



Imperial College
Academic Health
Science Centre
Improving Patient Care



**Transforming
health through
innovation:**

An overview of the AHSC

Welcome

“Imperial College AHSC aims to drive – not follow – the healthcare agenda in the UK and around the world, and be at the forefront of medical innovation. Our exceptional ability to translate new scientific discoveries into the clinic is both preventing disease and improving the lives of countless numbers of patients.

Between 2015 and 2020, we plan to build on our pursuit of world-class education, innovation and patient care. We aim to do this by focusing our research and expanding our training of the next generation of clinicians, and allied healthcare professionals.

We will be harnessing rapid advances made in genomic medicine and funding experimental medicine projects through the Institute of Translational Medicine and Therapeutics (ITMAT). As part of these efforts, we will work to improve patient safety and the patient experience; discover, design and implement new surgical techniques; and use the very latest advances in informatics and real time diagnostics to improve healthcare outcomes and tackle the spectre of antimicrobial resistance.

The AHSC will also help create wealth, making a substantial contribution to the London and the wider UK economy. The AHSC is such an interesting challenge and opportunity. The excitement of working with such a dynamic university and one of the largest trusts in the country on a tripartite mission of high-quality service, research and training is really aspirational. We have created a healthcare model for others to follow.

As Director I look forward to building on and developing the work of the AHSC so that we can further expand translational medicine, transform patient experience and ultimately improve more lives.”

*Professor Jonathan Weber,
Director of Imperial College AHSC*



About us

Imperial College Academic Health Science Centre is a unique partnership between Imperial College Healthcare NHS Trust (ICHT), one of the country’s safest, largest and most successful acute hospital trusts, and Imperial College London, a world top ten university. Our vision is to improve the quality of life of patients and populations by taking new research discoveries and translating them into new therapies as quickly as possible. It is focused on research and education as the key drivers to better patient care.

We are also close working partners with Imperial College Health Partners, the designated Academic Health Science Network for North West London (AHSN), spreading innovation and best practice in healthcare more widely across our region.

Our vision

The AHSC’s vision is to be a world leader in transforming health through innovation in patient care, education and research.

We will make advances in the prevention, diagnosis and treatment of diseases, both common diseases with large societal burdens and rarer diseases afflicting individuals and families, where insights contribute to developmental and pathogenic mechanisms.

Our work as an AHSC follows four key values; Excellence, Discovery, Innovation and Equity.

Our goals

The patient is central to all we seek to achieve in pursuit of these goals:

- To utilise the research strengths of the College combined with the critical mass of the Trust to enhance healthcare for patients and populations
- To create powerful new interdisciplinary synergies spanning the College, AHSC and the AHSN to transform healthcare through translational science, bioengineering and informatics
- To educate and train the future generation of multidisciplinary clinical scientists capable of utilising new technologies for enhanced healthcare
- To translate research into new policies for the benefit of patients nationally and internationally
- To create new wealth through innovation in healthcare, discovery science and population-based translation

Genomic medicine

Health and healthcare are certain to be radically transformed through the application of discoveries in genetics and genomic medicine.

We aim to harness advances in genetics, genome biology and genome technologies to improve the understanding and management of common and rare diseases, as well as cancer. This will be achieved through cutting-edge research, integration with medical care, and education and training.

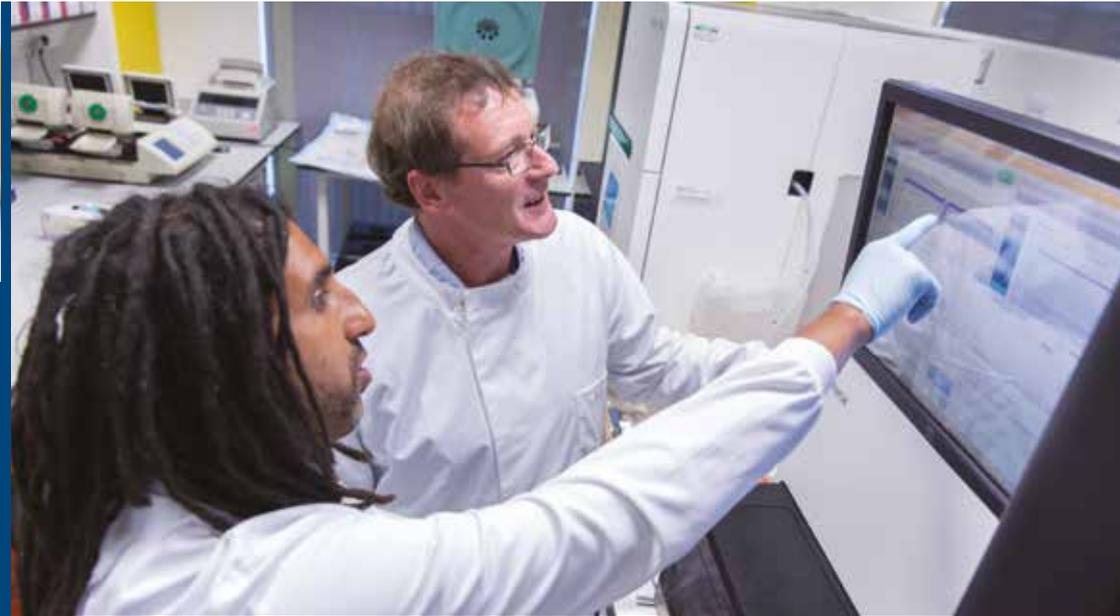


Designation

Genomic medicine



The trusts will work together as part of the **West London Genomic Medicine Centre** to contribute to the successful delivery of the **100,000 Genomes Project**



In December 2014, Imperial College Healthcare NHS Trust in partnership with three other trusts – Royal Brompton & Harefield NHS Foundation Trust, the Royal Marsden NHS Foundation Trust and the Chelsea and Westminster Hospital NHS Foundation Trust – was designated one of the first 11 Genomic Medicine Centres (GMCs) by NHS England.

