Our achievements

Cancer Research UK has made a huge number of very important discoveries which have fundamentally changed the way we prevent, diagnose and treat cancer.

The ten year survival rate for cancer is now 42%, double the figure of 30 years ago. Five year survival has increased to 50%. Survival rates have improved for almost all of the common cancers and in many cancers the progress has been dramatic. Testicular cancer, melanoma and Hodgkin's disease now all have ten year survival rates of over 80%. Breast cancer now has over 70% ten year survival rate, up from 46% in the 1970s. Our work has been at the heart of this progress and has saved the lives of hundreds of thousands of people in the UK and many millions more around the world.

Understanding cancer

We have made many significant breakthroughs in understanding how cancer starts and develops and helped characterise many aspects of the disease. We have led groundbreaking work on understanding the cell cycle, how DNA damage leads to cancer, mechanisms of cellular DNA repair, immune system and inflammatory responses to cancer, invasion and metastasis and genetic pre-disposition to cancer. Scientists at Cancer Research UK and across the world are building on these discoveries to develop new treatment approaches.

- We have discovered crucial genes that protect us against cancer – the tumour suppressor genes. We co-discovered the p53 tumour suppressor protein which normally plays a central role in preventing cancer and is altered or inactivated in the vast majority of cases of the disease.

- We were the first to discover the breast cancer susceptibility gene BRCA2 and show that it is also associated with increased risks of prostate and ovarian cancer. Our research on the links with BRCA paved the way for the development of the genetic tests available today and potential new advances in treatment.

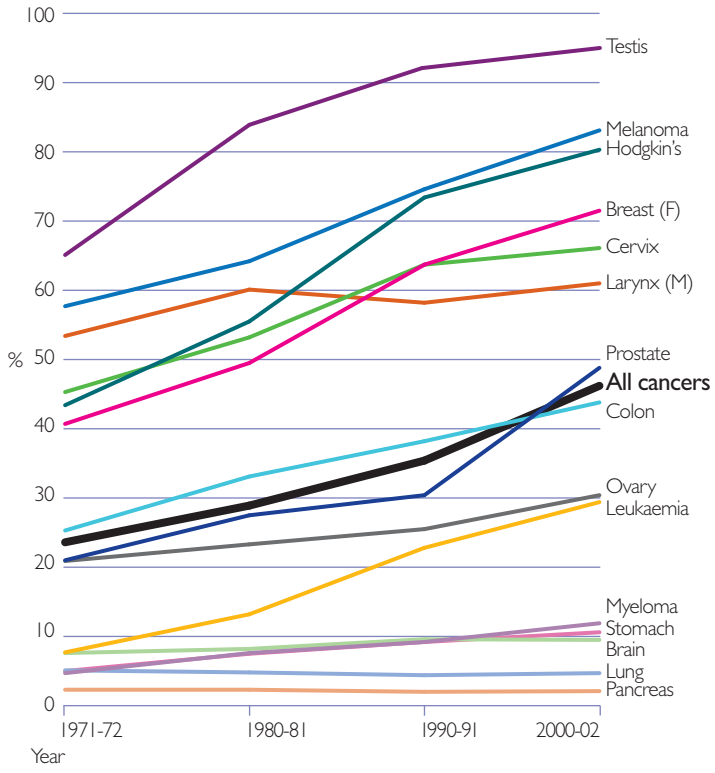
- We have led the world in identifying common genetic variants that increase the risk of breast, bowel, prostate and lung cancer. These genome-wide studies identify people who are at increased inherited risk of developing the disease through combined effects of multiple common gene variants, known as polymorphisms.

- Our scientists were the first to discover a virus which causes cancer in humans in 1963 when they observed "virus-like particles" in the tumour cells of a child with Burkitt's lymphoma. The Epstein-Barr virus (EBV) also causes cancer of the nasal cavity, some Hodgkin's lymphomas and lymphomas in people who are immunosuppressed, for example transplant patients. Our scientists have played a leading role in EBV research, pioneering work on therapeutic vaccines and developing successful immunotherapy for EBV lymphoma in transplant patients.

