

INTRODUCTION

It is said that modern healthcare can trace its roots back around 5,000 years, to the Ancient Egyptians. If that's true, then the National Health Service – at just sixty years young - is a recent innovation, still in its infancy.

As everyone knows, the NHS was officially born on 5 July 1948; health secretary Aneurin Bevan visiting Park Hospital in Manchester to launch the new organization. Then, as now, its extraordinarily ambitious aim was to unite GPs, hospitals, pharmacists, opticians and dentists in a single, seamless system of healthcare for all.

Historians still debate the social, political and technological forces that informed that radical new vision but there is no doubt that the preceding half-century was an incredibly turbulent period, encompassing a number of major scientific and medical advances against the backdrop of two World Wars.

Just sixty years previously, Louis Pasteur's rabies vaccine - in use since 1885 - had paved the way for immunization against a variety of other diseases. By the start of the twentieth century, too, anesthesia had begun to revolutionize surgery. In 1901, Roentgen received the first Nobel Prize for physics, following his discovery that, by passing electricity through rarefied gases, he could produce x-rays. By 1928 Fleming had discovered penicillin. Between those two discoveries, the terrible casualties sustained by huge numbers of combatants in the First World War prompted important new developments in the treatment of serious injuries.

Similarly, between 1939 and 1945, the war effort prompted a series of important breakthroughs in healthcare. Mass production of penicillin, for instance, was a direct response to the need to protect soldiers from wound infections - and, coincidentally, sexually transmitted diseases. The war also accelerated the development of trauma and orthopaedics units in general hospitals; perhaps most famously Archibald McIndoe's plastic surgery and burns unit at East Grinstead, and Ludwig Guttman's spinal injury centre at Stoke Mandeville.

The National Blood Transfusion Service, established in 1946, was the direct descendant of the blood depots set up in 1939 by the Medical Research Council in areas considered safe from enemy air attack. The new service itself went on to spawn advances in vascular surgery, transplantation, chemotherapy, the treatment of coagulation disorders and shock from massive blood loss.



These were some of the innovations that both informed the vision of the new NHS and helped make it possible. Since then, the NHS itself has been a force for innovation, a process that gathered pace with the ensuing decades. Here is a tiny selection of some of the milestones along the way.

1953 – DNA structure revealed

Two Cambridge University scientists, James D Watson and Francis Crick, write in the April issue of Nature magazine: "We wish to suggest a structure for the salt of deoxyribonucleic acid (whose) novel features are of considerable biological interest." This is how they announce their discovery of DNA (as it becomes known), destined to pave the way for genetic disease screening and the development of genetically targeted drugs.

1953 – UK's first conjoined twins to be separated

In December, two one-year-old Nigerian girls, known as Boko and Tomo, become the first conjoined twins in the UK to be successfully separated. Joined at the abdomen, the sisters are taken to London's Hammersmith Hospital, where they are operated on by Dr. Ian Aird. Sadly, Tomo dies in surgery, but Boko returns to Nigeria where she grows up normally and later marries.

1958 - polio and diphtheria vaccinations programme launched

A key part of the government's plans for the NHS, in line with its primary aim of promoting good health rather than simply treating illness, is the introduction of the polio and diphtheria vaccine programme for everyone under the age of 15. Until now, it has not been unusual, in epidemic years, for cases of polio to reach 8,000 and of diphtheria 70,000, leading to 5,000 deaths. The programme leads to an immediate and dramatic reduction in cases of both diseases.

1959 – Devon hospital appoints first Infection Control Nurse

Torbay General Hospital appoints the world's first Infection Control Nurse to control cross-infections in patients, and reduce sickness absence levels among nursing staff. Other hospitals begin to make similar appointments and in 1970 the Infection Control Nurses Association is formed. In 2006 this becomes the Infection Prevention Society, representing all healthcare professionals in the fight to prevent and control infection.



1960 - First UK kidney transplant

On 30 October, surgeons at Edinburgh Royal Infirmary carry out the UK's first living-donor kidney transplant. The procedure, involving identical 49-year-old twins, is successful and both live for several more years. Six decades on, kidney transplants, which for many are a hugely welcome alternative to a lifetime of regular dialysis, now enjoy a very high success rate. An ageing population, however, means a higher incidence of renal failure, and demand for organs now outstrips supply.

1961 - The contraceptive pill launched

The controversial new contraceptive pill is acclaimed as the biggest medical advance of the 20th century. Its origins lie in a 1950s treatment for menstrual disorders, whose contraceptive properties were an unforeseen side effect. Today, nearly 50 years after its launch in Britain, an estimated 100 million women worldwide use what everyone knows simply as 'the pill'.

