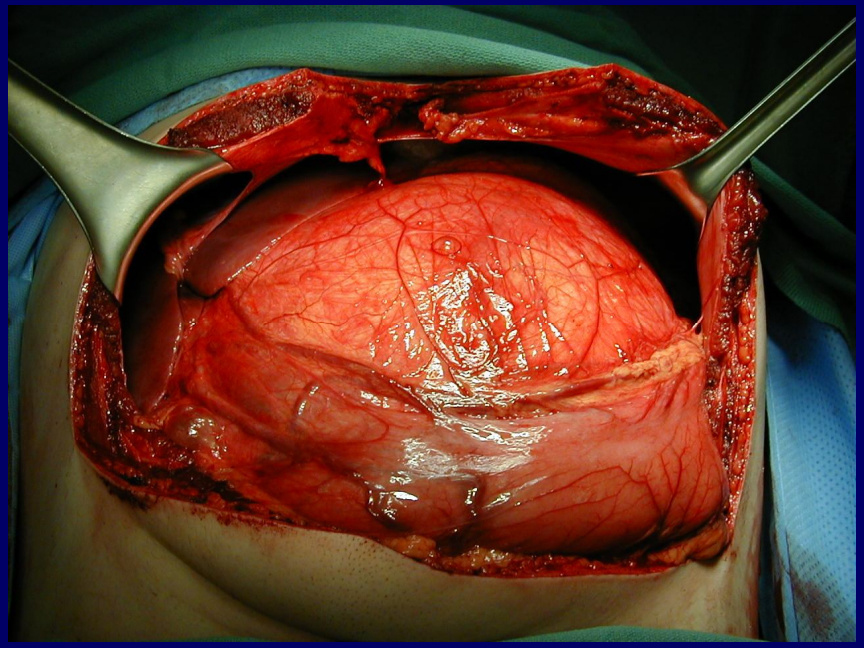
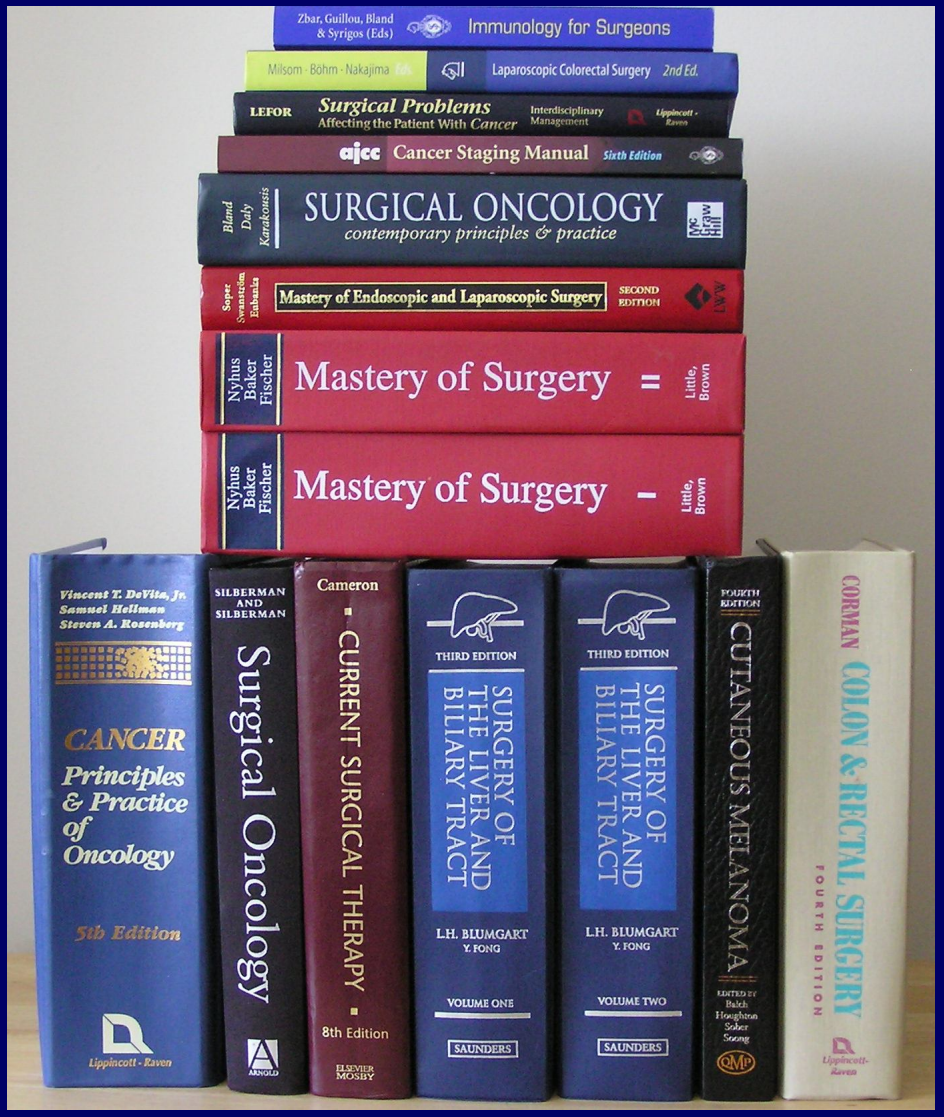
Principles of Oncologic Surgery



Surgery Grand Rounds
August 31, 2009

Martin McCarter, M.D.
Associate Professor of Surgery
GI Tumor & Endocrine Surgery
University of Colorado Denver


Zbar, Guillou, Bland & Syrigos (Eds)
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YOUR KEY TO THE CLASSICS

Principles of Oncologic Surgery

Outline

- The cancer problem
- Tumor biology
- Tumor staging systems
- General surgical principles
- Integrating multidisciplinary care
- Future of surgical oncology

Magnitude of the Problem

Leading Sites of New Cancer Cases and Deaths – 2009 Estimates

Estimated New Cases*		Estimated Deaths	
Male	**Female**	**Male**	**Female**
Prostate 192,280 (25%)	Breast 192,370 (27%)	Lung & bronchus 88,900 (30%)	Lung & bronchus 70,490 (26%)
Lung & bronchus 116,090 (15%)	Lung & bronchus 103,350 (14%)	Prostate 27,360 (9%)	Breast 40,170 (15%)
Colon & rectum 75,590 (10%)	Colon & rectum 71,380 (10%)	Colon & rectum 25,240 (9%)	Colon & rectum 24,680 (9%)
Urinary bladder 52,810 (7%)	Uterine corpus 42,160 (6%)	Pancreas 18,030 (6%)	Pancreas 17,210 (6%)
Melanoma of the skin 39,080 (5%)	Non-Hodgkin lymphoma 29,990 (4%)	Leukemia 12,590 (4%)	Ovary 14,600 (5%)
Non-Hodgkin lymphoma 35,990 (5%)	Melanoma of the skin 29,640 (4%)	Liver & intrahepatic bile duct 12,090 (4%)	Non-Hodgkin lymphoma 9,670 (4%)
Kidney & renal pelvis 35,430 (5%)	Thyroid 27,200 (4%)	Esophagus 11,490 (4%)	Leukemia 9,280 (3%)
Leukemia 25,630 (3%)	Kidney & renal pelvis 22,330 (3%)	Urinary bladder 10,180 (3%)	Uterine corpus 7,780 (3%)
Oral cavity & pharynx 25,240 (3%)	Ovary 21,550 (3%)	Non-Hodgkin lymphoma 9,830 (3%)	Liver & intrahepatic bile duct 6,070 (2%)
Pancreas 21,050 (3%)	Pancreas 21,420 (3%)	Kidney & renal pelvis 8,160 (3%)	Brain & other nervous system 5,590 (2%)
All sites 766,130 (100%)	All sites 713,220 (100%)	All sites 292,540 (100%)	All sites 269,800 (100%)

*Excludes basal and squamous cell skin cancers and in situ carcinoma except urinary bladder.

www.cancer.org

Scope of the Problem

Probability of Developing Invasive Cancers (%) Over Selected Age Intervals by Sex, US, 2003-2005*

		Birth to 39	40 to 59	60 to 69	70 and Older	Birth to Death
All sites†	Male	1.42 (1 in 70)	8.44 (1 in 12)	15.71 (1 in 6)	37.74 (1 in 3)	43.89 (1 in 2)
	Female	2.07 (1 in 48)	8.97 (1 in 11)	10.23 (1 in 10)	26.17 (1 in 4)	37.35 (1 in 3)
Urinary bladder‡	Male	0.02 (1 in 4,448)	0.41 (1 in 246)	0.96 (1 in 104)	3.57 (1 in 28)	3.74 (1 in 27)
	Female	0.01 (1 in 10,185)	0.12 (1 in 810)	0.26 (1 in 378)	1.01 (1 in 99)	1.18 (1 in 84)
Breast	Female	0.48 (1 in 208)	3.79 (1 in 26)	3.41 (1 in 29)	6.44 (1 in 16)	12.03 (1 in 8)
Colon & rectum	Male	0.08 (1 in 1,296)	0.92 (1 in 109)	1.55 (1 in 65)	4.63 (1 in 22)	5.51 (1 in 18)
	Female	0.07 (1 in 1,343)	0.72 (1 in 138)	1.10 (1 in 91)	4.16 (1 in 24)	5.10 (1 in 20)
Leukemia	Male	0.16 (1 in 611)	0.22 (1 in 463)	0.35 (1 in 289)	1.17 (1 in 85)	1.50 (1 in 67)
	Female	0.12 (1 in 835)	0.14 (1 in 693)	0.20 (1 in 496)	0.77 (1 in 130)	1.07 (1 in 94)
Lung & bronchus	Male	0.03 (1 in 3,398)	0.99 (1 in 101)	2.43 (1 in 41)	6.70 (1 in 18)	7.78 (1 in 13)
	Female	0.03 (1 in 2,997)	0.81 (1 in 124)	1.78 (1 in 56)	4.70 (1 in 21)	6.22 (1 in 16)
Melanoma of the skin§	Male	0.16 (1 in 645)	0.64 (1 in 157)	0.70 (1 in 143)	1.67 (1 in 60)	2.56 (1 in 39)
	Female	0.27 (1 in 370)	0.53 (1 in 189)	0.35 (1 in 282)	0.76 (1 in 131)	1.73 (1 in 58)
Non-Hodgkin lymphoma	Male	0.13 (1 in 763)	0.45 (1 in 225)	0.58 (1 in 171)	1.66 (1 in 60)	2.23 (1 in 45)
	Female	0.08 (1 in 1,191)	0.32 (1 in 316)	0.45 (1 in 223)	1.36 (1 in 73)	1.90 (1 in 53)
Prostate	Male	0.01 (1 in 10,002)	2.43 (1 in 41)	6.42 (1 in 16)	12.49 (1 in 8)	15.78 (1 in 6)
Uterine cervix	Female	0.15 (1 in 651)	0.27 (1 in 368)	0.13 (1 in 761)	0.19 (1 in 530)	0.69 (1 in 145)
Uterine corpus	Female	0.07 (1 in 1,499)	0.72 (1 in 140)	0.81 (1 in 123)	1.22 (1 in 82)	2.48 (1 in 40)

* For people free of cancer at beginning of age interval.