Relative survival

This graph shows the increase in ten year relative survival rates from the 1970s to the present for the most common cancers.

Relative survival of adults* diagnosed with cancer in England and Wales, 1971-2001**



*15-99 years
**Coleman M (2007) 2020 goals launch

Causes and prevention

Our researchers have been at the forefront of finding ways to prevent the disease. We have shown that up to 50% of cancers could be prevented by changes in lifestyle and have conducted world-leading research on these factors, as well as medical interventions such as tamoxifen chemoprevention. Our work has underpinned fundamental changes in Government health policy and the development of national and international prevention programmes.

- We have supported influential long-term studies into the hazards of smoking tobacco and the benefits of giving up. Our research has shown that half of all regular smokers will eventually die of their habit. This body of evidence has played a leading role in the reduction in smoking rates from over 80% of men in 1950 to 23% today. The UK has experienced the most rapid decrease in the world in premature death from tobacco over the past few years.

- Cancer Research UK is part of the European Prospective Investigation into Cancer (EPIC), the largest-ever study of the links between diet and health. Important discoveries, such as the link between excessive red meat consumption and cancer, continue to flow from this work and will inform cancer prevention strategies that will save lives in the future.

- We discovered that current or recent use of HRT increases a woman's risk of breast cancer. Use of HRT by UK women aged 50-64 in the past decade has led to about 20,000 extra breast cancer cases. These risks are informing HRT prescribing practice worldwide.

- We launched the International Breast Cancer Intervention Study (IBIS I) which showed that tamoxifen reduces breast cancer rates by around a third in women who are otherwise at increased risk of the disease. We are now supporting the IBIS II trial to test the effectiveness of anastrozole, a newer drug that may have fewer side effects than tamoxifen.

Screening

We have contributed to the development of all three national screening programmes for breast, bowel and cervical cancer, which have saved tens of thousands of lives.

- In the 1960s we first tested mammography as a way of diagnosing early breast cancer. More recently, we found that two X-rays were better than one, detecting more cancers and reducing recall rates. Two-view mammography is now used by all the national screening centres.

- In the 1950s we undertook some of the earliest studies of cervical screening. Since then our work has helped to improve the UK's cervical cancer screening programme. The death rate from cervical cancer for women aged 55–64 dropped by nearly 80% in the second half of the twentieth century, largely due to the screening programme. More recently, our scientists pioneered a new screening technique that could be used alongside cervical smears.

Treating cancer

Hundreds of thousands of people have beaten the disease thanks to new treatments developed by Cancer Research UK. Our scientists have contributed to the discovery or early clinical development of 5-10% of all major cancer treatments currently in clinical use around the world and we have taken over 100 novel drugs into clinical trials since 1982. We now lead the world in terms of the proportion of patients entering clinical trials to test new treatments, many of which have been practice-changing and have led to substantial improvements in survival.

Breast cancer

- Modern treatment of breast cancer has been revolutionised by the work of Cancer Research UK, contributing to the 70% ten year survival rate. We demonstrated the benefit of using tamoxifen to prevent recurrence after surgery and defined the role of newer treatments such as the aromatase inhibitors which have more potent effects on tumour cells. Our scientists showed that giving the drug tamoxifen to all breast cancer patients who needed it, whatever their age, could save an extra 20,000 lives each year worldwide. Our trials have shown that anthracyline drugs improve the results of adjuvant chemotherapy and that taxane drugs further improve the results. Through our clinical trials units, we helped to show that Herceptin can save additional lives among patients whose breast cancer has extra copies of the Her-2 gene. We have shown that radiotherapy to the breast can reduce the chances of regrowth of the tumour after the primary is removed, and that giving fewer but stronger radiation doses is just as effective. Looking forward, we are working on more targeted drug and radiotherapy treatments.

Lung cancer

- We continue to advance and perfect radiation techniques. We have developed a new approach to radiotherapy, CHART, which improves survival in patients with the most common type of lung cancer.

