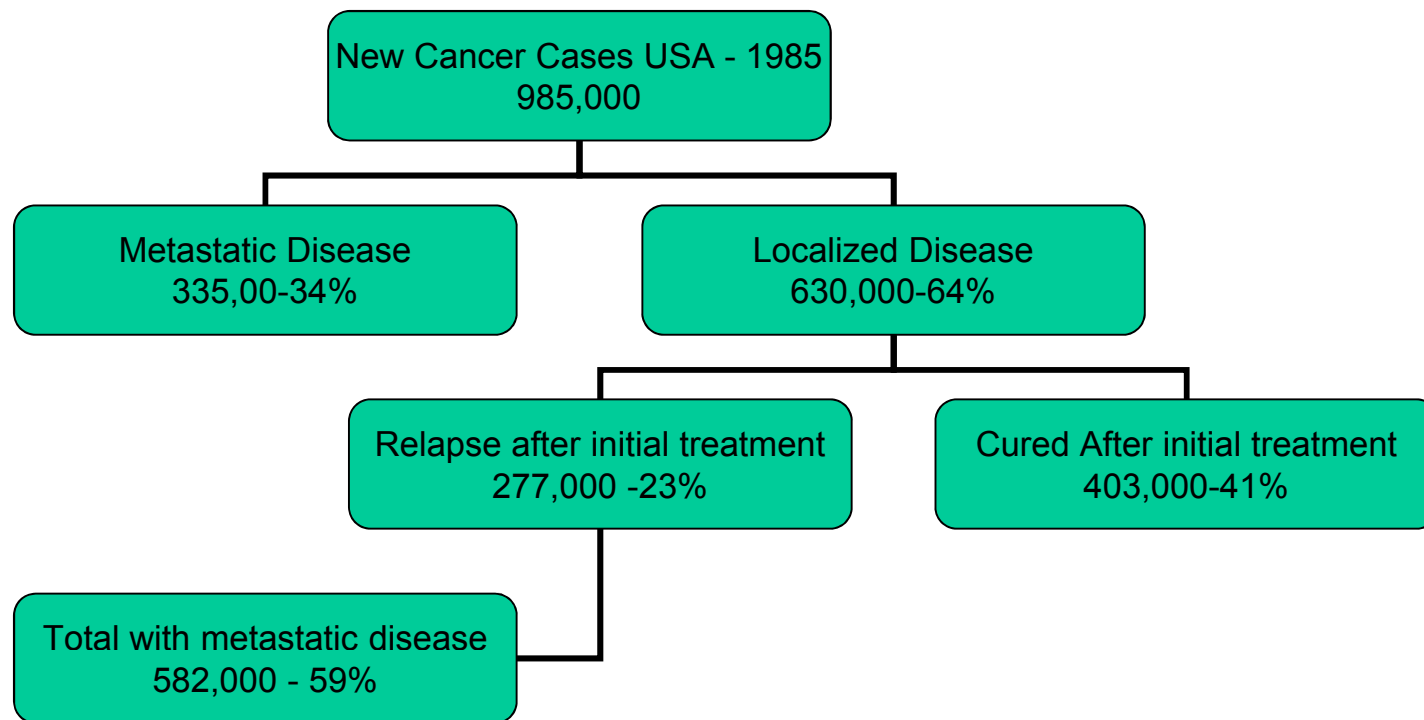


CANCER: BASIC FACTS

Mark Struthers, BBA, BSRT (R)(MR), CMRT, CIIP

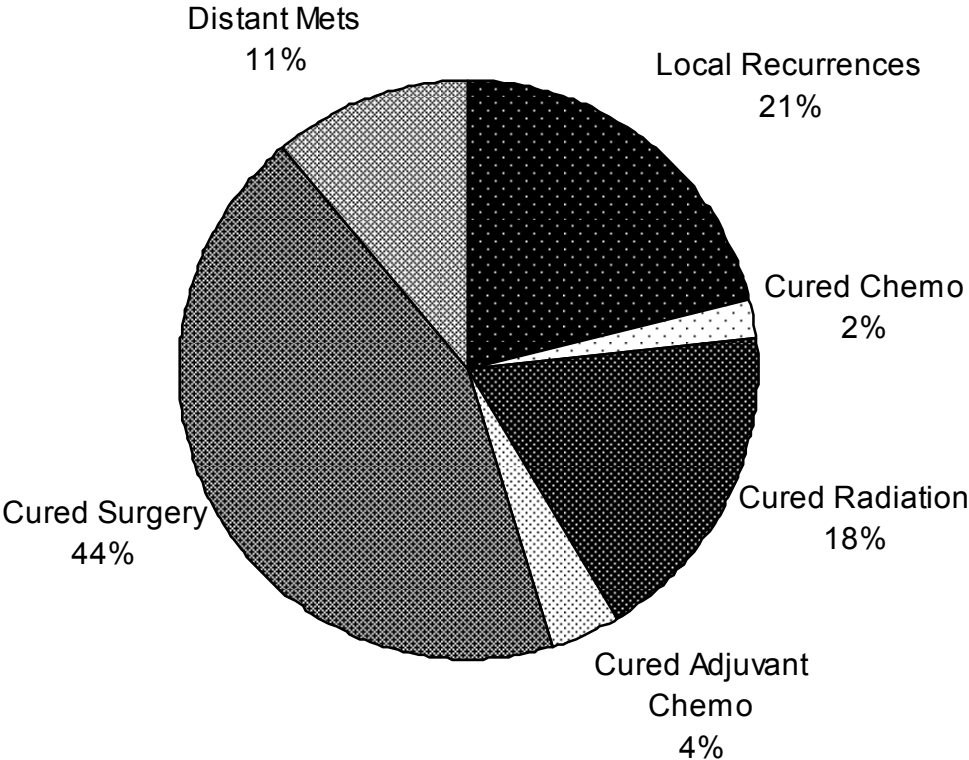




About 1,479,350 new cancer cases are expected to be diagnosed in 2009.



Outcome of Treatment in Patients With Localized Disease



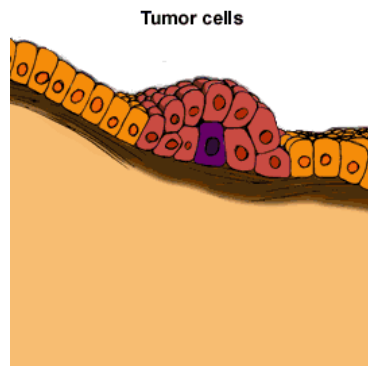
Characteristics of Cancer

- An unrestricted or unregulated growth
- Cancer growth is "invasive". The cancer cells invade other structures, tissues or organs and often disrupt their function
- Cancer spreads or metastasizes throughout the body
- The growth rate of cancer may be faster or slower than that of normal cells
- Cancer cells are often not completely formed, or immature



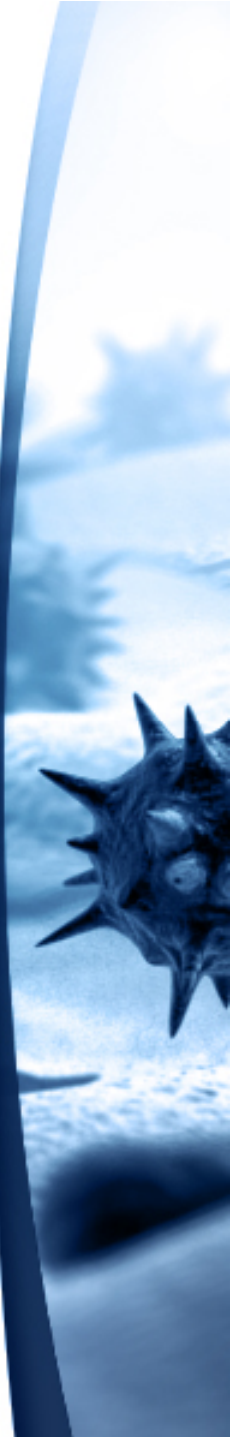
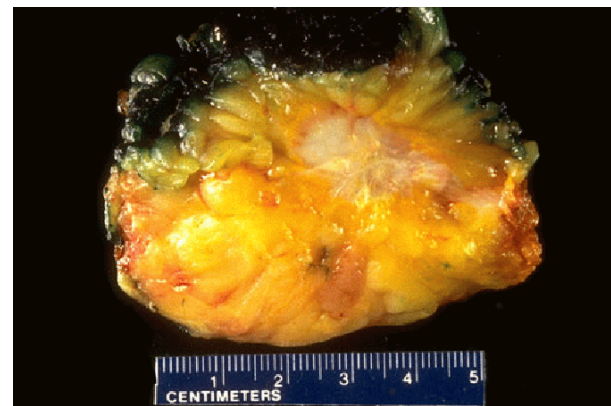
What is cancer?

