



TOP 20 MOST IMPORTANT MEDICAL DEVELOPMENTS OF THE LAST 50 YEARS

As voted by Fellows and Members of the Royal College of Physicians of Edinburgh, November 2010*

1. **ANTIBIOTICS:** While Scottish scientist Alexander Fleming made the initial discovery of penicillin in 1928 and further antibiotic discoveries were made in the 1940s, the medical application and further development of antibiotics really took off in the 1960s. This has resulted in dramatic declines in death rates and serious ill-health arising from infection.
2. **VACCINATION:** the development of vaccines against a range of infectious diseases including small pox (which was eradicated as a result of vaccination in 1977), polio and hepatitis B has resulted in a major shift towards disease prevention.
3. **IMAGING:** the development of CT and MRI scanning revolutionised the manner in which the body can be scanned in order to detect disease (i.e. cancer) and inform treatment in a range of disease areas. The University of Aberdeen conducted the first clinical whole-body MRI scan in the world in August 1980.
4. **ANTI-TB THERAPY:** the 'Edinburgh method' of combined therapy, first developed by Sir John Crofton and his team in the 1950s, has been recognised as the single-most important treatment of tuberculosis (TB) and was adopted worldwide. This significantly reduced death rates from TB in the UK and worldwide and almost eradicated the disease, prior to the more recent emergence of some drug-resistant strains of TB.
5. **TOBACCO CONTROL:** recognition of the adverse effects of smoking on lung health (cancer, chronic obstructive pulmonary disease and asthma) and the beneficial effects of actively reducing cigarette smoking has significantly reduced smoking-related death rates and ill-health worldwide. In Scotland, spearheaded by Sir John Crofton, founder of ASH Scotland (1973) and President of the RCPE (1973-76).
6. **ANGIOPLASTY:** a surgical technique which widens a narrowed or blocked artery in the heart and has been instrumental in improving the life expectancy and quality of life of people suffering from coronary heart disease (including heart attacks and angina).
7. **RANDOMISED CONTROLLED TRIALS – MODERN USE AND ANALYSIS OF:** the system used for testing and measuring the effectiveness of new drug treatments has been developed and refined and now ensures that new drug treatments are safe and clinically effective. The driving force behind this has been the Cochrane Collaboration, an international scientific and medical collaboration, named after Archie Cochrane (a doctor from Galashiels,) who in the 1960s and 1970s advocated the need for conducting randomised controlled trials. The Cochrane Collaboration reviews the evidence produced by these trials. These recommendations may be included within NHS clinical guidelines used by medical staff. In Scotland, the Scottish International Guidelines Network (SIGN), originally established by the Royal College of Physicians of Edinburgh and the Royal College of General Practitioners, develops evidence-based clinical guidelines for the NHS in Scotland and has, in the last couple of decades, developed a worldwide reputation for guideline development.
8. **ANTI-VIRAL THERAPY FOR HIV:** first available in 1996 and this has transformed the outlook from death in most cases to an expectation of near-normal lifespan for most patients.
9. **STATINS:** cholesterol-lowering drugs which are now used extensively in the prevention of heart disease (primarily those at high risk of heart disease and patients who have already experienced a heart attack or stroke). Statins have significantly reduced death rates in these areas.

10. **KIDNEY DIALYSIS:** kidney dialysis provides an artificial replacement for loss of kidney function in patients who experience kidney failure and which would prove fatal if not treated. It ensures that the essential process of removing waste and excess water from the blood is maintained. Kidney dialysis is used to maintain kidney function until a kidney transplant can take place or is used to maintain kidney function in those for whom a transplant would not be suitable.
11. **ACE INHIBITORS:** angiotensin-converting enzyme (ACE) inhibitors are drugs used to treat high blood pressure, heart problems and kidney disease. Their use has greatly improved the quality of life for people with heart failure and prevented the development of heart attacks, strokes and kidney failure.
12. **ENDOSCOPY AND LAPAROSCOPIC SURGERY:** an endoscope is a long, thin, flexible tube through which doctors can examine inside the body without the need for surgery. Laparoscopic surgery (commonly known as 'keyhole' surgery) is a form of minimally invasive surgery by which instruments are inserted through some small incisions in the skin rather than requiring full-scale surgery. Both techniques have revolutionised treatment, improved the experience for patients and improved safety.
13. **TREATMENT FOR STOMACH ULCERS:** Scottish scientist Sir James Black won the Nobel Prize for Medicine in 1988 for his work in developing effective drug treatments for stomach ulcers, thus negating the former need for, and risk of, surgery for stomach ulcers.
14. **KIDNEY TRANSPLANTATION:** the transplantation of a kidney from a donor (living or deceased) into a patient with end-stage kidney disease. The first successful kidney transplant in the UK was performed in Edinburgh by Sir Michael Woodruff and his team on 30 October 1960. A total of 2694 kidney transplants were performed in the UK in 2009-10.
15. **BETA-BLOCKERS:** beta-blockers reduce the effects of adrenaline on the heart and are used to treat high blood pressure, angina and other forms of heart disease. In 1962, Scottish-born scientist Sir James Black developed a beta-blocker which revolutionised the treatment of angina and is considered by many to be the most significant drug development of the last century.
16. **SPREAD OF MODERN HOSPICE MOVEMENT:** from St Christopher's in London in 1967 (the first hospice "to link expert pain and symptom control, compassionate care, education and clinical research") to around 200 hospices in the UK today. This has significantly improved the quality of life of terminally ill patients.
17. **LIVER TRANSPLANTATION:** 50 years ago it was inconceivable to hope that doctors might be able to offer patients with chronic liver disease the option of replacing their diseased liver with a healthy liver. The first liver transplant was performed in Denver, USA, in 1963. A total of 679 liver transplants were performed in the UK in 2009-10.
18. **INHALED THERAPY:** is a form of therapy in which medication is administered into the lungs via an inhaler and is used to alleviate chronic forms of respiratory disease including chronic obstructive pulmonary disease (COPD) and asthma. Inhaled therapy enables the direct administration of treatment into the lungs, providing a more rapid form of treatment in the case of acute (serious) respiratory symptoms.
19. **WHO ANALGESIC LADDER:** the World Health Organisation (WHO) analgesic ladder, developed in 1986, provides a stepped approach to pain management which revolutionised the prescribing of oral opioids for cancer pain and has enabled doctors to manage pain more effectively in patients in all other clinical areas.
20. **ERYTHROPOIETIN:** an artificial version of a hormone produced by the kidney which promotes the formation of red blood cells and is used to treat anaemia in patients with kidney disease, cancer and other forms of critical illness. Its use has greatly improved quality of life for patients with advanced kidney disease allowing many to return to normal fitness

The items within the poll were shortlisted by the organisers and speakers of the forthcoming RCPE St. Andrew's Day Symposium: Five Decades of Medical Progress (2 and 3 December 2010) and are linked to the main medical specialty areas under discussion at this two-day event (cardiology, gastroenterology, infectious diseases, neurology, renal medicine, palliative care, respiratory medicine). These items were then ranked by an online poll of RCPE members.