† All sites excludes basal and squamous cell skin cancers and in situ cancers except urinary bladder.

‡ Includes invasive and in situ cancer cases.

§ Statistic is for whites only.

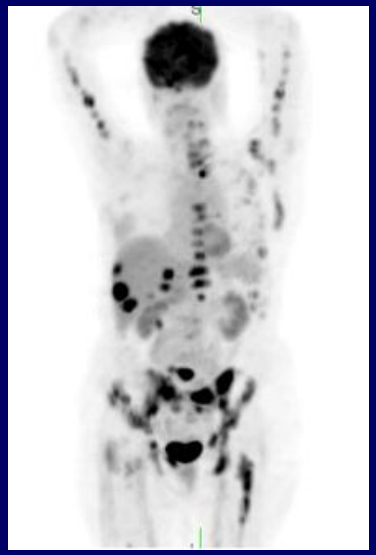
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.3.0. Statistical Research and Applications Branch, National Cancer Institute, 2008. srab.cancer.gov/devcan.

American Cancer Society, Surveillance and Health Policy Research, 2009

Tumor Biology

Understanding tumor biology is critical for:

- **deciding when to operate**
- **deciding what operation to do**
- **deciding when NOT to operate**



Classes of Tumors

General Groupings

Carcinoma = Epithelial tumors

- **breast, melanoma, GI, GU, lung, GYN, H&N**
- **invade lymphatic and vascular structures**

Sarcoma = Connective tissue tumors

- **displace other structures**
- **hematogenous spread**

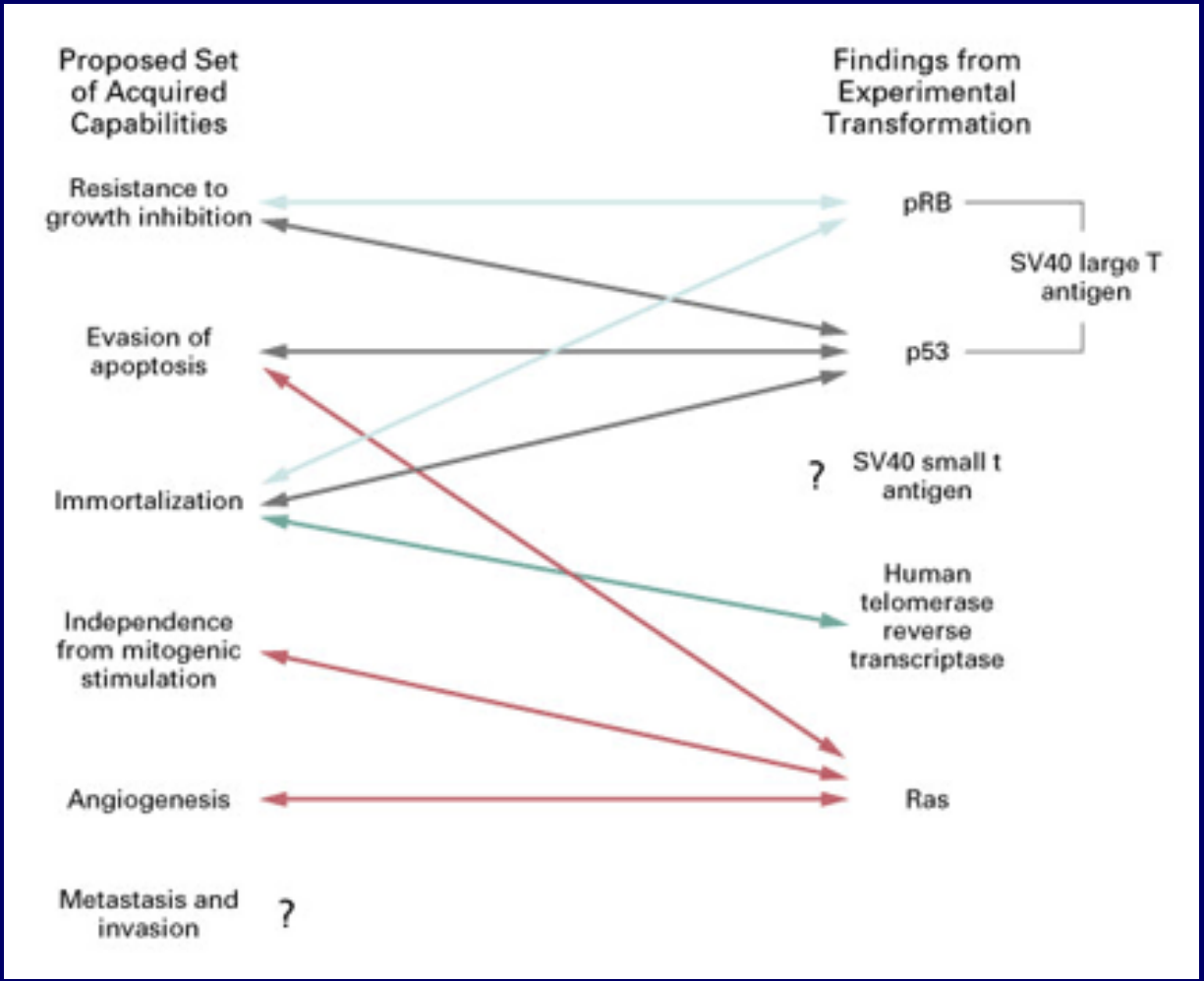
Ovarian

Testicular

Carcinoid tumors = “carcinoma like”

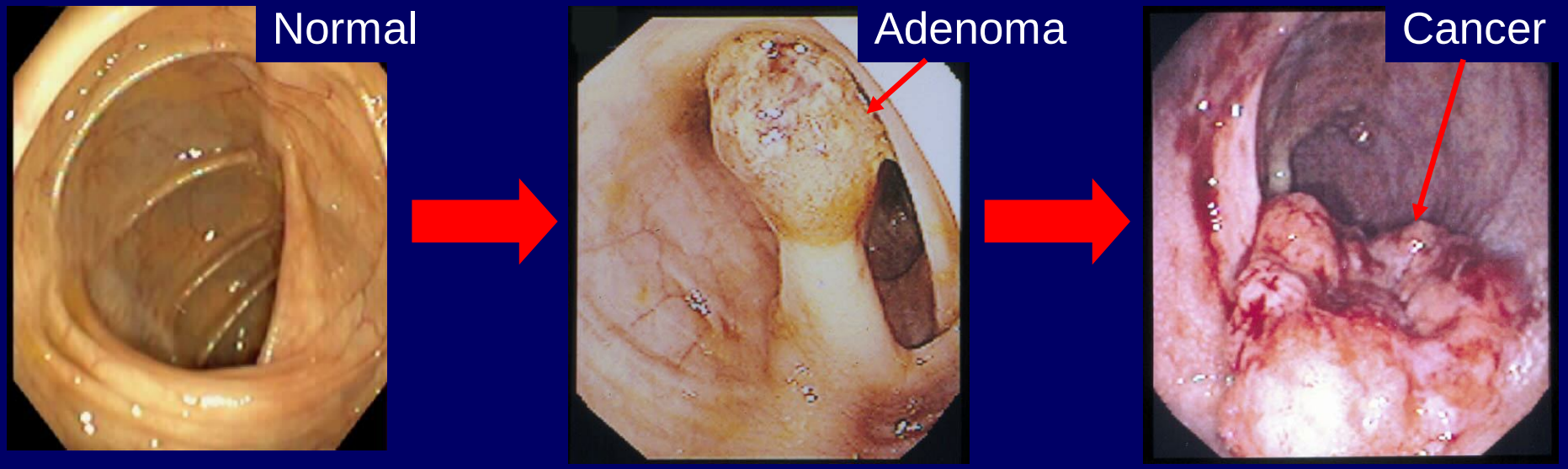
Liquid tumors – leukemia and lymphoma

What Does it Take to Make a Tumor?



