Early detection of cancer is the key to success because effective treatment and cure are more likely. Clearly a small cancer is generally more easily treated than a large one and a cancer that has not spread is usually much more easily treated than one which has metastasised to other parts of the body.

Cancers come in all sizes and in all parts of the body. They affect almost all tissues. They are classified into:

1. **Carcinomas** - from body coverings and linings
2. **Sarcomas** - from bone, muscle and connective tissue
3. **Adenomas** - from glandular tissue
4. **Lymphomas** - from lymphoid tissue
5. **Leukaemias** - from blood

The Symptoms of Cancer

Because of the diversity of types and locations of cancerous growths, the symptoms may be enormously varied and may be missed by the individual because they are non-specific and may mimic other illnesses.

**General Symptoms** may include:

- Fatigue
- Weight loss (particularly if unexplained)
- Fever, which may be intermittent or persistent and often low-grade
- Sweating, often excessive and occurring during the day or at night.
- Generally feeling unwell without explanation
- The discovery of anaemia (iron deficiency) without explanation

There are then the symptoms which relate to individual cancers and are often site-specific, depending on the organ involved, such as:

a. **Skin** - a lump, an ulcerated area, discolouration or other changes
b. **Bowel** - from the mouth to the anus, changes may occur. In the mouth, persistent ulceration or the development of a white patch. Other gut symptoms may include
dyspepsia, abdominal pain, change of bowel habit or rectal bleeding

c. Kidney, Bladder and Prostate - pain, frequency of micturition, difficulty passing urine or blood in the urine.

d. Liver - often insidious until the later stages with general feelings of ill-health and the changes of jaundice with yellowing of skin and eyes.

e. Pancreas - often one of the most difficult to diagnose because the tumours are generally small and cause little in the way of symptoms until late when they cause pressure effects.

f. Lung - classically cough, increased sputum and blood flecks in the sputum. Sometimes pleuritic pain.

g. Brain - depends on the area of brain affected and may result in stroke-like symptoms, seizures, headaches or personality changes.

When a cancer spreads to a distant part of the body, new symptoms may develop. They may be manifest as enlarged glands or a lump. A metastasis may result in an exacerbation of existing symptoms but, in reality the symptoms may be any one of a hundred.

The difficulty with so many of these symptoms is that they may also be caused by a wide variety of benign conditions and people will tolerate them, dismissing them as trivial, and not report them to the doctor for a long period. Reasons for failure to report are:

- Not considered important
- “Expected for someone my age”
- Don’t want to be a nuisance
- FEAR of the possibility that the symptoms could be something sinister.

It is remarkable that people will put up with a developing lump, frequency of urination, change of bowel habit, indigestion, pain, cough or bleeding from the back passage for weeks or months before doing anything about it. It is commonly the case that, by the time the problem is reported, the golden period for early diagnosis has slipped by.

**Diagnosis of Cancer**

The introduction of the two week rule for suspected cancer has made a huge step forward in the timely diagnosis of the disease. Advances in medical research and investigation have led to the introduction of a range of investigations to make the diagnosis more rapid and more accurate.

Diagnosis starts, as in all illness and disease, with a visit to the GP and a detailed *history*. The creation of a picture of the symptoms, nature, duration, location and severity may alert the clinician to the possibility of disease. The history may include information about personal and family illness.

*Physical Examination* may give important clues to abnormalities; findings such as lumps, enlarged glands, enlarged liver or functional change may increase suspicion or accord with the history.

*Diagnostic tests* involving the investigation of blood, urine or other body fluids and products may be carried out by the GP. Like the history and examination, such tests may give an *indication* of cancer but they are not diagnostic and the clinician cannot rely on them.

Patients with any unexplained and possibly sinister symptom, however unlikely, should be referred on a *two-week rule* to the appropriate local cancer diagnostic service.

