

**PRESS RELEASE**

For immediate release

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**‘Next Generation’ Gene Sequencer to determine the genetic links of  
heart disease**

The arrival of a state-of-the-art gene sequencer at Royal Brompton Hospital will pave the way for major advances in the treatment of cardiovascular disease. The Next Generation Genetic Sequencer has enabled experts to sequence all of patients’ genes for the first time in the NHS, and will be used to research the underlying genetic links of cardiovascular disease. Heart disease is the UK’s biggest killer and the most common cause of premature death in the UK, and cardiovascular disease causes more than one in three of all deaths (around 200,000 deaths each year).

Funded by the National Institute for Health Research (NIHR), the Next Generation Genetic Sequencer will initially be used for research purposes to enable clinicians to better understand heart disease by carefully categorising patients into disease types and discovering the genetic factors that cause the disease. Over the next 10 years, researchers will look at 10,000 patients above the age of 16 years. They will eventually use this information to help establish new genetic factors causing heart disease in individual patients, which will assist in providing personalised treatments.

Professor Dudley Pennell, director of the Cardiovascular Magnetic Resonance Unit at Royal Brompton Hospital, Professor of Cardiology at Imperial College London, and director of the joint Royal Brompton/Imperial NIHR Cardiovascular Biomedical Research Unit (BRU), said: “The Next Generation Genetic Sequencer is a significant advance for the Trust, Imperial College London and for the wider NHS. The sequencer will bring clear benefits for patients, because we will be able to determine a genetic cause of their cardiac condition to allow accurate diagnosis and personalised treatment. We can now read all the patient’s genes in just one day.”

The Next Generation Genetic Sequencer will sequence the "exome", which is the portion of a patient’s DNA which contains the 22,000 genes that exist in humans.

These genes make proteins, the molecules found in all living cells which play a variety of roles essential to life. Outside these genes, variation in a person's DNA is currently of limited use for the diagnosis or treatment of heart disease.

The ability to sequence the whole exome comes exactly 10 years after Former US President Bill Clinton announced the decoding of the human genome at the White House. The current Next Generation Genetic Sequencer (Applied Biosystems SOLiD v3+ sequencer) installed at Royal Brompton Hospital operates 200,000 times faster and is 10,000 cheaper than the systems used at that time. These technological advances are starting to make the promised genetic revolution a reality.

## **Ends/**

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### **Notes to editors:**

**Royal Brompton & Harefield NHS Foundation Trust** is a national and international specialist heart and lung centre based in Chelsea, London and Harefield, Middlesex. The Trust helps patients from all age groups who have heart and lung problems and is the country's largest centre for the treatment of adult congenital heart disease.

In April 2008, the NIHR awarded a four-year grant worth over £10 million to a partnership of Royal Brompton & Harefield NHS Foundation Trust and Imperial College London to fund respiratory and cardiac Biomedical Research Units (BRUs) at the Trust. The Units will lead innovative research in respiratory and cardiovascular medicine, translating advances in medical research into benefits for patients and supporting the expansion of current research output in these priority areas of disease.

The Cardiovascular BRU, a Cardiac Regeneration Unit, will research into new treatments for the heart using genes, stem cells, tissue engineering and devices. A significant part of the research will be the establishment of cardiovascular genetics research working in close synergy with advanced cardiac imaging and cardiac Positron Emission Tomography (PET). This will develop a pipeline of discovery of new mechanisms of heart disease and new treatments. The imaging technologies will also be used to develop new techniques of delivering novel treatments (such as stem cells).

**For patients:** If you have seen the BBC TV news report regarding genetic testing at Royal Brompton Hospital and feel you may be suitable to take part in this research project, then you should contact your GP or your hospital doctor for advice. If your doctor considers that you are suitable, you may be referred to Royal Brompton to see a cardiologist. At the moment the research programme is concentrating on patients with a family history of heart disease, particularly cardiomyopathy and sudden death.

Consistently rated amongst the world's best universities, **Imperial College London** is a science-based institution with a reputation for excellence in teaching and research that attracts 14,000 students and 6,000 staff of the highest international quality. Innovative

research at the College explores the interface between science, medicine, engineering and business, delivering practical solutions that improve quality of life and the environment - underpinned by a dynamic enterprise culture.

**The National Institute for Health Research** provides the framework through which the research staff and research infrastructure of the NHS in England is positioned, maintained and managed as a national research facility. The NIHR provides the NHS with the support and infrastructure it needs to conduct first-class research funded by the Government and its partners alongside high-quality patient care, education and training. Its aim is to support outstanding individuals (both leaders and collaborators), working in world class facilities (both NHS and university), conducting leading edge research focused on the needs of patients.  
<http://www.nihr.ac.uk/>