The trusts will work together as part of the West London Genomic Medicine Centre to contribute to the successful delivery of the 100,000 Genomes Project. This is a national initiative which aims to sequence 100,000 genomes from around 70,000 participants, for the first time, to enable new scientific discoveries and medical insights, and bring benefits to patients.

The trusts will collaborate to gather samples and medical information of participants with cancer or inherited rare diseases over the next three years. The aim is to create a bank of anonymised data to better understand the role that alteration in gene sequences play in diseases and to develop targeted treatments.

The first patients have now been recruited to the project.

The project also has the potential to transform the future of healthcare by enhancing our knowledge of the influence of genetics on diseases, how other people can be helped with similar diseases in the future and how different types of tests can be developed to detect changes beyond the genome.

Imperial has a strong record of sequencing patients' genes to help treat a range of inherited diseases such as heart disorders. For example, Imperial researchers, in partnership with clinicians at Imperial College Healthcare NHS Trust, have used 'next generation' genetic sequencing machines to pinpoint faulty genes in patients with cardiomyopathy – a disease of the heart muscle. Cardiomyopathy often runs in families, but the disease can be caused by mutations in any of a large number of genes.

Tracking down the mutation responsible in a particular family could previously have taken many years, but now scientists can do so in months or weeks thanks to the

genetic sequencing machines. Once the faulty gene has been identified, family members can be easily screened to find out if they will develop the condition later in life.

To support the project, Imperial will deliver an MSc in Genomic Medicine for students and healthcare professionals. The aim of the course is to enhance knowledge and skills in genomic medicine, as well as provide the highest level of training. This will ensure that Imperial remains a leader in this rapidly evolving field of medicine.



Our work

Turning discoveries from basic science into improvements in patient care is at the heart of what the AHSC does. These examples show how Imperial's research has had impacts on clinical practice in the UK and internationally.



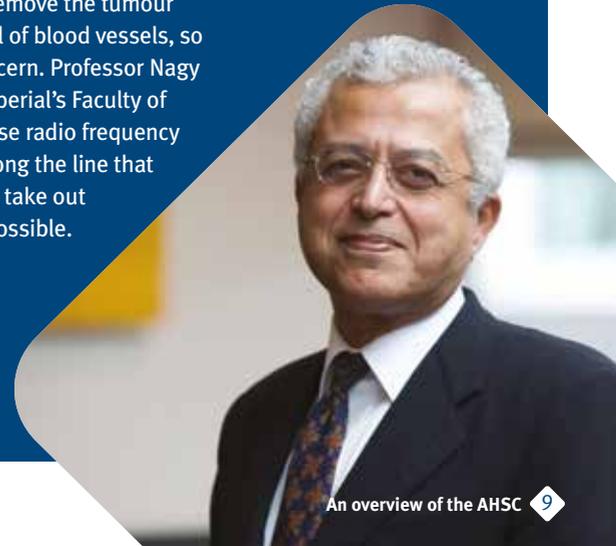
Preventing bowel cancer

A clinical trial led by Professor Wendy Atkin showed that a screening programme for people aged 55 to 64 was effective at preventing bowel cancer. Eleven years after a single flexible sigmoidoscopy (FS) examination, the incidence of bowel cancer was reduced by a third and deaths from bowel cancer cut by 43 per cent compared with the group who were not screened. After the trial results were published, the UK National Screening Committee approved a bowel cancer screening programme using FS, aiming to achieve 30 per cent coverage by 2014, 60 per cent by 2015 and full coverage by 2016.



Safer removal of liver tumours

Liver cancer is the sixth most common cancer worldwide, and the main treatment is surgery to remove the tumour and surrounding tissue. The liver is full of blood vessels, so minimising blood loss is a serious concern. Professor Nagy Habib, working with researchers at Imperial's Faculty of Engineering, developed devices that use radio frequency energy to clot blood inside the liver along the line that is to be cut. This allows the surgeon to take out the tumour with as little bleeding as possible. Clinical trials show that this technique improves recovery, reduces the time patients spend in hospital and keeps patients out of intensive care.





Early treatment for HIV

For most people in high-income countries HIV is considered a chronic illness which can be managed with medication. But the virus still causes extensive damage to the immune system, and treatment with antiretrovirals is a lifelong commitment. An international clinical trial led by Professor Jonathan Weber and Dr Sarah Fidler found that a 48-week course of antiretroviral medication taken in the early stages of HIV infection slows the damage to the immune system and delays the need for long-term treatment. The results of the trial known as SPARTAC (Short Pulse Anti Retroviral Therapy at HIV Seroconversion), have informed HIV treatment guidelines nationally and internationally.



Improving breast cancer survival rates

Clinical trials led by Professor Charles Coombes showed that switching to exemestane after two to three years of tamoxifen treatment can cut women's risk of dying from breast cancer. Until recently, most women diagnosed with early stage oestrogen receptor-positive breast cancer were given tamoxifen for around five years after surgery to help prevent the disease coming back. However, many patients developed resistance to the effects of the drug. The researchers found that patients who switched to exemestane after two years were 18 per cent less likely to have disease recurrence and were 14 per cent less likely to have died than those who stayed on tamoxifen. This way of treating breast cancer is now widely accepted and is the recommended treatment in guidelines around the world.





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