- A group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death.



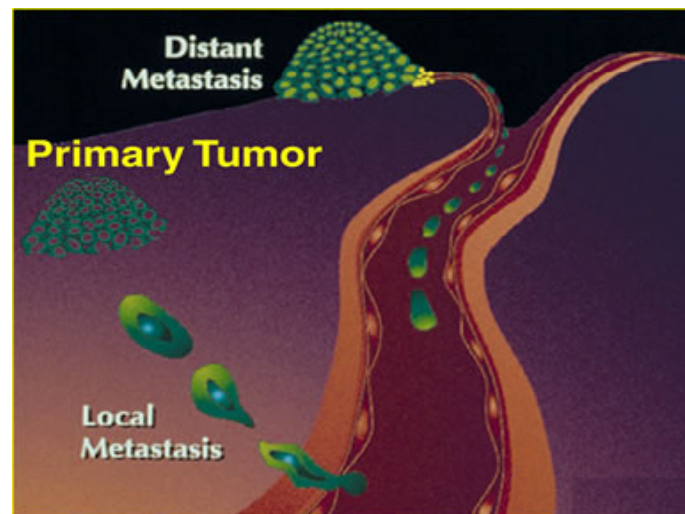
What is in situ cancer?

- Early localized tumors
- Traditionally, in situ cancers are counted separately from invasive cancers because it is not certain that they will become invasive.



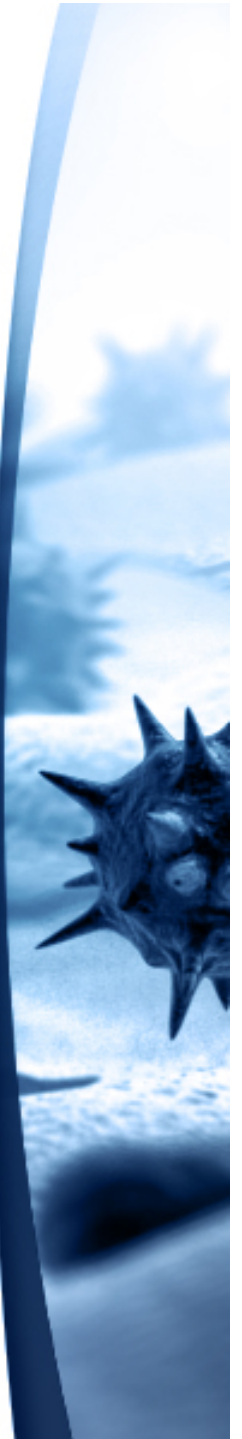
What is invasive cancer?

Cancer that has spread beyond the layer of cells where it first developed to involve adjacent tissues.



What causes cancer?

- Cancer is caused by both external (chemicals, radiation, and viruses) and internal (hormones, immune conditions, and inherited mutations) factors
- Causal factors may act together or in sequence to initiate or promote carcinogenesis
 - Ten or more years can pass between exposures and detectable cancer



Statistics

The American Cancer Society estimates that 169,000 lives will be lost to cancer in 2009 because of tobacco use.

Scientific evidence suggests that about one-third of the 562,340 cancer deaths expected to occur in 2009 will be related to overweight or obesity, physical inactivity, and poor nutrition and thus could also be prevented.



Prevention

- Some factors can be controlled:
 - Protection from sunlight
 - Many of the more than 1 million skin cancers that are expected to be diagnosed in 2009 could be prevented by protection from the sun's rays and avoiding indoor tanning.
 - Cessation of cigarette smoking
 - Prevention of heavy use of alcohol



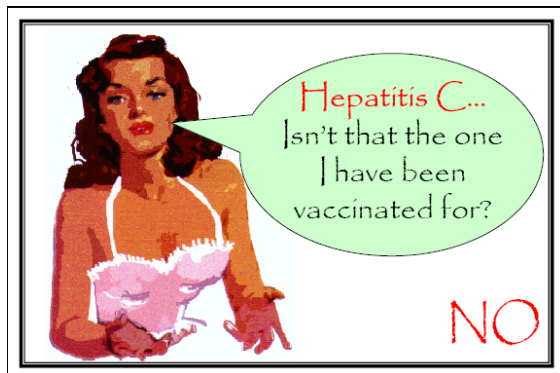
Prevention

- Diets high in fruits, vegetables, and fiber may reduce the incidence of some types of cancers.



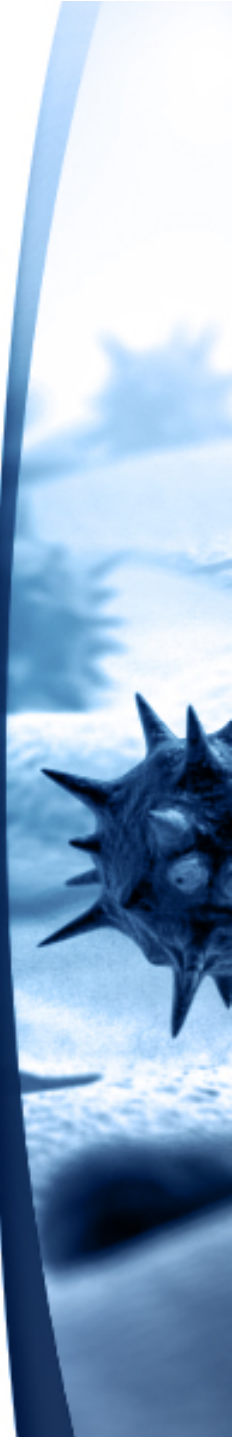
Prevention

- Minimizing exposure to infectious agents:
 - Hepatitis C virus
 - Human Papillomatous Virus (HPV)
 - HIV
 - Helicobacter pylori



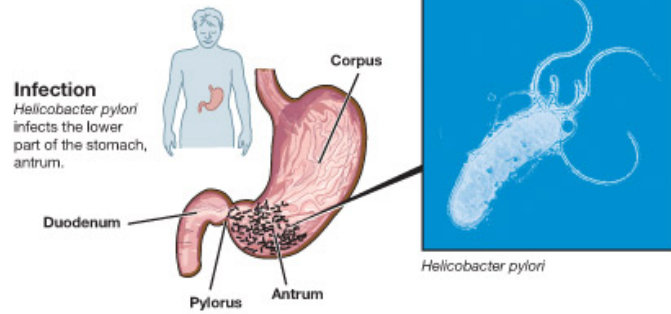
Prevention

- Cancers related to infectious agents, such as hepatitis B virus (HBV), human papillomavirus (HPV), human immunodeficiency virus (HIV), *Helicobacter pylori* (*H.pylori*), could be prevented through behavioral changes, vaccines, or antibiotics.

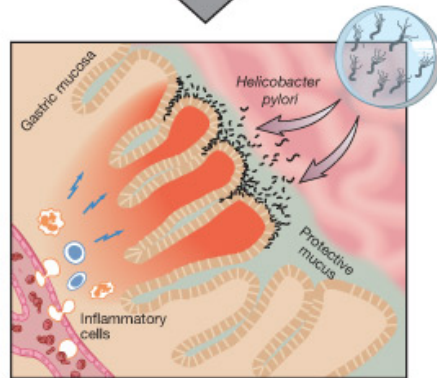


Helicobacter pylori

– the bacterium causing peptic ulcer disease

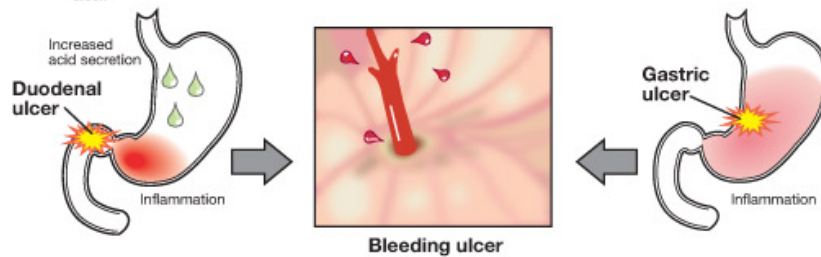


Inflammation
Helicobacter pylori causes inflammation of the gastric mucosa (gastritis). This is often asymptomatic.