Weinberg, RA. NEJM 2002; 347:1593-1603

Tumor Biology



APC loss

K-ras mutation

Chrom 18 loss

p53 loss

Normal Epithelium → Hyper-proliferation → Early Adenoma → Intermediate Adenoma → Late Adenoma → Cancer

Staging is All About Real Estate

American Joint Commission on Cancer (AJCC)

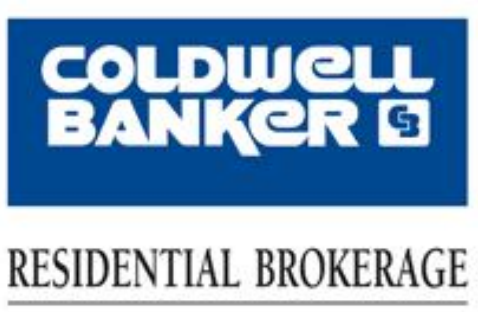
T = Tumor (size, grade) N = Nodes (number) M = Metastasis

Goals

- Estimate prognosis
- Facilitate treatment planning
- Allow comparisons between treatment groups

General Classification

Stage I - Superficial early cancer
Stage II - Locally advanced - nodes
Stage III - Regionally advanced + nodes
Stage IV - Metastatic beyond regional nodes



Staging – the TNM System

Advantages

- Each revision provides more accurate prognosis
- Allows for general estimates of survival

Stage	Est 5 yr Survival
I	95%
II	80%
III	50%
IV	5%

Disadvantages

- Each revision more complex
- Stage shifting over time
- Still lumping cancers by relatively crude descriptive characteristics

Cancer Speak

Terms you may have heard

- **Tumor** = abnormal growth
- **Cancer** = tumor that has the capacity to metastasize
- **Adjuvant therapy** = chemo or radiation therapy added after surgery
- **Neoadjuvant therapy** = chemo or radiation therapy given before planned definitive surgery
- **R0** = complete margin negative resection
- **R1** = complete gross resection, microscopically positive margin
- **R2** = gross disease left behind

Biology of Cancer Recurrence

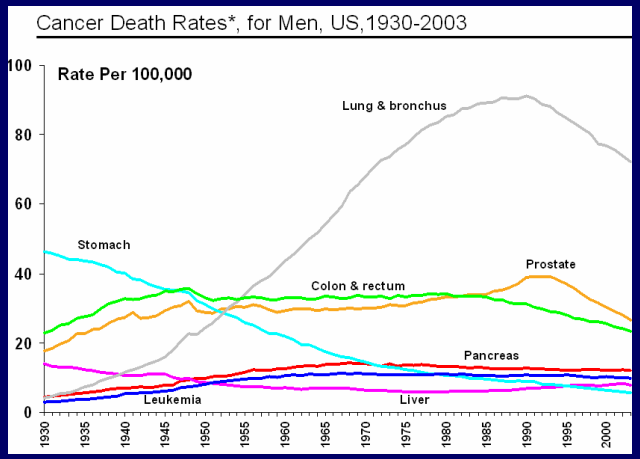
some general rules of thumb

Recurrence of tumor

- Tumor environment is a wound that doesn't heal
- ~75% of recurrences occur within the first 2 years of surgery
- 5 year mark for "cure" is arbitrary

- One third local recurrence alone
- One third local plus distant simultaneously
- One third distant alone

Statistics for Cancer Patients



- Median follow-up and survival
- Absolute differences vs. relative differences
- Overall survival
- Disease specific survival
- Disease free survival (recurrence free)

Guller U. JACS 2004;198:441-58

Surgery as Curative

- To cure a patient with surgery is still relatively rare
- Some percentage (one third?) may be cured
- Earlier detection is best chance for cure
- Clarify the goal of your operation
  (curative, debulking, palliative, preventative)

Surgery as Preventative

Prophylactic surgery to prevent cancer development

Disease	Marker	Treatment
FAP	APC	Colectomy
MEN 2	RET	Throidectomy
Familial Breast Cancer	BRCA 1,2	Mastectomy
Familial Ovarian Cancer	?	Oophorectomy

Principles of Surgery for Local Control

- Local control should be a top priority
- First operation is best chance for control
- Apply basic surgical fundamentals to reduce local recurrences
- Salvage surgery to achieve local control problematic

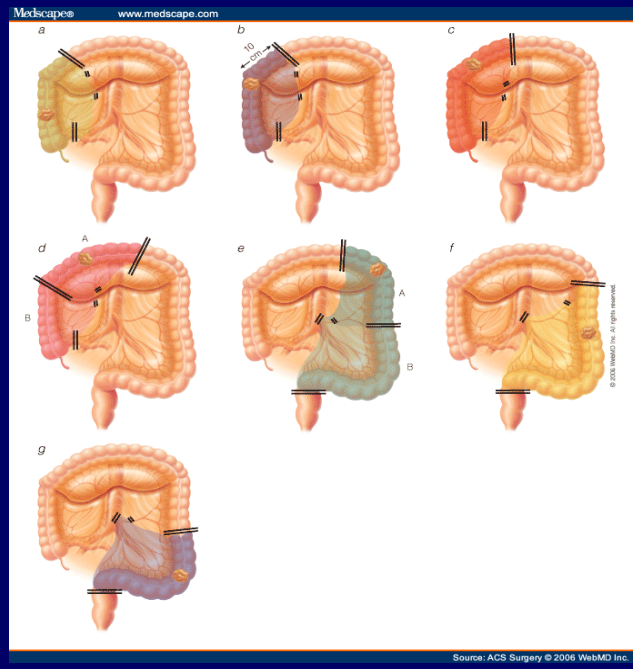
Principles of Biopsies

To biopsy or not to biopsy that is the question?

Answer:

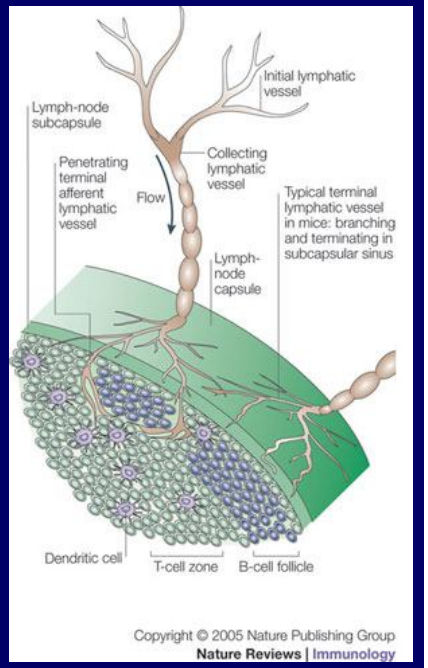
- Know your tumor biology
- Will it change treatment plan?
- Will biopsy cause tumor spread?
- Biopsy options
  - Aspiration, Core, Incisional, Excisional
- Avoid hematoma
- Plan to excise needle or biopsy site

Principles of Margins



- Factor in tumor biology
- Factor in location
- Factor in other treatments
- In general 1cm gross margin is minimum necessary
- Wider margin preferable if it can be done with minimal additional morbidity
- Goal of margin is reduced local recurrence

Principles of Lymph Nodes



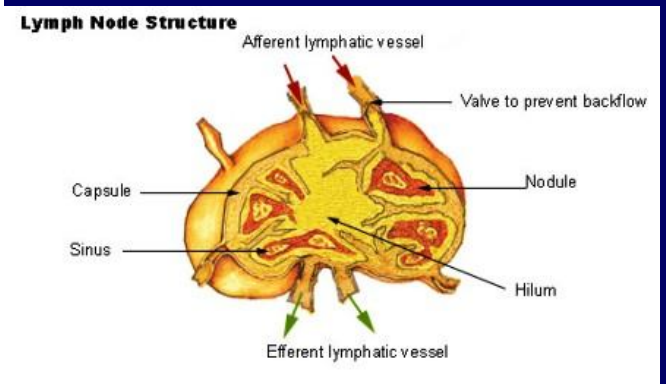
Function of lymph nodes

- Primarily for antigen recognition
- Not a filter
- Majority of tumor cells pass through
- Rare tumor cells can grow in lymph nodes
- Lymph nodes are indicators - not governors - of survival

Principles of Lymph Nodes

Lymph node dissection

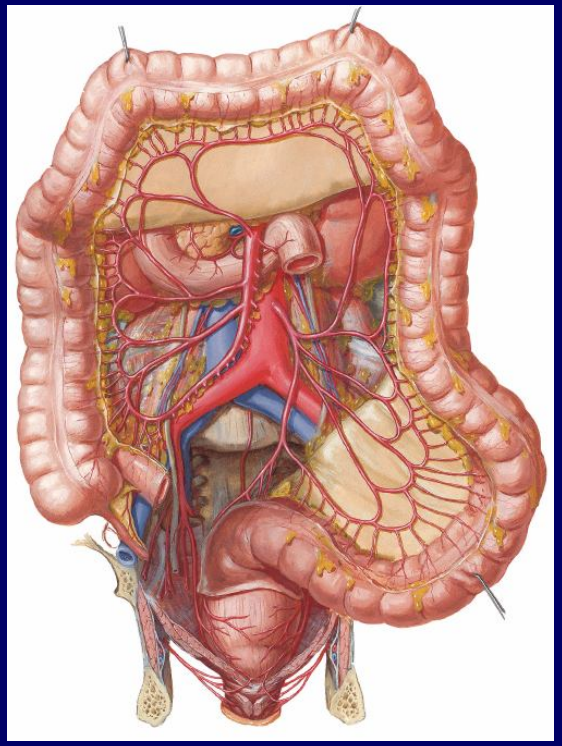
- Harvest lymph nodes for:
  - 1 staging
  - 2 local control
  - 3 interrupt metastatic cascade
- Factor in risk/benefit ratio



Principles of Surgical Oncology

Colorectal cancer

- 5 cm margin when possible
- 1 cm margin for low rectal with XRT
- Take major vascular pedicle at origin along with lymph nodes
- Equivalent cancer outcomes from laparoscopic vs. open

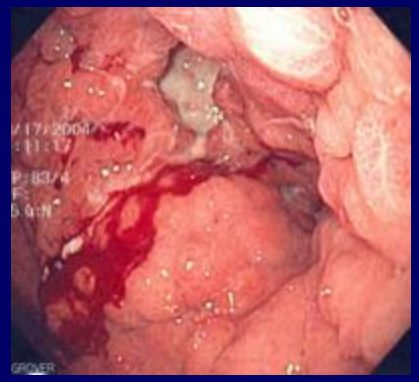


Principles of Surgical Oncology

Melanoma

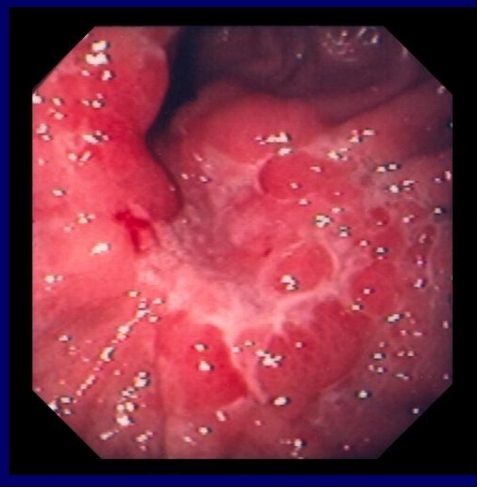
- 1 cm margin for <1mm deep primary
- 2 cm margin for >1mm deep primary
- Exceptions for hands and face
- SLN biopsy for >1mm deep primary
- Sentinel lymph node biopsy for staging
- Lymph node dissection for metastasis