Bowel cancer

- In bowel cancer, our trials have shown that giving chemotherapy can increase the chances of cure for patients with disease that has spread to the liver, but which may be removed at surgery. We have also shown that chemotherapy can increase survival rates for patients having radiotherapy for cancer of the anus, and have defined the best drug treatment for the many older patients.

Prostate cancer

- In prostate cancer, our research has shown that higher doses of radiotherapy can be given safely to tumours using computerised targeting, and we are conducting several trials to compare different approaches such as radical surgery, radiotherapy or other types of treatment for primary tumours.

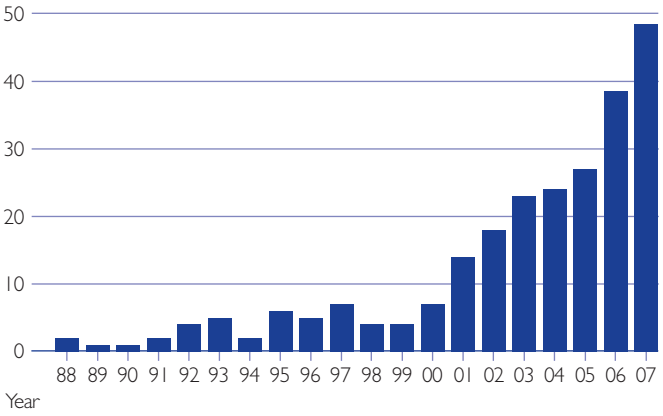
Cisplatin and carboplatin

- Cancer Research UK helped demonstrate the strong anti-cancer activity of cisplatin, and we discovered and developed carboplatin. Cisplatin and carboplatin have been two of the most successful anti-cancer agents ever developed, and are currently used to treat ovarian, lung and testicular cancers. Testicular cancer now has a 98% cure rate.

Clinical trials

Cancer Research UK has played an increasingly important role in funding and organising all types of clinical cancer trial: our 250 treatment trials since 1995 have involved more than 100,000 patients. We have rapidly increased our work in this field, with the number of new trials started rising from seven in 2000 to 49 in 2007, reflecting the gathering pace of scientific discovery and its application in the clinic. More widely, by March 2009, we expect there to be more than 50 new drugs in clinical development worldwide where the initial discovery or the first Phase I trial was carried out by Cancer Research UK. Of these, between six and nine will be in Phase III development, including a number of potential treatments for lung cancer.

Clinical trials supported by Cancer Research UK



Lymphoma

- In lymphoma, our trials have helped to determine the best treatment for Hodgkin's disease, combining high cure rates of 70-80% with as few side effects as possible. We have carried out the largest trials in the world on Burkitt lymphoma, using molecular diagnosis to target patients and showing cure rates of 60-70% can be achieved with intensive chemotherapy.

Brain cancer

- Our researchers first discovered temozolomide and demonstrated its effectiveness in clinical trials. Since then temozolomide plus radiotherapy has become the international standard of care for the brain cancer glioblastoma, leading to a pronounced increase in survival.

Children's cancers

- We have been the main funder of clinical trials co-ordinated by the Children's Cancer and Leukaemia Group, which have significantly boosted the cure rates for many childhood cancers. Three-quarters of children and adolescents with cancer are now successfully treated.

Pancreatic cancer

- In pancreatic cancer we have shown that chemotherapy after an operation can raise the chance of a cure for some, and further, that using the newer drug gemcitabine can improve the results for patients with tumours that are too advanced for surgery.

Informing and influencing

We communicate our messages to the widest possible audience and work hard to influence public policy.

- We were a key player in the effort to secure a ban on tobacco advertising. We successfully lobbied the Government to introduce smokefree legislation throughout the UK, protecting workers from second-hand smoke and precipitating a sharp fall in smoking rates.

- We give information on cancer and on clinical trials to around one million people every month through our award winning website.

For more information on our impact and achievements, please see www.cancerresearchuk.org/achievements