Ulcer

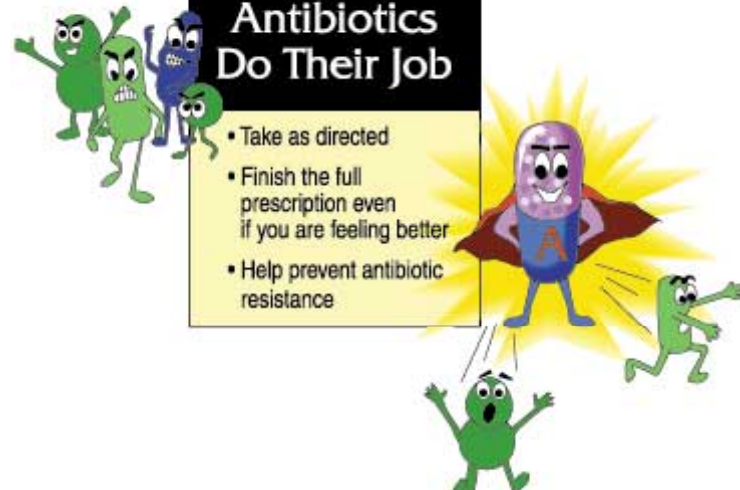
Gastric inflammation may lead to duodenal or gastric ulcer. Severe complications include bleeding ulcer and perforated ulcer.



© The Nobel Committee for Physiology or Medicine

Help Your Antibiotics Do Their Job

- Take as directed
- Finish the full prescription even if you are feeling better
- Help prevent antibiotic resistance



Prevention

- Regular screening and self-exams can detect cancers of the breast, tongue, stomach, colon, rectum, cervix, prostate, testis, and melanoma at an early stage, when treatment is more likely to be successful.
- These sites include over half of all new cancer cases.

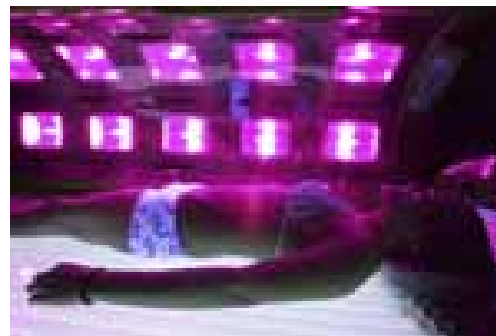


Skin Cancers

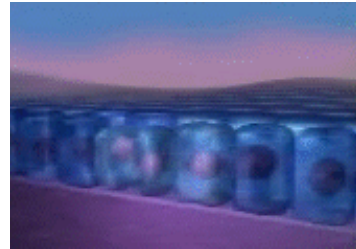
- Substantially more than 1 million unreported cases of basal cell or squamous cell cancers occur annually.
- The most common serious form of skin cancer is melanoma, which is expected to be diagnosed in about 68,720 persons in 2009.
- Melanoma is primarily a disease of whites; rates are more than 10 times higher in whites than in African Americans.



Advanced Health Education Center 2009



Vital Statistics



- Of these new cases, about 85% of all patients survive 5 years. With early detection, about 95% would survive 5 years. This means that of those persons diagnosed with cancer in 2005, about 100,000 more would survive if their cancers had been detected in a localized stage and treated promptly.

Who gets cancer?

- **Anyone can get cancer**
- **Since the incidence rises with age, most cases affect adults in mid-life or older**
 - **More than 76% of all diagnosed cancers occur in people aged 55 and older**
- **Cancer in children is rare**
 - **among children ages 1-14 years, cancer causes more deaths in the U.S. than any other disease**



Hereditiy and Cancer

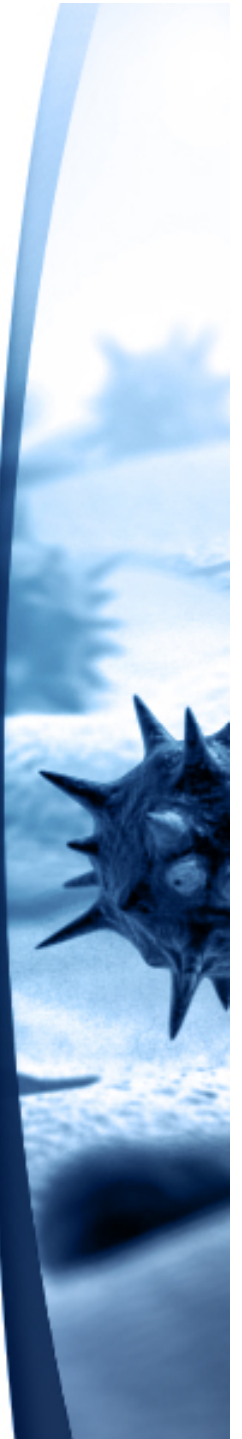


About 5 to 10% of all cancers are clearly hereditary; in that an inherited genetic alteration predisposes the person to a higher risk of acquiring particular types of cancer

Statistics



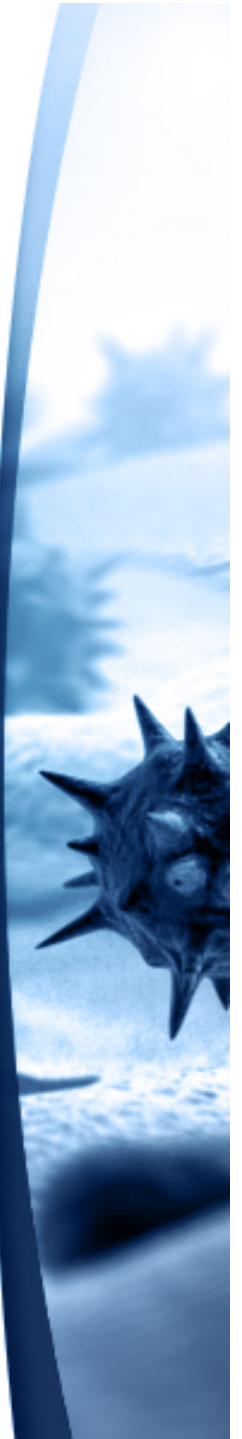
Over 11.1 million Americans alive today have a history of cancer; about 50% of these were diagnosed five or more years ago



Survival Rates

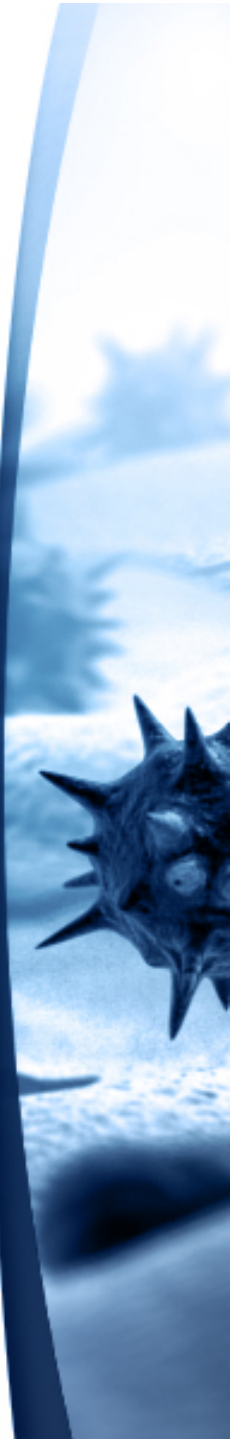


Most of the patients with more than a five year survival rate can be considered cured, while others in this group may have evidence of cancer. "Cured" means that a patient has no evidence of disease and has the same life expectancy as a person who never had cancer.

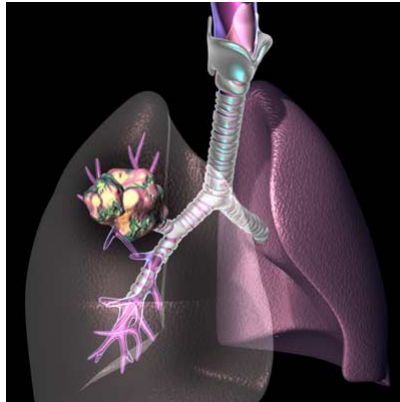


How many people will die?