Principles of Surgical Oncology

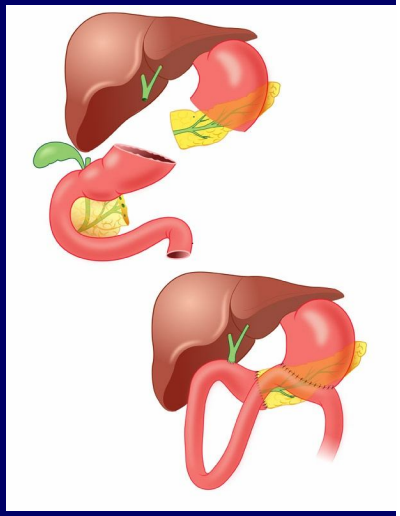


Gastric Cancer

- 5 cm margin when possible
- Take major vascular pedicle with lymph nodes
- Remove lymph node station beyond obviously involved nodes
- Splenectomy generally not indicated
- D2 dissection – no survival benefit

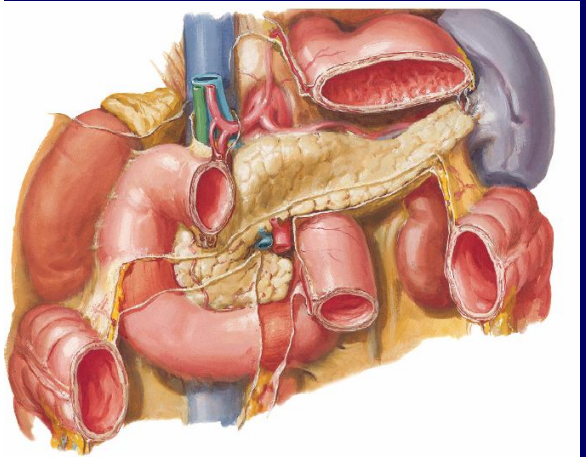


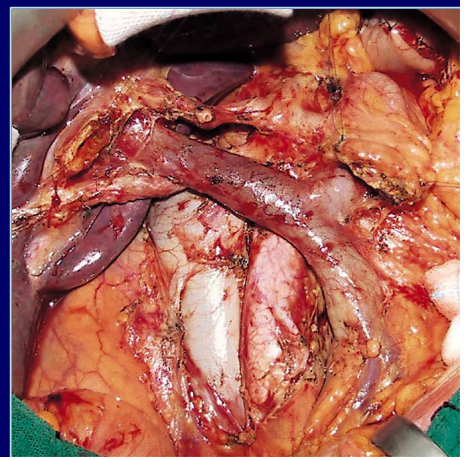
Principles of Surgical Oncology



Pancreatic Cancer

- Resectability is in the eye of the beholder
- Contraindications include Celiac, SMA or Hepatic artery involvement
- Relative contraindications include portal vein or lymph node positive disease

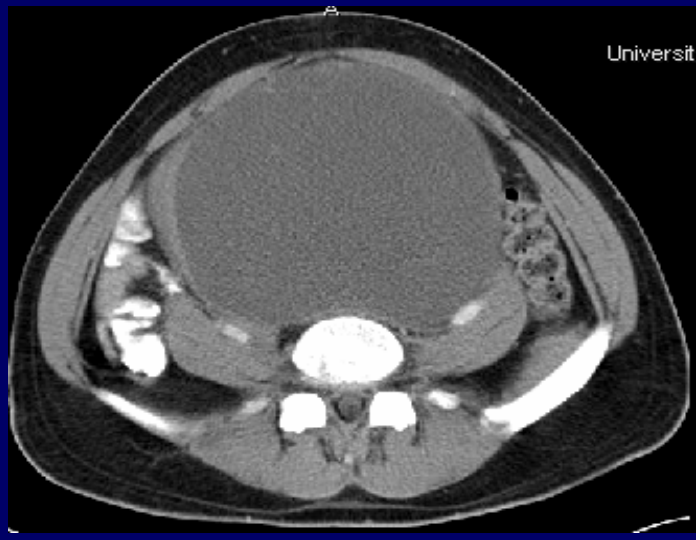




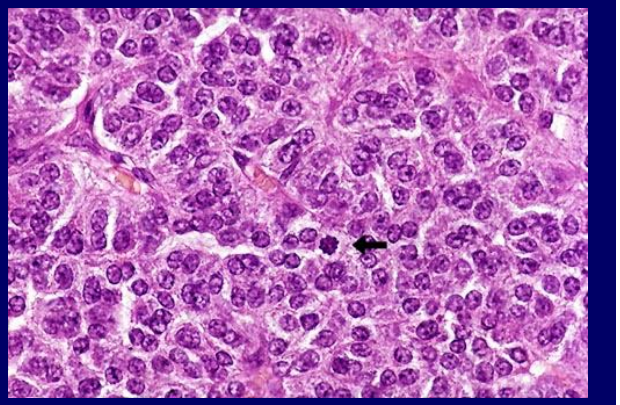
Principles of Surgical Oncology

Sarcomas

- 1-2 cm gross margin
- Preserve neurovascular structures
- No need for lymph nodes*
- Radiation reduces local recurrence
- Chemotherapy of limited value



Principles of Surgical Oncology

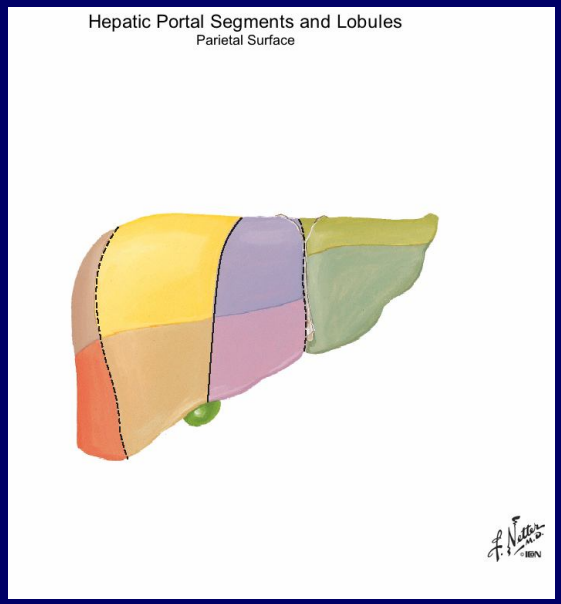


Carcinoids

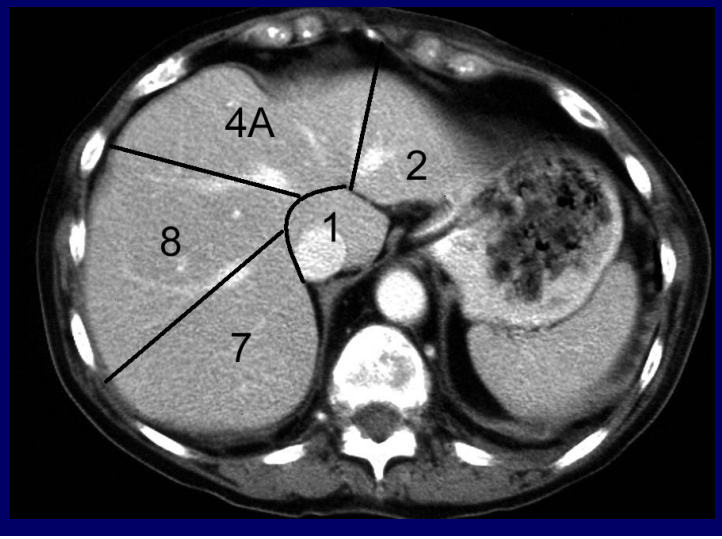
- Slow growing
- Surgery for symptoms – obstruction, hormonal
- Debulking as a goal
- <1 cm – remove tumor only
- >2 cm – remove tumor and lymph nodes
- 1-2 cm – consider removing lymph nodes

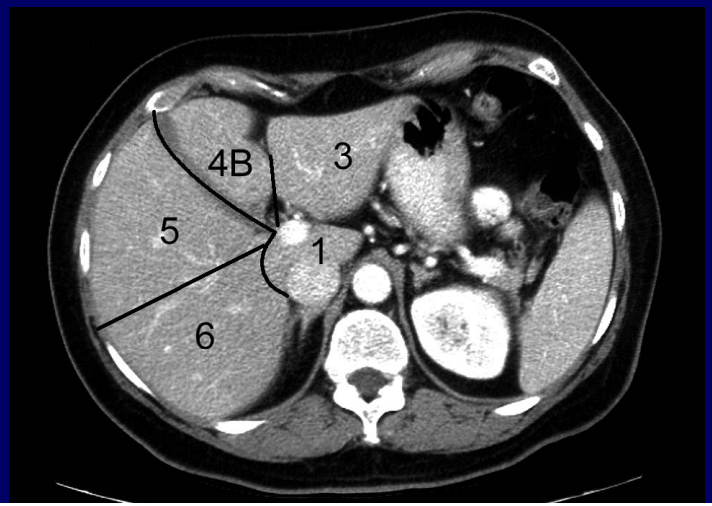
Principles of Surgical Oncology

Liver Tumors



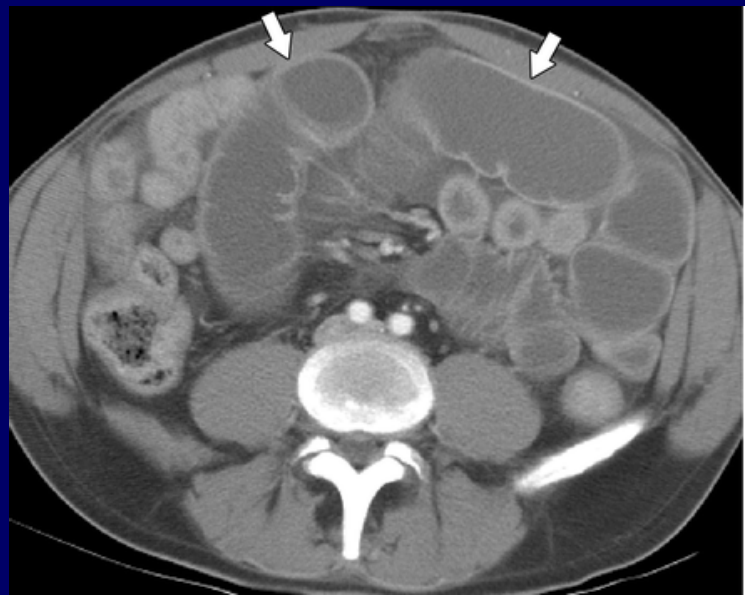
- Primary vs. metastatic
- Resectability
  - Eye of the beholder
  - Real estate
  - Defined by what will be left behind
    (not by what can be removed)