1962 - First full hip replacement carried out

One of the greatest surgical advances of the 20th century is the development of the full hip replacement operation, pioneered by orthopaedic surgeon, innovator and bio-engineer, Professor Sir John Charnley. Surgeons from all over the world make their way to Wrightington Hospital, Wigan, to learn his techniques. In an unusual departure from normal practice, Professor Charnley asks his patients if they mind giving their hips back for research purposes after their death. Virtually all agree.

1967 – World's first heart transplant

In December 1967, in Cape Town, South Africa, Dr Christiaan Barnard causes worldwide incredulity when he carries out the first human heart transplant. Six months later, in May 1967, during a seven-hour operation, London surgeon Donald Ross, coincidentally South African-born, and his team of 18 doctors and nurses carry out Britain's first human heart transplant at the National Heart Hospital.



1972 - CT scanners revolutionize body examinations

Research by electrical engineer Godfrey Newbold Hounsfield leads to the development of CT (computer tomography) scanners that produce 3-D images from a series of two-dimensional X-rays. The concept wins Hounsfield a Nobel Prize, which he shares with Allan McLeod Cormack, an American who has developed the same idea in the USA. Since then, CT scanners have advanced enormously, although the principle remains the same.

1975 - Endorphins discovered in pig's brain

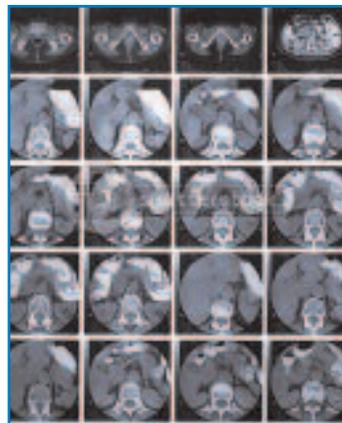
At the University of Aberdeen, Drs. John Hughes and Hans Kosterlitz isolate from a pig's brain what they call enkephalins, but which later become universally known as endorphins, a contraction of endogenous morphine. Produced during strenuous exercise in vertebrates by the pituitary gland and the hypothalamus, endorphins produce analgesia and a sense of well-being.

1978 - World's first 'test-tube baby' born

Blocked fallopian tubes prevent Lesley Brown from conceiving, so Oldham General Hospital gynaecologist Dr Patrick Steptoe, and Dr Robert Edwards, a physiologist at Cambridge University, fertilize one of her eggs in vitro before replacing it in her womb. On 25 July she gives birth to a 5lb 12oz girl, Louise, whom the media immediately dub the world's 'first test-tube baby'. Globally, more than a million children, including Louise's sister Natalie, have since been conceived this way.

1979 - First successful bone marrow transplant on children

Until his untimely accidental death in 2007, Professor Roland Levinsky was an international leader in the field of immunodeficiency diseases, working in bone marrow transplantation, stem cell biology and gene therapy. In 1979, at London's Great Ormond Street Hospital, he performs the UK's first successful bone marrow transplants in children with primary immunodeficiency.



THE 1980s

1980s - MRI scans introduced

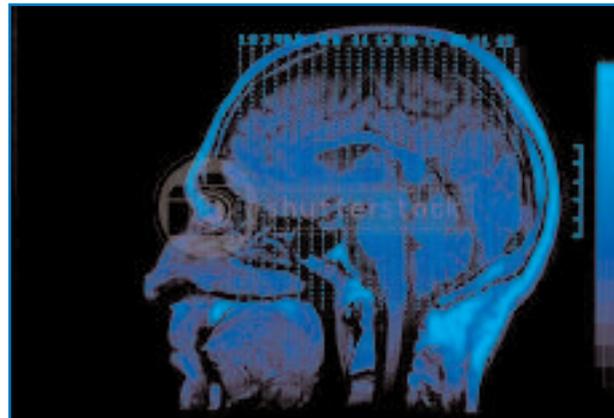
Magnetic resonance imaging (MRI) scanners prove more effective than earlier equipment in providing information about soft tissue, such as the brain. The patient lies inside a large cylindrical magnet and extremely strong radio waves are then sent through the body. From the highly detailed pictures it produces, specialists can readily identify conditions such as brain tumours, multiple sclerosis and the extent of damage following a stroke.

1987 - World's first heart, lung and liver transplant

In 1987, at Papworth Hospital near Cambridge, Professors Sir Roy Calne and John Wallwork carry out the world's first liver, heart and lung transplant. Professor Calne describes their patient as "plucky". When she dies 10 years later, surgeons transplant her still healthy heart into another transplant patient.

1988 - Breast screening introduced

To reduce breast cancer deaths in women over 50, this ambitious programme is launched in England and Wales with a network of breast-screening units providing free mammograms. By 2000, Department of Health-funded research shows that mortality from breast cancer has substantially reduced since the programme's introduction, although other contributory factors, such as improved drug therapies and early presentation due to greater breast cancer awareness, have also played their part.