- This year, about 562,340 Americans are expected to die of cancer, more than 1,500 people a day.
- One in every four deaths in the U.S. is from cancer.

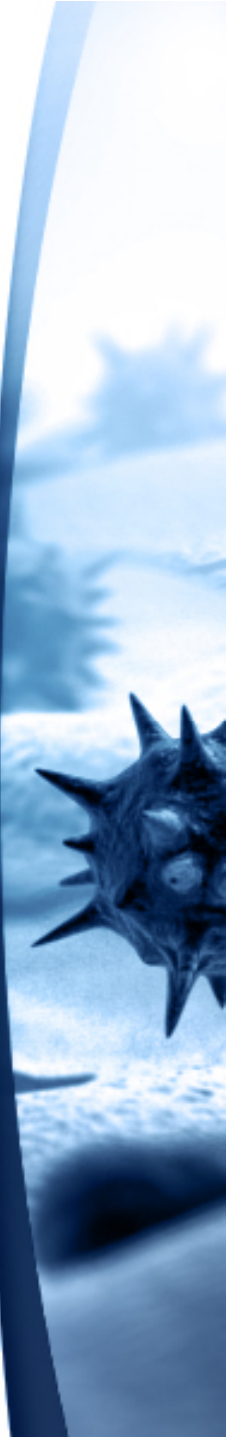


National cancer death rate?



The major cause of the increasing death rates has been lung cancer. Death rates for many major cancer sites have leveled off or declined over the past 50 years.

If lung cancer deaths were excluded, cancer mortality would have declined by 14% between 1950 and 1990.



How many are surviving?

In the early 1900s, few cancer patients had any hope of long-term survival. In the 1930s, fewer than 1 in five cancer patients were alive five years after treatment. In the 1940s this number improved to 1 in 4. By the 1960s the number had improved to 1 in 3.

About 879,000 Americans or 6 out of ten patients who get cancer this year will be alive five years after diagnosis!



How many are surviving ?

When adjusted for normal life expectancy (factors such as dying of heart disease, accidents, and diseases of old age), a relative 5 year survival rate of **66%** (2001) is commonly used to measure progress in the early detection and treatment of cancer.

****Why are they surviving?**



Cancer Warning Signals

Change in bowel or bladder habits

A sore that does not heal

Unusual bleeding or discharge

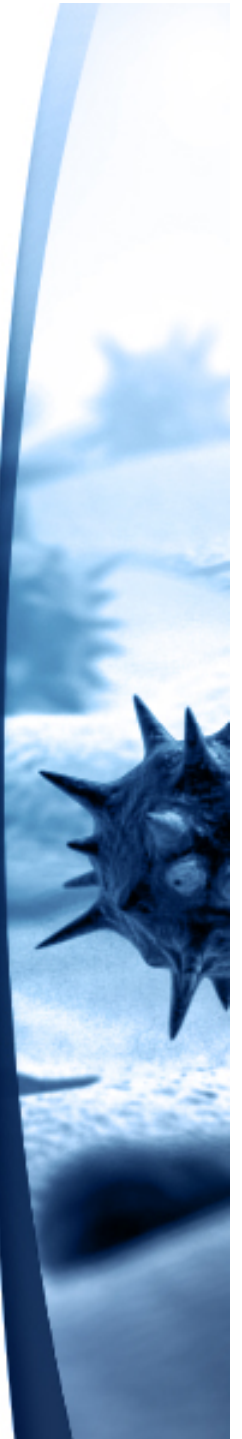
Thickening or lump in the breast or elsewhere

Indigestion or difficulty in swallowing

Obvious change in a wart or mole

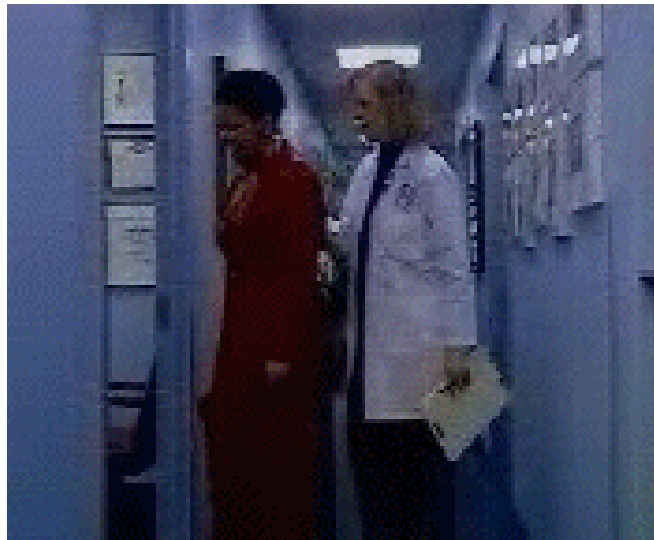
Nagging cough or hoarseness

The American Cancer Society



Sequence of Events Leading to Treatment

Family Physician - Initial Symptoms



Sequence of Events Leading to Treatment

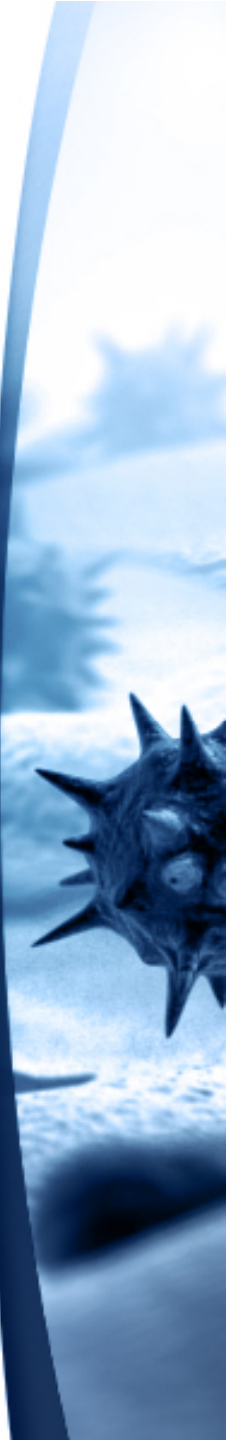
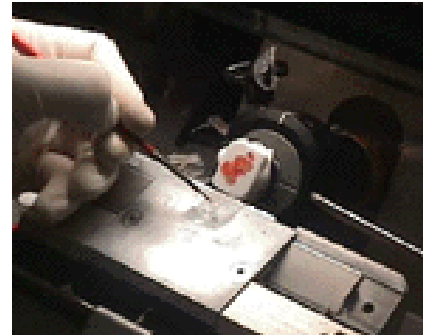
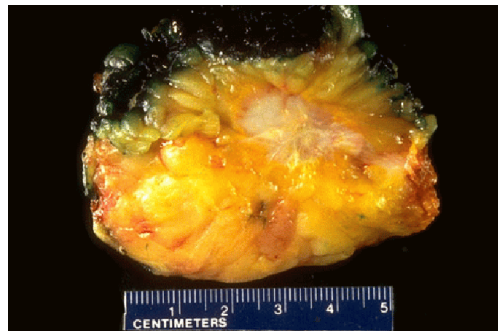
Diagnostic Work-Up