Principles of Palliative Surgery

- One cannot palliate asymptomatic cancer patients
- Address the highest priority symptom
- Manage expectations
- 25% will fail immediately
- 25% will recur with same symptom



Principles of Radiation Oncology

Radiation Therapy

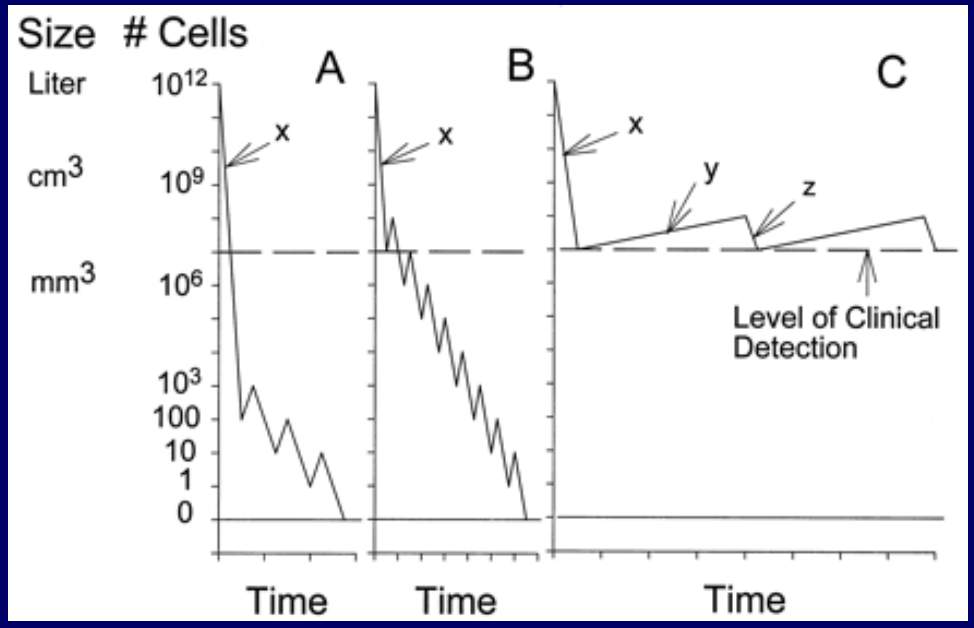
- Rapidly dividing cells
- Can help reduce local recurrence rate
- Organ preservation (breast, larynx, anal sphincter, extremity)
- Technology and targeting improving

Breast cancer
Prostate cancer
Rectal cancer
Head & Neck
Sarcomas

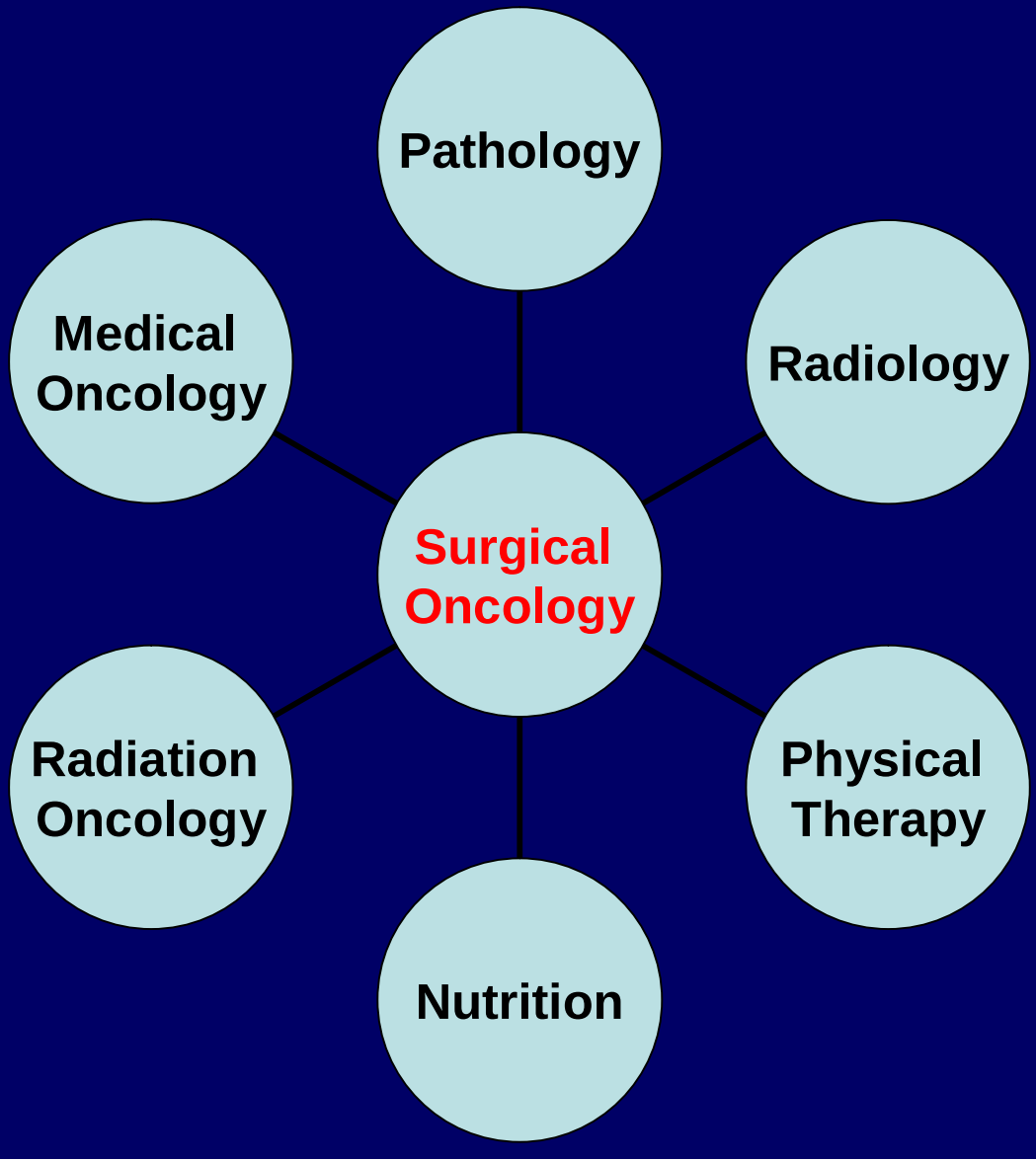
Principles of Medical Oncology

Concepts of Chemotherapy

- Tumor doubling time
- Adjuvant vs. Neoadjuvant
- Targeting molecular pathways
- Biologic response indicators
- Drug development – phase I, II, III



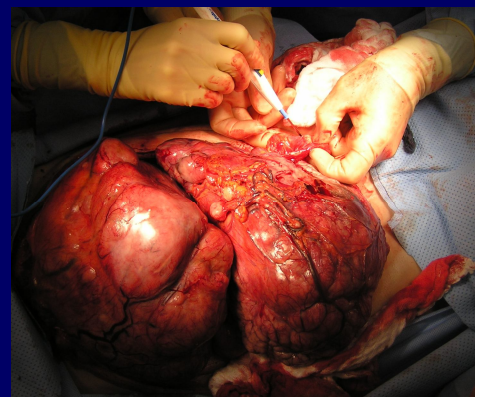
Integrating a Multidisciplinary Approach



Future of Surgical Oncology
"Targeted Therapy"

The paradigm of Gastrointestinal Stromal Tumors (GIST)

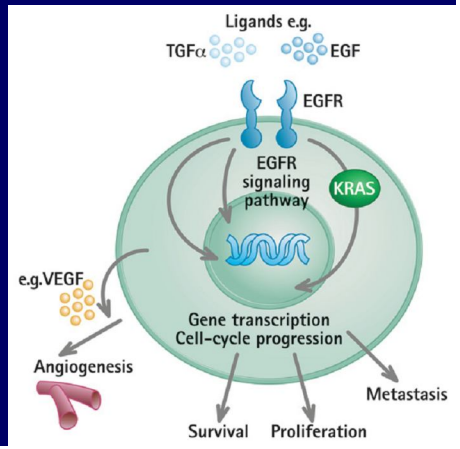
- **cKIT mutation (tyrosine kinase) identified as the activating growth signal**
- **Imatinib (Gleevec) developed as an oral agent to block the activating mutation (ATP binding site)**
- **Indicated in metastatic and high risk resected GIST**
- **Changed the natural history of this disease**



Future of Surgical Oncology "Personalized Therapy"

Example of Tumor KRAS Status in Colorectal Cancer

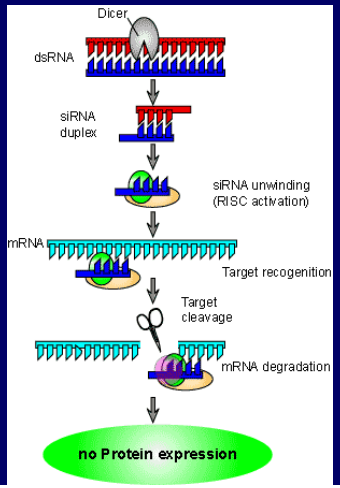
- Cetuximab (Erbitux) and panitumumab (Vectibix) are monoclonal antibodies directed at the epidermal growth-factor receptor
- Approved for treating metastatic colorectal cancer
- Recent trials demonstrated that tumors with a mutation in KRAS do not respond to EGFR receptor blockade
- Tumor analysis now required to treat with these agents

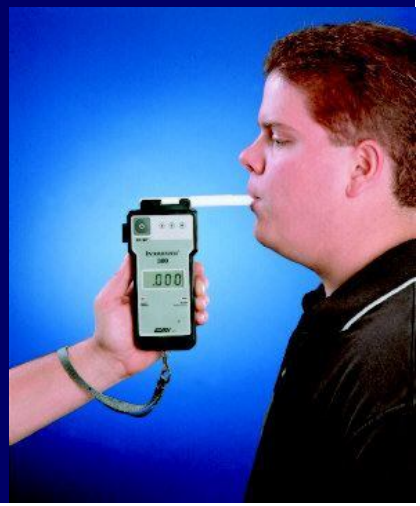


Future of Surgical Oncology Biomarkers

Biomarkers are tumor or circulating molecules that help detect and monitor certain cancers

- **CEA, CA19-9, PSA, CA27-29**
- **Proteomic analysis**
- **microRNA or small interfering RNA (siRNA) analysis**
- **Breath analysis**





Fundamentals of Surgical Oncology

Biology is King

Selection is Queen

Technical maneuvers are the

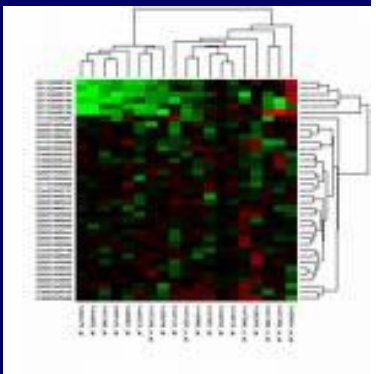
Prince and Princess

Occasionally the prince and princess try to overthrow the powerful forces of the King and Queen, sometimes with temporary apparent victories, usually to no long term avail.

