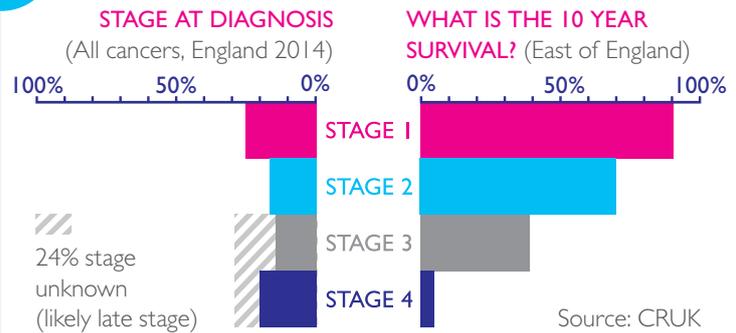# EARLY DETECTION OF CANCER

What is early detection?

Early detection is defined as the detection of primary cancer, or a pre-malignant condition, at an earlier point in the disease progression than would occur with current detection and diagnostic approaches.

Some cancers are currently detected early, but unfortunately many are detected at a late stage. A breakdown by stage for all cancers diagnosed in England in 2014 shows that a significant proportion of people are diagnosed late, i.e. 59% for Stages 3, 4 and those with unknown stage, who typically have advanced disease.

Diagnosing cancer earlier is key to improving survival, as highlighted in a breakdown of survival by stage. This comes from a long term study in the East of England on patients diagnosed with a number of common cancers from 1996-2000. For those diagnosed at an earlier stage, 10 year survival is significantly higher.

STAGE AT DIAGNOSIS
(All cancers, England 2014)

100% 50% 0%

WHAT IS THE 10 YEAR SURVIVAL? (East of England)

0% 50% 100%

STAGE 1
STAGE 2
STAGE 3
STAGE 4

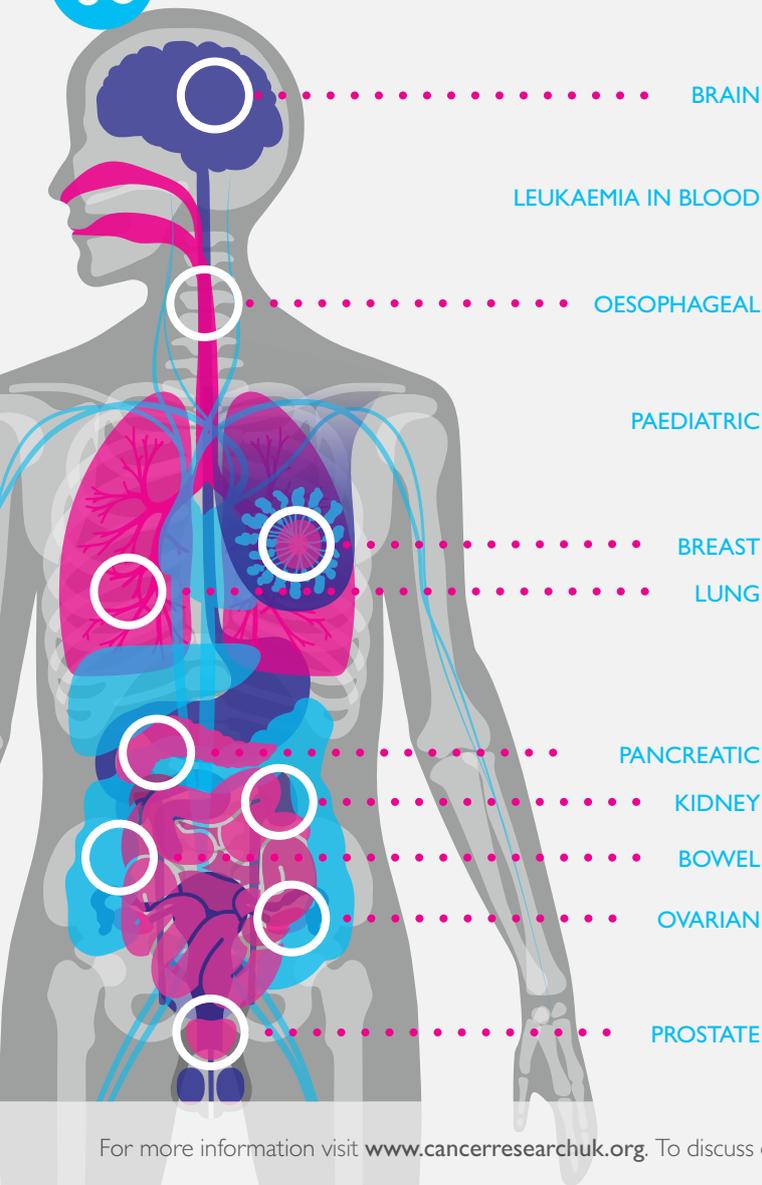24% stage unknown (likely late stage)

Source: CRUK

Early detection factsheets

This series of factsheets explores a number of common cancers and discusses the challenges of early detection for each. Highlighted are opportunities where improved understanding or technology development could potentially enable earlier detection and improve outcomes and survival.

Featured cancers

- BRAIN
- LEUKAEMIA IN BLOOD
- OESOPHAGEAL
- PAEDIATRIC
- BREAST
- LUNG
- PANCREATIC
- KIDNEY
- BOWEL
- OVARIAN
- PROSTATE

Glossary

Definitions of cancer-related terms:

Basement membrane - Thin membrane that separates epithelial tissues from underlying tissue.

Benign - Tumour that will not invade or spread to another area.

Biopsy - Sample of tissue taken for examination by a pathologist. Often done to confirm the presence and type of cancer.

Diagnosis - Determining which disease is causing a patient's symptoms. Typically involves carrying out tests or procedures.

Dysplasia - A higher number of cells in tissue caused by increased cell proliferation - the additional cells appear abnormal.

Epithelial tissues - Line the surface of body cavities and organs.

Hyperplasia - A higher number of normal cells in tissue caused by increased cell proliferation.

In situ cancer - Cancer that has not spread from where it started.

Invasive cancer - Cancer that has spread and is growing into surrounding, healthy tissues.

Lead time - Time between early detection with screening and the point when diagnosis would have happened without screening.

Lead time bias - A perceived increase in survival time in cases where early detection does not alter the course of the disease.

Length / Lag time bias - Distortion of statistics caused by more slow-growing (lower risk) cancers being detected by screening than fast-growing. Makes outcomes appear better than reality.

Liquid biopsy - Analysis of non-solid tissue sample such as blood.

Malignant - Tumour grows out of control, invades and spreads.

Metaplasia - The reversible replacement of one mature cell type with another.

Metastasis - Spread of cancer from one body area to another.

Over-diagnosis - Diagnosis of disease that will not result in symptoms in a patient's lifetime, leading to unnecessary interventions.

Relative survival - Compares the survival of individuals with cancer to those in the general population. It is similar to the probability of survival from cancer without including any other cause of death. Note that it can be more than 100%.

Risk stratification - Assessment of a patient's risk based on medical history, test results, etc. Treatment pathways can vary depending on the patient's risk stratification profile.

Screening - Testing people who appear healthy for signs of disease. Screening saves lives by finding cancer early.

Surveillance - Regular monitoring of disease progression after diagnosis to keep track of change and inform treatment choices.

Under-diagnosis - Failure to diagnose a condition or disease caused by no diagnostic test being 100% accurate.

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For more information visit **www.cancerresearchuk.org**. To discuss opportunities contact **EDadmin@hermes.cam.ac.uk**