Identification of Problem



Sequence of Events Leading to Treatment

Biopsy - Tissue Confirmation



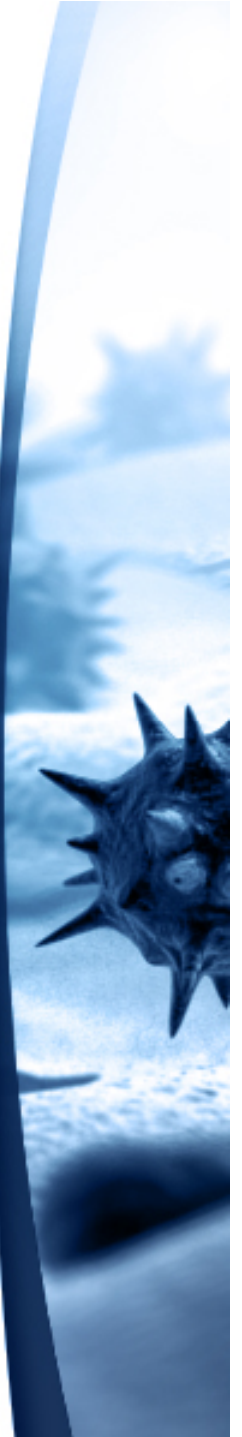
Sequence of Events Leading to Treatment

Oncologist - Treatment



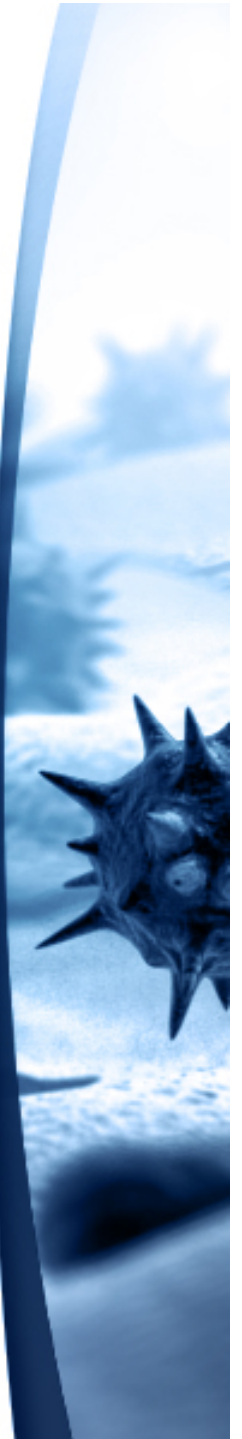
Cancer Treatment Modalities

1. Surgery
2. Radiation Therapy
3. Chemotherapy



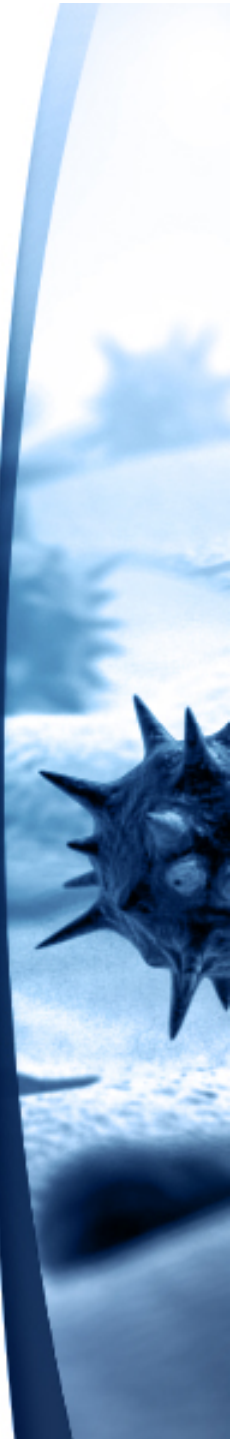
Surgery

- Plays a key role in the diagnosis and staging of cancer
- Advances in surgical techniques have allowed surgeons to successfully operate on a growing number of patients
 - Operations are more conservative to allow for better function of tissues and potential for reconstruction.
- Offers the greatest chance for cure for many types of cancer



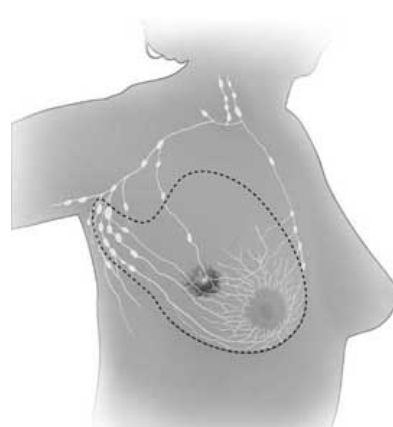
Forms of Surgery

- **Preventive (prophylactic)**
- **Diagnostic/Staging**
- **Curative**
- **Debulking (cytoreductive)**
- **Palliative**
- **Supportive**



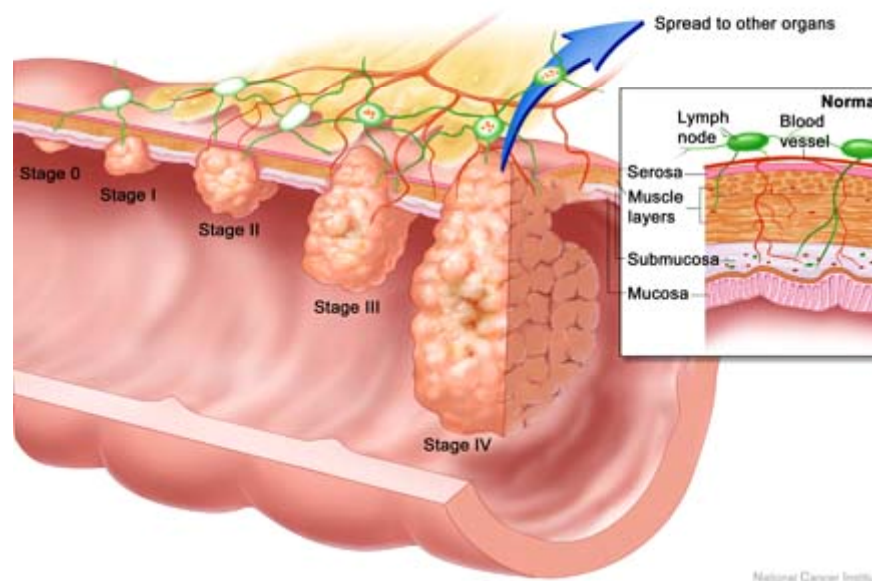
Preventative Surgery

- Removes tissues likely to become malignant before signs of cancer appear
 - Pre-cancerous polyps in colon
- Removes an entire organ which is likely to develop cancer
 - Breast removal in females with strong genetic predisposition to cancer



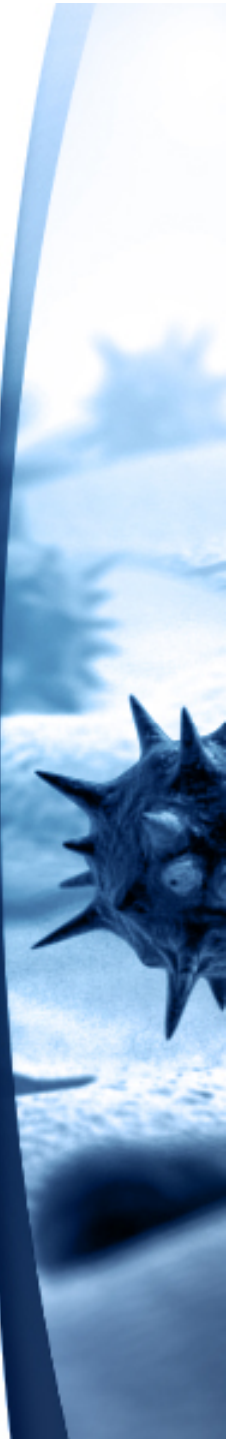
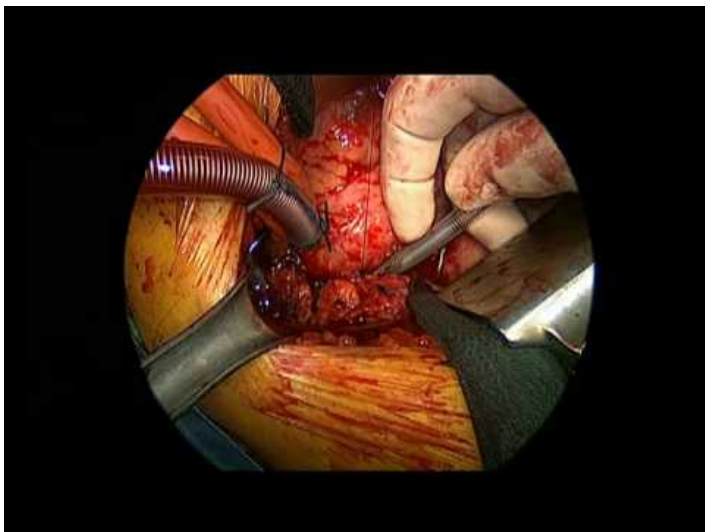
Diagnostic/Staging Surgery