Blake Cady, MD

Future of Surgical Oncology

- Growing opportunity
- 1 in 3 diagnosed with some form of cancer
- Aging population
- Increased need for surgical specialists with broad knowledge of cancer treatments
- Integration of multiple therapies
- Field wide open for basic and clinical research
- Intellectually stimulating – rapid progress
- Molecular evaluation of tumor



Rules of Surgical Oncology

Biology is King

Selection is Queen

Technical maneuvers are the

Prince and Princess

Occasionally the prince and princess try to overthrow the powerful forces of the King and Queen, sometimes with temporary apparent victories, usually to no long term avail.

Blake Cady, MD

#1 Rule of Surgical Oncology

When in doubt – consult this man

Future of Surgical Oncology

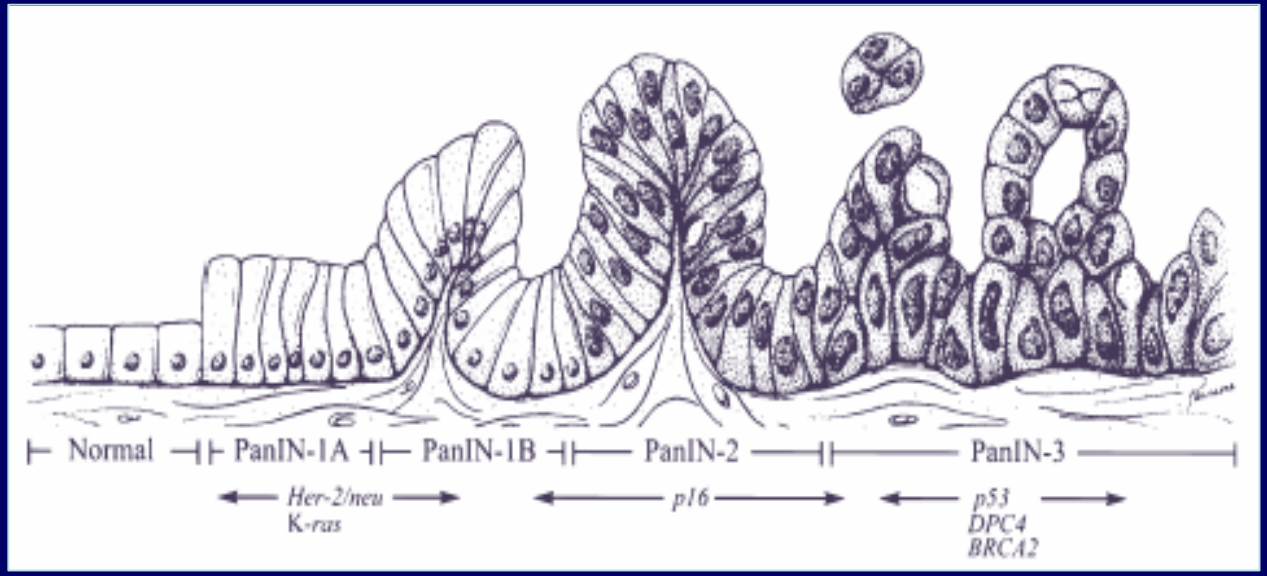
Past	Radical resection
Present	Conservative resection (laparoscopic approaches)
Future	?

Tumor Biology

Tumor Type	Estimated Tumor Doubling Time (days)
Choriocarcinoma	1.5
ALL	4-6
Hodgkin's	38
GI adenocarcinoma	80-130

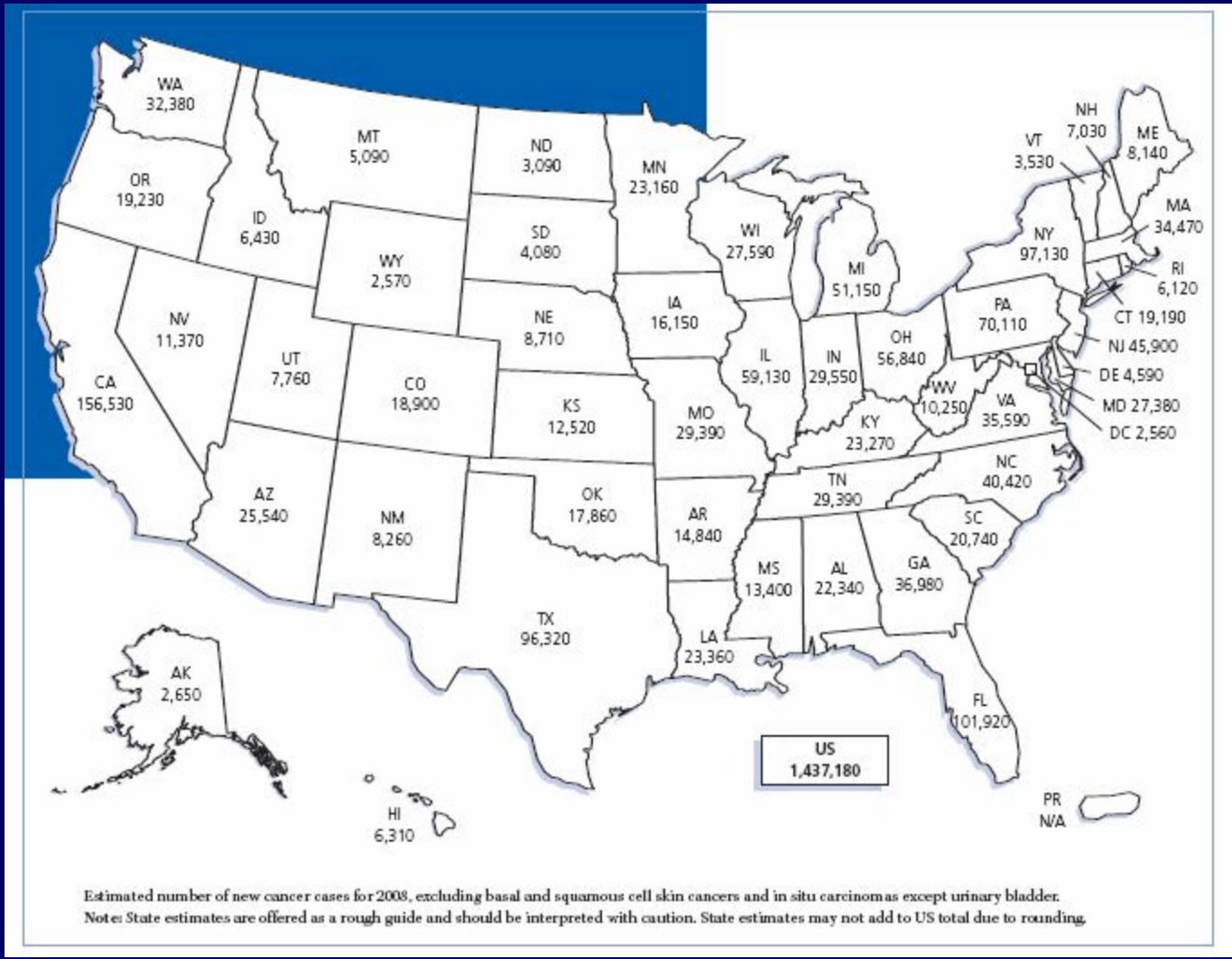
McCarter, M. Ann Surg Onc 2000;8:38-43

Molecular Events in Pancreatic Cancer



- Oncogene activation/overexpression
  - K-ras (85%)
- Receptor tyrosine kinase overexpression
  - HER2/neu
  - EGFR
- Tumor suppressor mutation
  - p53 (50%)
  - SMAD4 (DPC4) (50%)
- Cell cycle regulatory protein silencing/loss
  - p16 (8%)
- Nuclear Transcription Factor Activation