After the hospital specialist has re-checked the history and examination, he or she may well carry out a range of additional tests:

- **Blood tests** to confirm or supplement and tests already done
- **Urine tests** may be necessary
- **Radiography** - X-rays may give the first definitive indication of disease, particularly in areas such as the lung.

*Medicine for Managers* articles are not intended to be a source of medical advice. Their purpose is to familiarise the non-medical reader about current key medical disorders. Any medical or medicinal products mentioned by name are examples only and should not be regarded as an endorsement of their use.
Endoscopy - may be used to visualise areas of the body to make a direct diagnosis. For example, laryngoscopy (looking at the voice box in suspected laryngeal/vocal cord cancer), gastroscopy to view the stomach or sigmoidoscopy to assess the lowest part of the bowel if a rectal tumour is suspected. Endoscopy itself is a simple technique involving the introduction of a flexible tube with a light on the end into a body cavity. The end of the tube can be moved through 360° to visualise all parts of the area and a biopsy can be taken by passing a forceps along the tube.

Imaging - has become a mainstay of diagnosis. A generation ago, imaging was confined to X-rays; now there are so many types of scan to obtain pictures of the internal structures that diagnosis may be made more quickly and much more accurately. Ultrasound is a relatively simple technique involving a probe which is placed on the body and which sends out very high frequency sound waves (inaudible) which bounce off tissues inside the body using a technique similar to echo location in ships. The resulting echoes are converted by computer into a picture of the area. The technique is the same as for ante-natal diagnosis.

CT Scan. This is a radiological technique where an X-ray machine is used to obtain high quality digital pictures of the area under investigation and they are then converted by a computer into electronic images which may be viewed from any direction to produce a 3-D picture of the area under investigation. The scanner itself usually looks like an enormous doughnut. The resulting pictures look like textbook diagrams of the internal organs.

MRI Scan produces similar but somewhat more detailed pictures using magnetic resonance. The individual under investigation is placed in a powerful magnetic field and the distortion of the field is captured and, again, a computer then uses the images to create the 3-D picture of the body under investigation.
**Enhanced scans** make use of the properties of agents to show up on scans. So, **nuclear (radionuclide) scans** involve the injection of a minute amount of radioactive material which circulates round the body and accumulates in particular tissues, e.g. bones to enhance their structure. In **PET scans**, the injection of a tracer (equivalent to a dye) which again will accumulate in a particular area to aid visualisation.

- **Biopsy** is an important tool in the diagnostic process. It involves taking a sample of the tissue under investigation for examination under the microscope. From the review of the biopsy the pathologist may be able to make a diagnosis of the tissue type but also of its nature and its aggressiveness. The biopsy may be carried out by:
  - Superficial incision or excision of a lesion where it is accessible on the outside of the body
  - Surgical procedure, often to remove the entire tumour (**excision**) or part of the tumour (**incision**)
  - **Needle biopsy** is a simple technique often used when investigating breast lumps, to withdraw a small amount of fluid or tissue from a suspect area.
  - **Endoscopy** using biopsy forceps to take a sample of the tissue in the visualised area.

New diagnostic techniques are being developed to make the diagnosis more accurate to assist the **oncologist** (cancer specialist) to devise the most effective treatment plan.

**Treatment of Cancer.** Over the last one hundred years the treatment of cancer has developed beyond measure, starting at a trot with surgical techniques and increasing to a gallop with radiological and pharmacological techniques. Cancer treatment changes almost weekly as new developments, treatments and combinations of treatments become available. This is reflected in the improving survival rates and tumours which may be regarded as cured.

I am sure that the books on cancer treatment, if stacked, would reach to the top of the Eiffel Tower. It is of necessity a very basic description in a page or so.

Radiation and chemotherapy have been used for many decades and surgery for hundreds of years. They still are.