- Can be used to gather tissue samples
- Done to determine metastasis of cancer



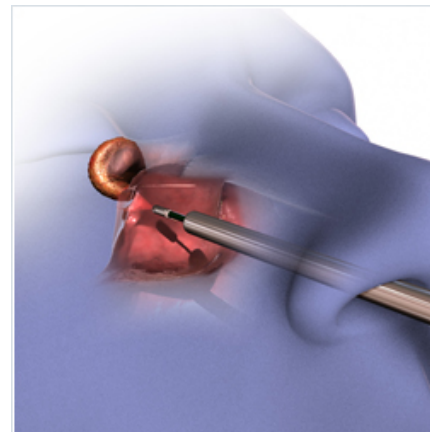
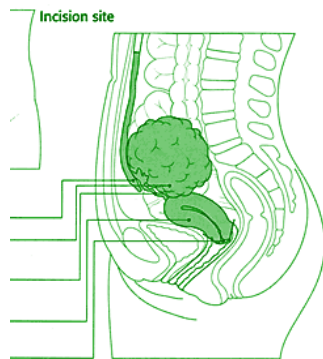
Curative Surgery

- Used for a confined tumor which can be removed in one unit
- Can be done with or without chemotherapy or radiation therapy



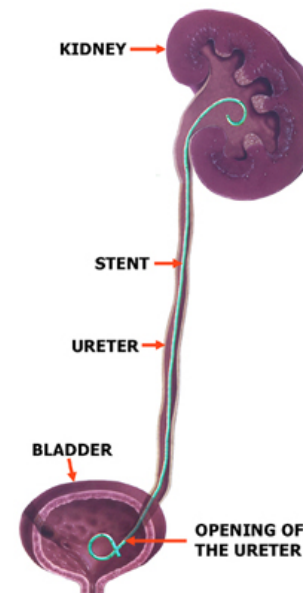
Debulking Surgery

- Used to reduce the size of a tumor if it cannot all be removed at once
- Usually followed up with radiation therapy or chemotherapy
 - Commonly used for advanced ovarian cancer



Palliative Surgery

- Used to treat complications related to advanced cancer
- Can relieve pain or obstruction of other tissues by a large mass
- I.e.: Nerve block, stent placement



Supportive Surgery

- Placement of devices related to cancer therapy
 - Typically a vascular access device

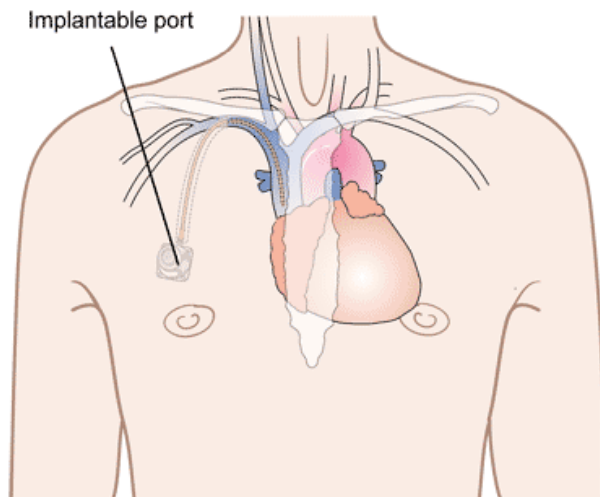


Diagram showing an implantable port
© CancerHelp UK

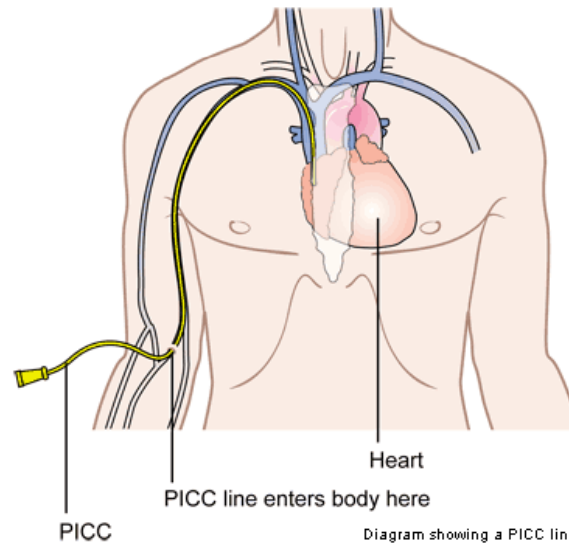
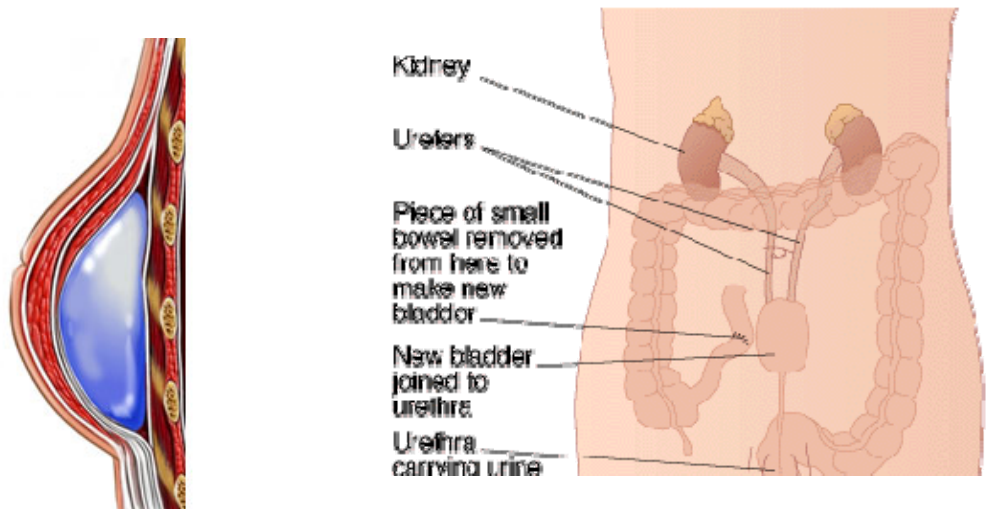


Diagram showing a PICC line
© CancerHelp UK



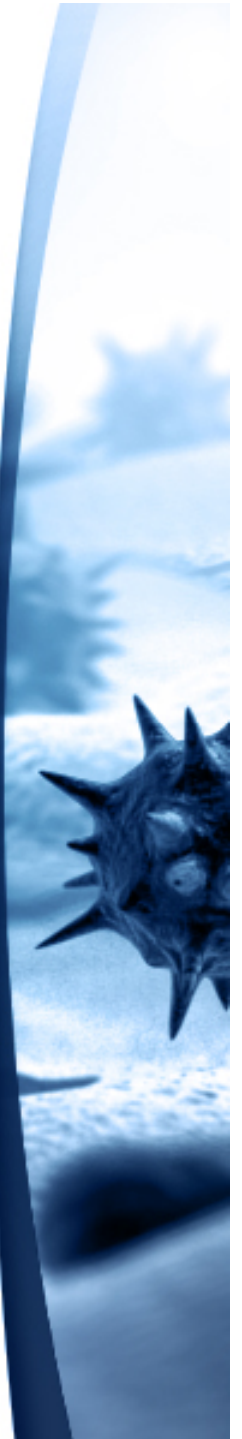
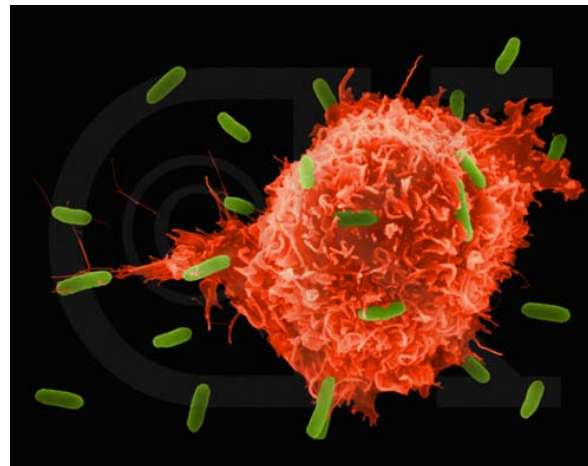
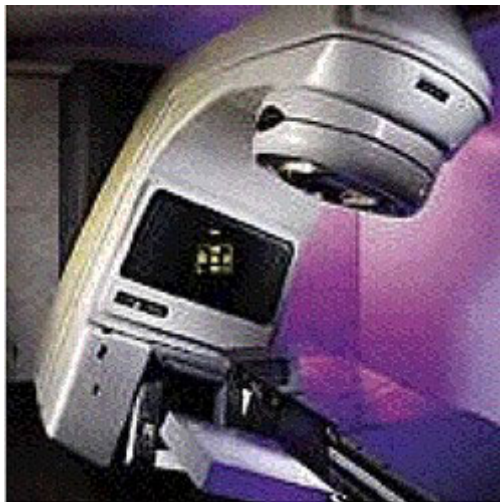
Restorative