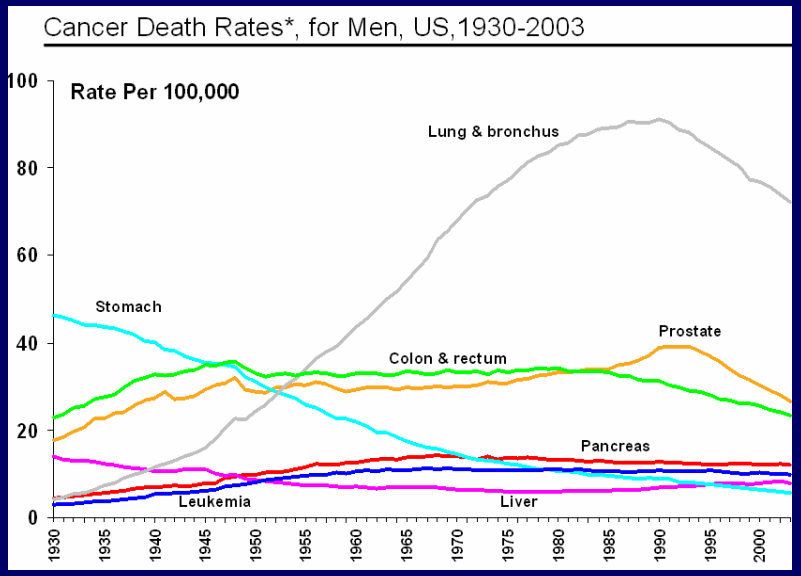
Scope of the Problem

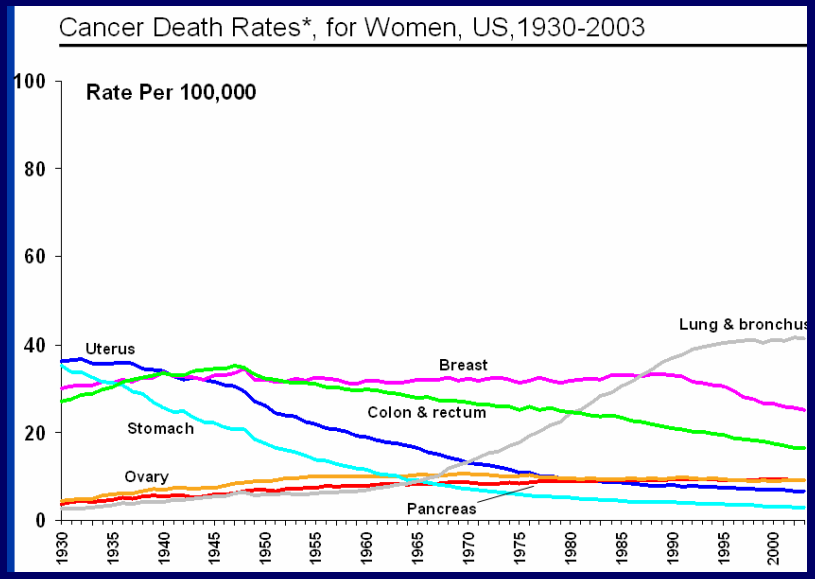


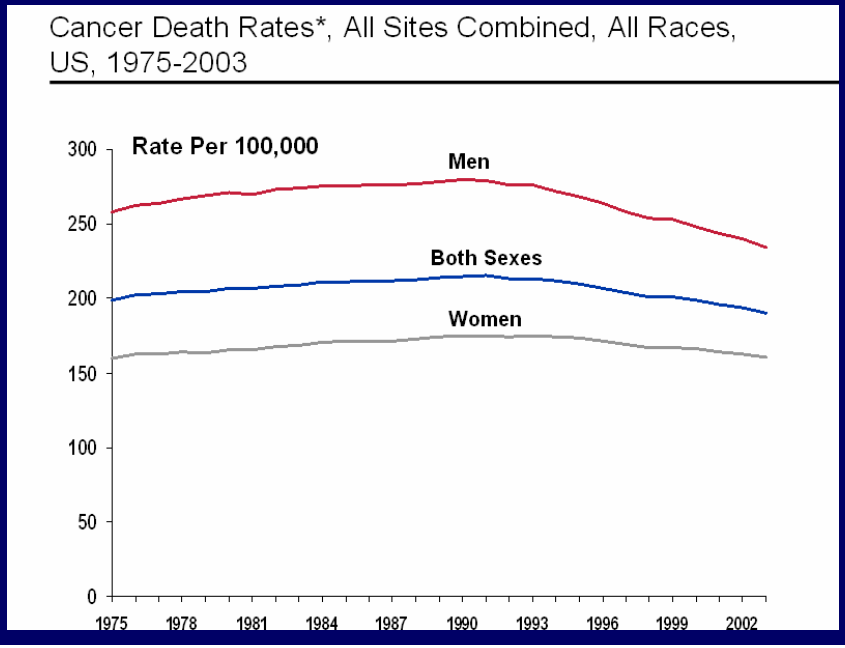
Estimated number of new cancer cases for 2008, excluding basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
Note: State estimates are offered as a rough guide and should be interpreted with caution. State estimates may not add to US total due to rounding.

www.cancer.org

Scope of the Problem

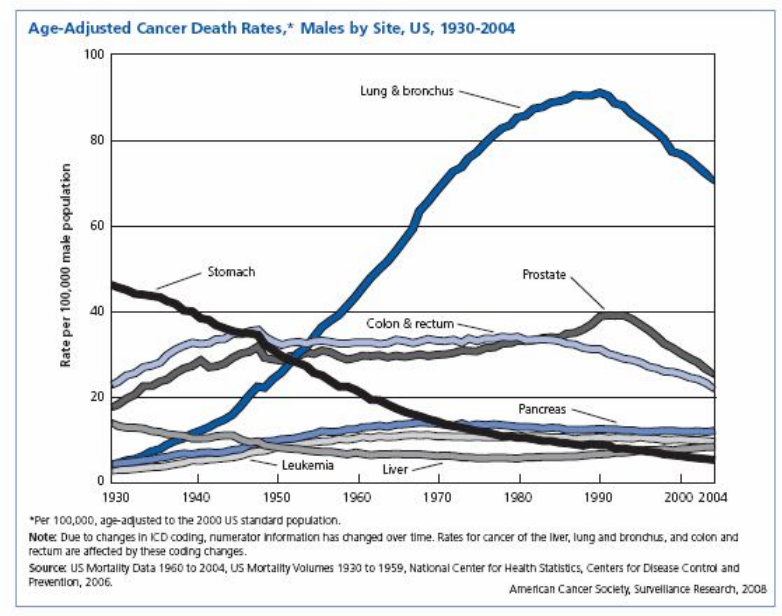


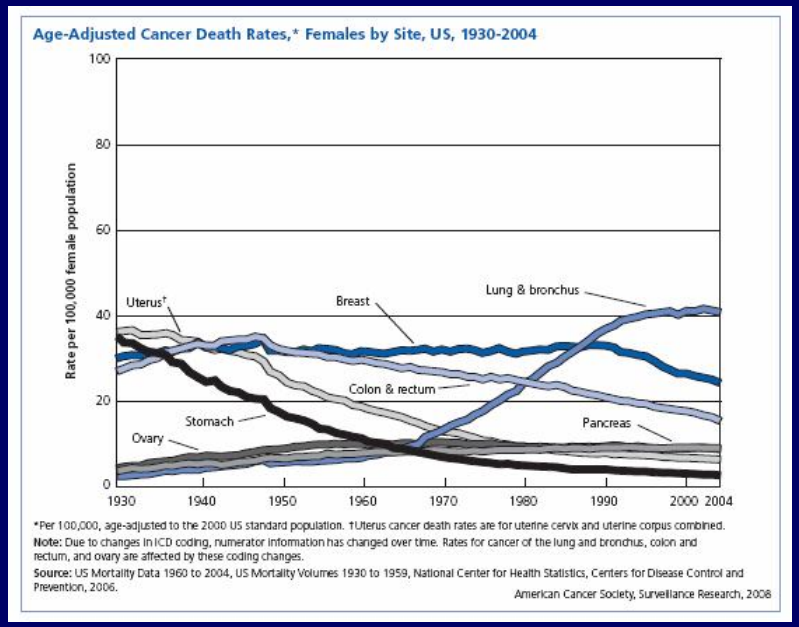




www.cancer.org

Scope of the Problem

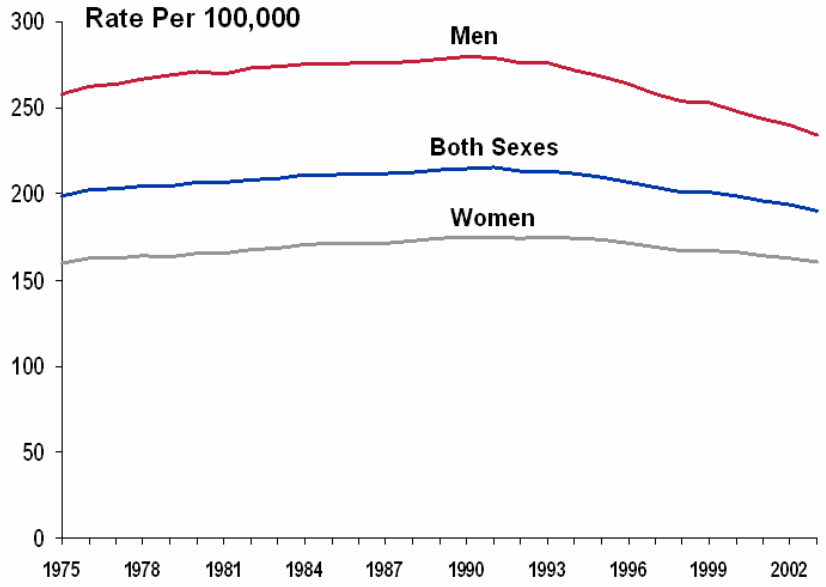




www.cancer.org

Scope of the Problem

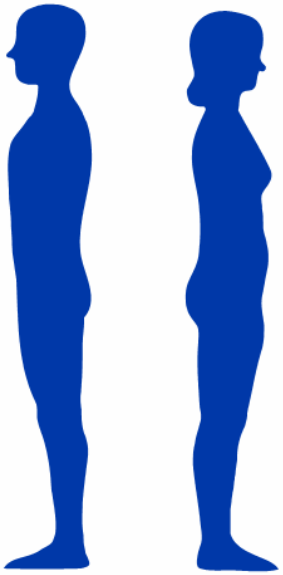
Cancer Death Rates*, All Sites Combined, All Races, US, 1975-2003



*Age-adjusted to the 2000 US standard population.
Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U.S. (1969-2003), National Cancer Institute, DCCP Surveillance Research Program, Cancer Statistics Branch, released April 2006. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Scope of the Problem

