Neoplasia III: Cancer Epidemiology
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Neoplasia Outline

- Tumor nomenclature
- Tumor characteristics
- Epidemiology
  - Cancer incidence
  - Environmental variables
  - Age
  - Heredity

Cancer Incidence

- Roughly 1.5 million new cases of cancer every year
- >500,000 deaths from cancer every year
- Cancer is 2nd leading cause of death (after heart disease)
- Most common cancers
  - Men: Prostate
  - Women: Breast
- Deadliest cancers
  - Men: Lung
  - Women: Lung

Recent Changes in Death Rates

Decreased death rates:
- Cervical cancer (pap smears)
- Colon cancer (earlier detection)
- Breast cancer (earlier detection)
- Lung cancer in men (less smokers)
- Some types of leukemia (new treatment)

Increased death rates:
- Lung cancer in women (more smokers)
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Some Stats

- Breast cancer death rate in US is 5x that in Japan!
- Stomach cancer death rate in Japan is 7x that in US!
- Liver cancer infrequent in US, common in Africa.
- Probably due to environmental (not hereditary) factors.
- Most sporadic cancers are caused by environmental factors.

Environmental Carcinogens

- Sunlight: skin cancer
- Smoking: lung cancer
- Alcohol: liver, breast cancers
- HPV: cervical carcinoma

Occupational carcinogens

<table>
<thead>
<tr>
<th>Carcinogen</th>
<th>Exposure</th>
<th>Cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>roofing, tiles</td>
<td>mesothelioma</td>
</tr>
<tr>
<td>Benzene</td>
<td>light oil, solvents</td>
<td>leukemia</td>
</tr>
<tr>
<td>Beryllium</td>
<td>missile fuel</td>
<td>lung cancer</td>
</tr>
<tr>
<td>Ethylene oxide</td>
<td>ripening agents, fumigants</td>
<td>leukemia</td>
</tr>
<tr>
<td>Radon</td>
<td>uranium decay, mines</td>
<td>lung cancer</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>refrigerants</td>
<td>angiosarcoma and liver cancer</td>
</tr>
<tr>
<td>Nickel</td>
<td>welding, ceramics</td>
<td>nose and liver cancers</td>
</tr>
<tr>
<td>Cadmium</td>
<td>batteries</td>
<td>prostate cancer</td>
</tr>
</tbody>
</table>

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Age

- Cancer is more frequent at the two extremes of age.
- Elderly
  - Frequency of cancer increases with age
  - Most cancer deaths occur between 55-75
- Children
  - 10% of all childhood deaths
  - Leukemia/lymphoma, CNS tumors, sarcoma
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Three Types of Hereditary Cancer

- Inherited cancer syndromes
- Familial cancers
- Syndromes of defective DNA repair

Three Types of Hereditary Cancer

- Inherited cancer syndromes
  - Dominantly inherited
  - Retinoblastoma
  - Familial polyposis coli

Familial polyposis coli

Three Types of Hereditary Cancer

- Inherited cancer syndromes
- Familial cancers
- Syndromes of defective DNA repair
  - Recessively inherited
  - Xeroderma pigmentosum

Three Types of Hereditary Cancer

- Inherited cancer syndromes
- Familial cancers
- Most common sporadic cancers have familial forms too
- Breast, colon, ovary, brain
- Occur earlier, are often deadlier