- Deals with reconstruction following cancer surgery
- Can include breast reconstruction, bone grafts, prosthetics



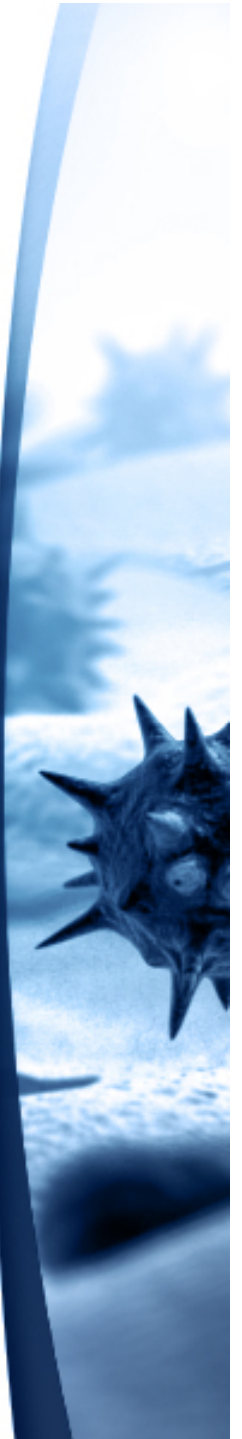
Radiation Therapy

- Attacks cancer cells that are dividing
- Will destroy both healthy and cancerous cells in the process
- Is not as effective in cancers which have metastasized to other tissues



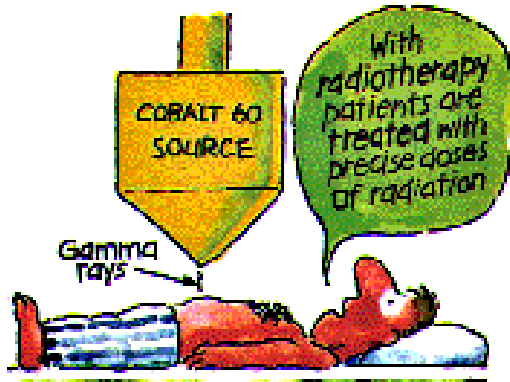
Goals of Radiation Therapy

- To cure or shrink cancer in its earlier stages
 - Can be used prior to surgery to minimize size of tumor
- To prevent cancer recurrence
 - Can be used as a follow-up for surgery
- Treat advanced cancer symptoms
 - Palliative therapy



Types of Radiation Therapy

- External beam radiation
- Internal radiation therapy (brachytherapy)
- Radiopharmaceuticals



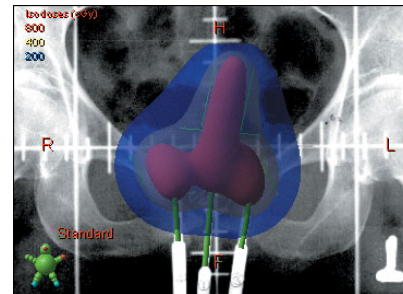
External Beam Radiation

- Typically given by a linear accelerator
- Aims closely refined beam at the tumor location and/or lymph nodes



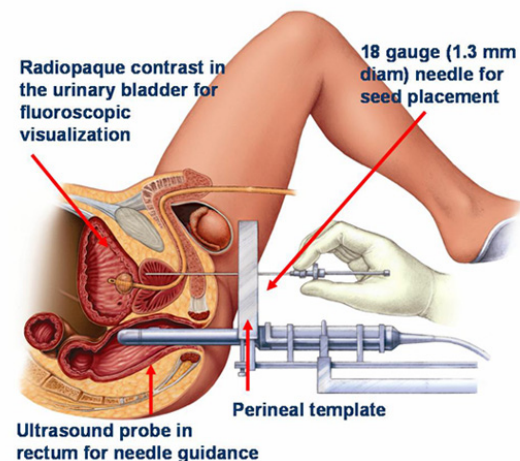
Internal Radiation Therapy (Brachytherapy)

- This is a form of short distance therapy
- Radioactive containers are placed into the tumor itself or into a cavity close to the tumor
- Delivers a high dose of radiation to a small area
- Can be a permanent or temporary placement



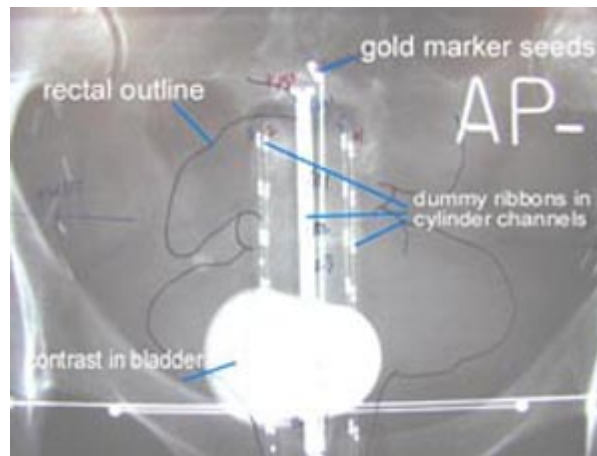
Types of Brachytherapy

- Interstitial radiation
 - Source (pellets, seeds, wires, tubes, containers about the size of a grain of rice) placed directly into or next to the tumor



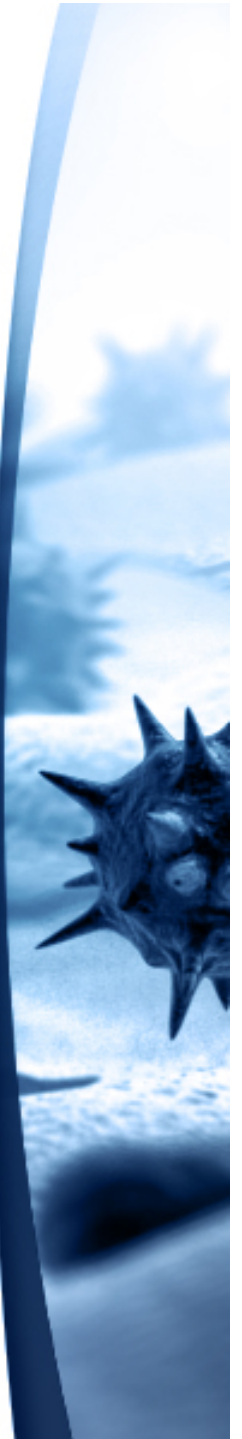
Types of Brachytherapy

- Intracavitary radiation
 - Container of radioactive material is placed in a body cavity (uterus, chest, vagina)



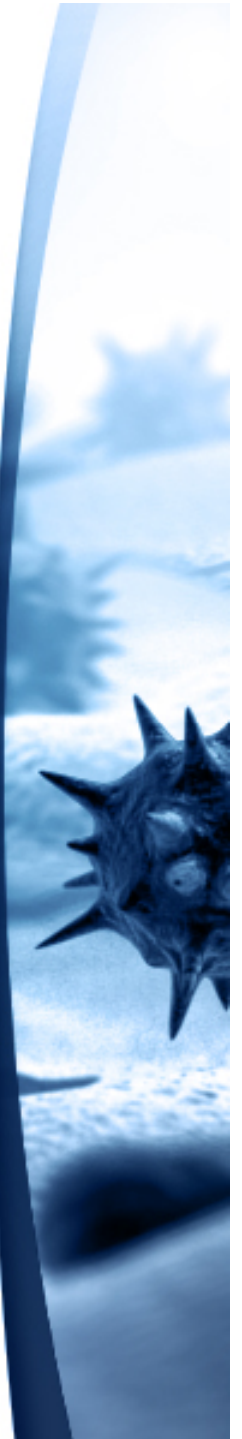
Radiopharmaceuticals

- Medications which contain radioactive materials
- Delivery: radioactive substance is targeted to specific areas of the body where cancer is present
 - Intravenous
 - Oral
 - Body cavity
- The radioactive activity is short lived meaning most of the radiation is gone within a few days or weeks

