vaccines at different stages of testing, many of which could lead to improved human health and wellbeing. In response to this fast-changing landscape, the MRC and BBSRC have recently funded five collaborative networks to drive UK vaccinology forward for the benefit of global health.

Radical beginnings

In 1796, Edward Jenner introduced the first vaccine against smallpox in the UK. He did a radical experiment: he vaccinated a boy with the cowpox virus and demonstrated that this protected him from deliberate infection with smallpox. Despite repeated attempts to infect the boy with this potentially lethal virus, the vaccine protected him. Jenner was an expert publicist. He was persistent in his attempts to convince the public and the politicians of the day about the benefits of vaccination.
When the NHS launched in 1948, it offered vaccination against just two diseases. Almost 70 years on, routine vaccination during childhood, adolescence and adult life protects us against 20 different infectious diseases. Many of these diseases are now rare because of the success of vaccination.

Amazing success
The majority of practising doctors in the UK have never seen a case of diphtheria, tetanus or polio. The success of vaccines is quite amazing. We must celebrate it and not forget how much has been achieved.

Most of these vaccines were invented when we understood little about how vaccines or the immune system actually works. They were based on extracting tiny pieces of the infection-causing bug, inactivating the pieces and then safely injecting them into humans to trigger a protective reaction from the immune system.

This rather hit-and-miss approach worked for many infections. But it is not effective for chronic infections such as tuberculosis, malaria or HIV – major causes of death and disability around the world.

Not an easy road
More recently, substances which boost our inbuilt immune system, combined with fragments of the infectious bug, have enabled development of a new generation of vaccines. However, that does not mean that vaccines are now easy to develop.

The vaccine development programme is long and expensive. Problems can hit even after a vaccine is released for general use. Vaccine development is a risky business for companies: they often make limited profit and are vulnerable to legal action if a few vaccine recipients have related (or even unrelated) side-effects.

The case for public funding of vaccine development is therefore very strong. The importance of supporting the science that underpins vaccination is clear to many research funding bodies, including the MRC.

Exciting times ahead
The next decade looks to be an exciting one for new vaccines. It’s vital, however, that we remember how much we’ve benefitted from vaccines over the past 50 years. We must not become complacent and allow vaccination rates to drop.

We also need to understand the motivations of the anti-vaccine movement. This includes the fears that parents have about the effects of vaccines on their children and how opinions become polarised and fixed.

As scientists, it is our responsibility to provide balanced, reliable information. We need to be tireless in our efforts to educate and involve the public and policymakers in promoting the uptake of the marvellous vaccines that we have, or will soon have, available.

There’s never been a more exciting time to be a vaccinologist!

Read more about the vaccine networks, funded through the Global Challenges Research Fund: mrc.io/gcrf-vaccine-networks
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 keen to receive feedback on Network and suggestions for new features from our readers. To share your views email network@headoffice.mrc.ac.uk

Network is produced by the MRC Corporate Affairs Group.

Editor: Isabel Baker
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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