1991 - First 57 NHS trusts established

Independent organisations with their own managements, known as NHS Trusts, are established, aimed at encouraging creativity and innovation and challenging the domination of the hospitals within a health service that increasingly focuses on providing services in the community.

1991 - Human Fertilisation and Embryology Authority set up

The first statutory body of its type in the world, the HFEA's creation reflects public and professional interest in the potential of human embryo research and assisted reproduction treatment. As the UK's independent regulator, it licenses centres carrying out in-vitro fertilisation (IVF) and donor insemination (DI) treatments, as well as all UK-based human embryo research.

1994 - Five-year campaign results in NHS Organ Donor Register

The kidney donor-card scheme (launched in 1971) expands in 1981 to include the cornea, heart, liver, and pancreas. Organ supplies cannot keep pace with demand, however, and the NHS Organ Donor Register is launched in October, following a five-year campaign by John and Rosemary Cox. Their 24-year-old son Peter has asked for his organs to be used to help others before he dies of a brain tumour in 1989. By 2008 a remarkable 15.2 million people have registered.

1998 - NHS Direct launched

Launched in England and Wales, NHS Direct goes on to become one of the largest e-health services in the world, handling more than half a million calls for advice and information every month. It pioneers a growing range of convenient alternatives to traditional GP services, including NHS walk-in centres. (Ten years later, it will apply , for Foundation Trust status.)



2000 - NHS walk-in centres introduced

The NHS introduces NHS walk-in centres (WiCs) in England to deal with minor illnesses and injuries without the need for an appointment or registration, 365 days a year. Managed by PCTs and largely nurse-led, WiCs are conveniently located and soon prove to be a successful complementary service to traditional GP and A&E services. Some 90 WiCs now treat around 3m patients a year.

2001 - First Innovation Hub established

NHS employees tend to be thoughtful and creative people, but too often, have had nowhere to take their good ideas until the nine Innovation Hubs in England are set up. The first was NHS Innovations North West (TrusTECH). The existence of the Hubs network now means that ideas conceived within the NHS are far less likely to be lost to big business or go overseas, enabling the NHS to retain Intellectual Property rights, and UK patients to benefit from improved healthcare.

2001 - Ara Darzi pioneers robotic surgery in UK

Following the arrival in the UK of the da Vinci® robotic surgical system, its use is pioneered by Professor Ara Darzi (now Lord Darzi, Parliamentary Under-Secretary of State at the Department of Health.) The system enables surgeons to perform, even such complex procedures, as open-heart surgery through 1-2 cm incisions. Professor Darzi and his team become highly respected internationally for their innovative work in minimally-invasive surgery, and in the advancement and use of allied technologies.

2004 - Foundation Trusts introduced

The new NHS Foundation Trusts represent the cutting edge of the government's commitment to the decentralisation of public services and the creation of a patient-led NHS. Hospital and mental health services are now provided by local managers, staff and members of the public; by the start of 2008 there are 92 such trusts in England, giving local communities a real say in how their hospitals are run

2006 - Papworth carries out first beating heart transplant

In a medical advance that offers considerable promise for the saving of many more lives, surgeons at Papworth Hospital in Cambridgeshire carry out the UK's first successful beating-heart transplant. They keep the organ pumping blood for five hours after removing it from the donor and transplanting it into a 58-year-old man.

2008 – UK scientists achieve world first with gene therapy breakthrough

In April, specialists at University College London (UCL) and Moorfields Eye Hospital announce the results of trials of a groundbreaking gene therapy for Leber's congenital amaurosis, an inherited degenerative eye disorder. In one of the three patients treated, degeneration is halted and his vision improves. "This study," says the British Society for Gene Therapy, "should give increased confidence in applying similar approaches for treatment of a host of debilitating disorders, unleashing the prospect of major advances through genetic medicine."

THE FUTURE

The founders of the NHS back in 1948 created what was to become the world's largest publicly funded health service - and one of the most efficient, egalitarian and comprehensive. But they could surely have foreseen few of the developments described above – developments that have revolutionized medicine and healthcare. Nor could the founders of the NHS have anticipated the huge social changes that have transformed British society over the past sixty years. As we have seen, NHS structures have changed a great deal since 1948 – and particularly over the past twenty years – as the service has sought to adapt to the changing needs and priorities of a rapidly-changing society. That is a never-ending challenge; one of the few things we can say with certainty about the future is that the process of change will continue and perhaps gather pace. We can be confident, too, that we shall see more advances in medicine and healthcare in the years ahead. Better still, we can be sure that the NHS will play a leading role in the development and exploitation of many of those advances, thanks to the continuing ingenuity and commitment of NHS staff and the professional expertise of the Innovation Hubs.



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