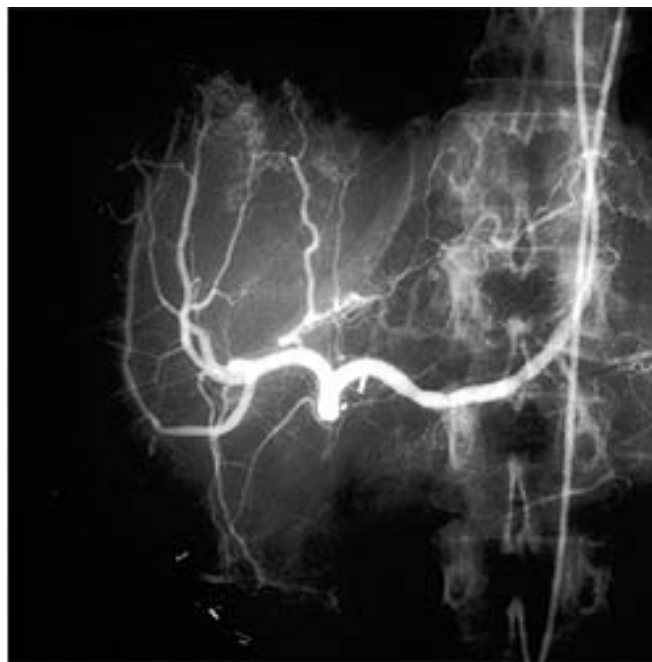
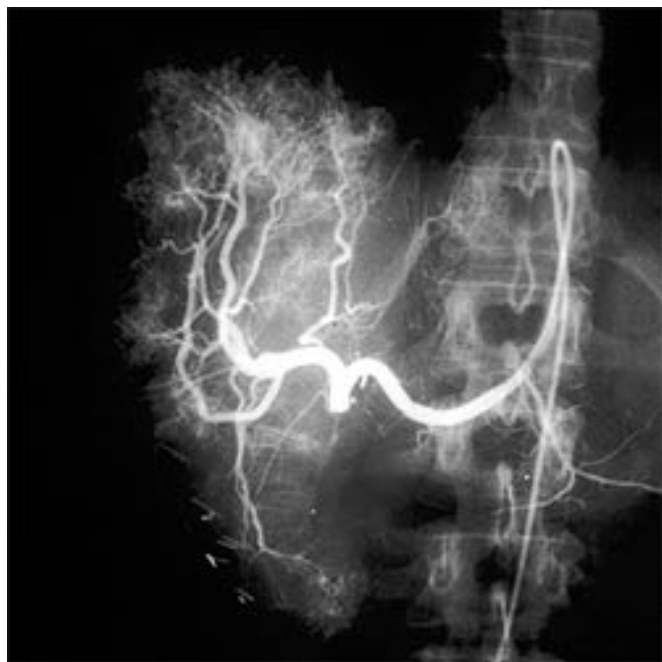


Some other options

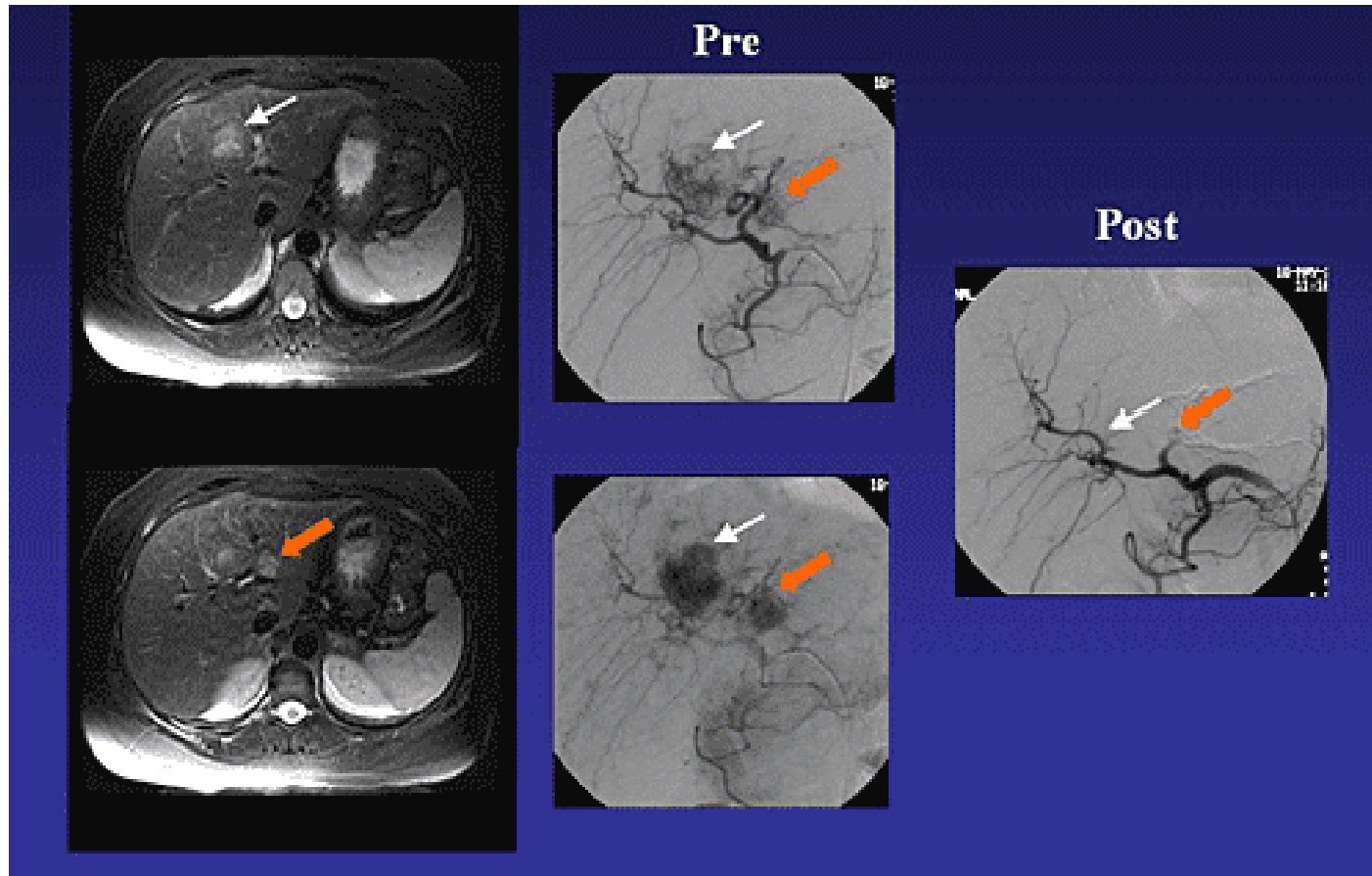
- Intra-arterial chemotherapy
- Embolization procedures
- Chemoembolization



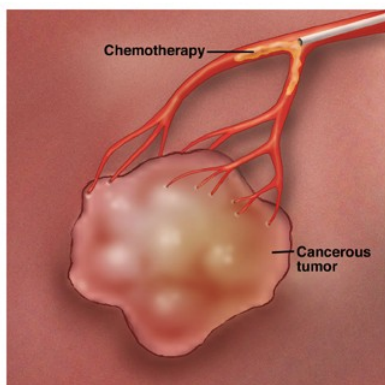
Intra-arterial Chemotherapy



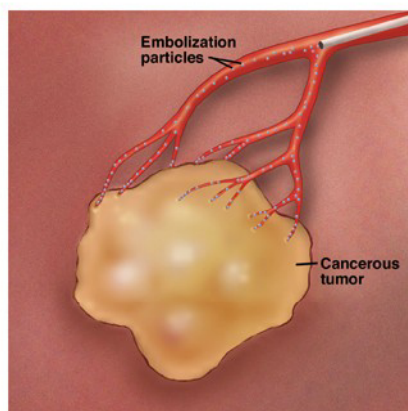
Embolization



Chemo-embolization



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There are many options available to patients for cancer therapy

As you can see



Questions?



Thank you for your time