**Surgery** enables the whole of a tumour to be removed if it has not metastasised. It is still commonly used in the treatment of tumours of breast, testis and prostate. Small tumours of the large bowel or localised to one lobe of a lung can also be completely excised. The technique involves removal of all tumour tissue with a margin of healthy tissue all round to ensure that no malignant cells remain. In some cases the ‘healthy’ surrounding tissue is subjected to **frozen section** analysis to ensure that there are no tumour cells left. The sample of tissue to be examined is placed on a disc and rapidly frozen to -30°C using ethyline glycol or polyvinyl alcohol.

Once frozen it can be cut into very thin slices with a microtome and examined under a microscope. The tissue can be ready for microscopic analysis in 10 minutes (as opposed to 6-8 hours using conventional section techniques).

All sorts of surgical aids are being developed. Perhaps one of the most innovative is the injection of a chemical into the tumour circulation which makes the tumour fluoresce when viewed with glasses with appropriate lenses. The
surgeon then needs to remove any fluorescent tissue to eliminate the cancer.

**Radiotherapy** destroys cancer cells by bombarding them with high energy gamma-rays. The cells are damaged and die.

The beam is able to rotate round the patient on many machines in order to be positioned to hit the right spot.

Accuracy is vital because radiotherapy will damage or destroy healthy as well as malignant tissue.

In other circumstances radio-active needles are placed in organs such as the thyroid to destroy thyroid cancer.

The needles allow very accurate targeting of the treatment.

Radiotherapy may successfully destroy or shrink cancers. It may also be used in combination with surgery and/or radiotherapy.

**Chemotherapy** commonly uses toxic drugs to interfere with the cell division process. The treatment targets rapidly dividing cells, such as occur in tumours but the drugs do not discriminate against other rapidly dividing cells such as skin, hair, stomach and genitalia.

Side effects such as hair loss, skin ulceration, nausea, vomiting and gastric ulceration and infertility are common side effects.

However, the normal body cells do regenerate when the treatment is complete so that the organs recover.

Chemotherapy is normally carried out with combinations of different drugs to try to minimise the side effects by reducing the dose of each in the cocktail and they are normally given in pulses with a period of weeks between to allow the body tissues (and the patient) to recover between doses.

**Hormone Therapy** is used in those cancers of which the development and growth is linked to hormonal factors. Breast tumours are sensitive to oestrogen, testicular and prostate cancers to testosterone. Consider prostate cancer.

Such tumours need testosterone to grow. The hormone normally controls prostatic growth and activity as well as other functions such as penile growth and erections, secondary hair growth and muscle strength.

Testosterone makes prostate cancer cells grow faster. If the testosterone is removed, the cancer will usually shrink, even if it has spread elsewhere in the body.

The treatment works either by blocking the instruction from the brain to manufacture testosterone or blocking the manufacture at testicular level. It doesn’t cure the disease but controls, slows and makes manageable the disease. It may be combined with radiotherapy.

**Immunotherapy** is a newer technique, with the objective of getting the body’s immune system to fight the tumour. Immunotherapy, if administered systemically, may improve the cancer-destroying properties of the immune system.

Targeted immunotherapy specifically acts on the immune system to destroy cancer cells. As yet it has really only had some success with breast disease and with bone marrow transplants where the donor’s immune cells will attack cancer cells present in the host. The technique has
great promise and it may be possible to engineer specific treatments for any individual’s particular disease.

**Gene Therapy** is a very new technique with the objective of replacing damaged genes in the DNA.

Mapping of the DNA code has allowed researchers to identify particular damaged genes responsible for functions such as uncontrolled growth and which can be repaired or replaced. There have been no significant successes yet but the technique promises miraculous results if it works reliably.

Every year sees improvements in treatment and survival rates have improved considerably over the last forty years. One in two of us will develop cancer, half of us will be cured.

For many it is a slow, painful death and I am sure we can all agree that every success is to be welcomed and applauded.

Every cancer charity; **Cancer Research UK** and all the rest must be supported. The disease will be beaten and we must hope for success as quickly as possible.

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