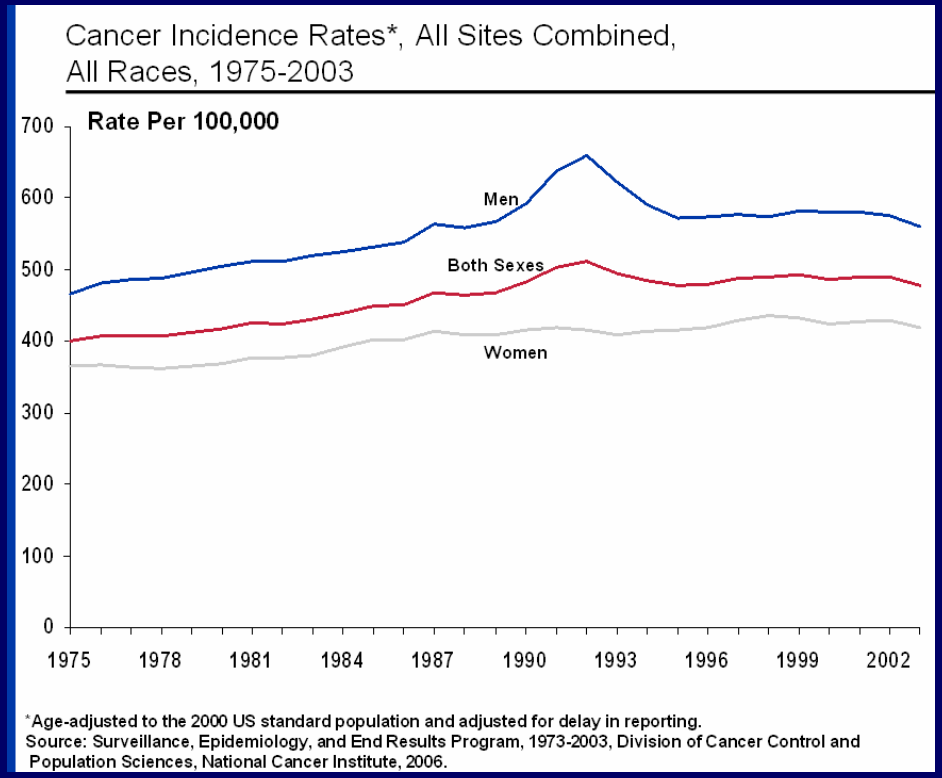
2007 Estimated US Cancer Cases*

		Men 766,860	Women 678,060		
Prostate	29%			26%	Breast
Lung & bronchus	15%			15%	Lung & bronchus
Colon & rectum	10%			11%	Colon & rectum
Urinary bladder	7%			6%	Uterine corpus
Non-Hodgkin lymphoma	4%			4%	Non-Hodgkin lymphoma
Melanoma of skin	4%			4%	Melanoma of skin
Kidney	4%			4%	Thyroid
Leukemia	3%			3%	Ovary
Oral cavity	3%			3%	Kidney
Pancreas	2%			3%	Leukemia
All Other Sites	19%			21%	All Other Sites

*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
Source: American Cancer Society, 2007.

www.cancer.org

Scope of the Problem



Scope of the Problem

Five-year Relative Survival (%)* during Three Time Periods By Cancer Site

Site	1975-1977	1984-1986	1996-2002
All sites	50	53	66
Breast (female)	75	79	89
Colon	51	59	65
Leukemia	35	42	49
Lung and bronchus	13	13	16
Melanoma	82	86	92
Non-Hodgkin lymphoma	48	53	63
Ovary	37	40	45†
Pancreas	2	3	5
Prostate	69	76	100
Rectum	49	57	66
Urinary bladder	73	78	82

*5-year relative survival rates based on follow up of patients through 2003.
†Recent changes in classification of ovarian cancer have affected 1996-2002 survival rates.
Source: Surveillance, Epidemiology, and End Results Program, 1975-2003, Division of Cancer Control and Population Sciences, National Cancer Institute, 2006.

Principles of Patient Selection

- Know tumor biology
- Know extent of disease
- Disease free interval
- Clarify goal of operation
  (cure, debulk, palliate)

Patient Selection - Liver Metastasis

Risk Factors

- Node positive primary
- Disease free interval <12 mo
- >1 tumor
- Size >5cm
- CEA > 200ng/ml

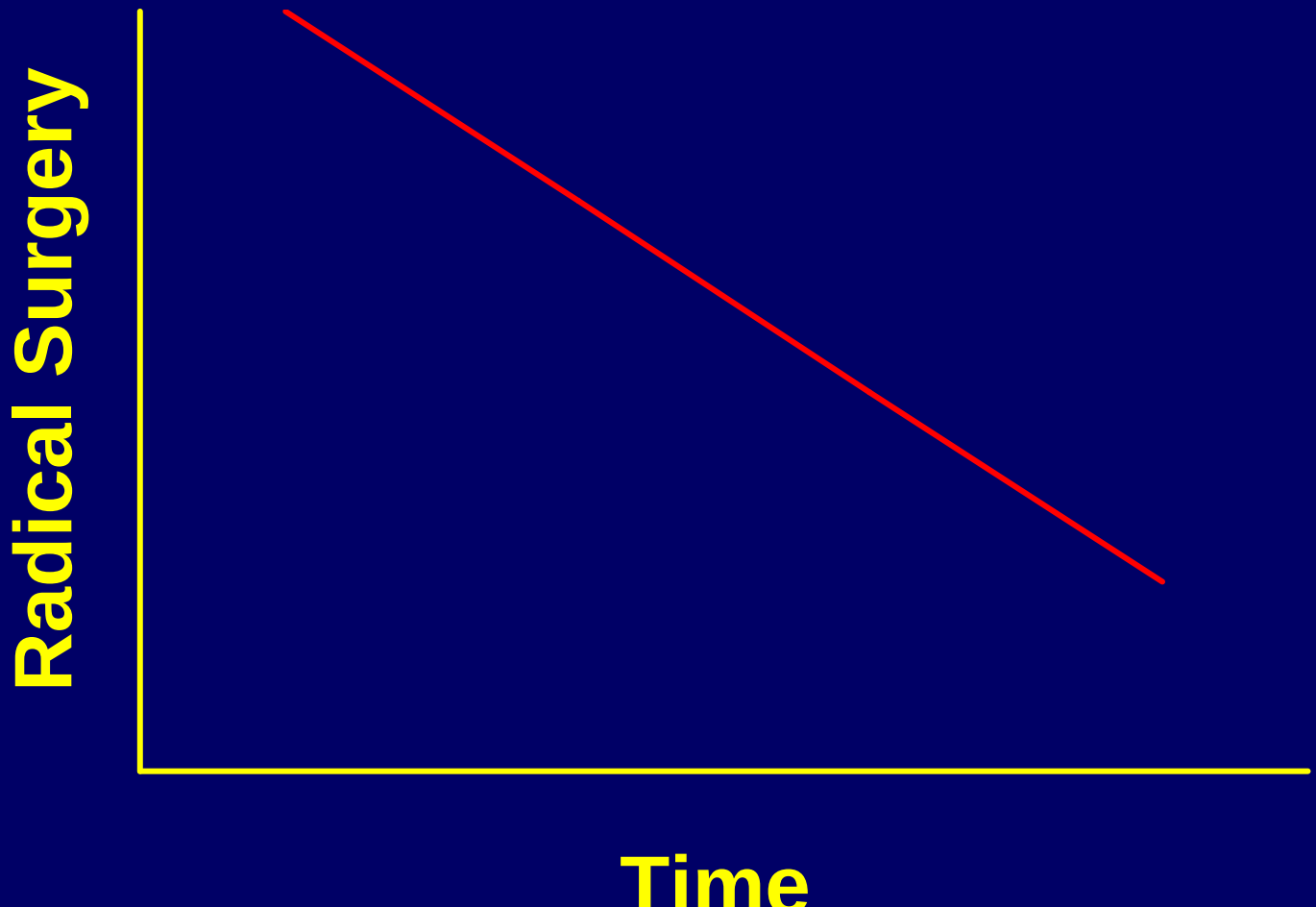
Table 5. CLINICAL RISK SCORE FOR TUMOR RECURRENCE

	Survival (%)					
Score	1-yr	2-yr	3-yr	4-yr	5-yr	Median (mo)
0	93	79	72	60	60	74
1	91	76	66	54	44	51
2	89	73	60	51	40	47
3	86	67	42	25	20	33
4	70	45	38	29	25	20
5	71	45	27	14	14	22

Each risk factor is one point: node-positive primary, disease-free interval <12 months, >1 tumor, Size >5 cm, CEA >200 ng/ml.

Fong Y, Ann Surg 1999;230:309-21

History of Surgical Oncology



Scope of the Problem

Lifetime Probability of Developing Cancer, by Site, Women, US, 2001-2003*

Site	Risk
All sites†	1 in 3
Breast	1 in 8
Lung & bronchus	1 in 16
Colon & rectum	1 in 19
Uterine corpus	1 in 40
Non-Hodgkin lymphoma	1 in 55
Ovary	1 in 69
Melanoma	1 in 73
Pancreas	1 in 79
Urinary bladder‡	1 in 87
Uterine cervix	1 in 138

* For those free of cancer at beginning of age interval. Based on cancer cases diagnosed during 2001 to 2003.
† All Sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.
‡ Includes invasive and in situ cancer cases
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.1.1 Statistical Research and Applications Branch, NCI, 2006. http://srab.cancer.gov/devcan

Lifetime Probability of Developing Cancer, by Site, Men, 2001-2003*

Site	Risk
All sites†	1 in 2
Prostate	1 in 6
Lung and bronchus	1 in 12
Colon and rectum	1 in 17
Urinary bladder‡	1 in 28
Non-Hodgkin lymphoma	1 in 47
Melanoma	1 in 49
Kidney	1 in 61
Leukemia	1 in 67
Oral Cavity	1 in 72
Stomach	1 in 89

* For those free of cancer at beginning of age interval. Based on cancer cases diagnosed during 2001 to 2003.
† All Sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.
‡ Includes invasive and in situ cancer cases
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.1.1 Statistical Research and Applications Branch, NCI, 2006. http://srab.cancer.gov/devcan

Estimated 5 year Survival Rates by Stage at Diagnosis

Five-year Relative Survival Rates* (%) by Stage at Diagnosis, 1996-2004

Site	All Stages	Local	Regional	Distant	Site	All Stages	Local	Regional	Distant
Breast (female)	88.7	98.1	83.8	27.1	Ovary	45.5	92.7	71.1	30.6
Colon & rectum	64.4	89.7	68.4	10.8	Pancreas	5.1	20.0	8.2	1.8
Esophagus	15.8	34.4	17.1	2.8	Prostate§	98.9	100.0	—	31.7
Kidney†	66.5	89.9	61.3	9.9	Stomach	24.7	60.7	24.8	3.7
Larynx	62.5	80.9	50.2	23.4	Testis	95.5	99.3	95.7	71.1
Liver‡	11.7	23.8	7.7	2.9	Thyroid	96.9	99.7	96.9	57.8
Lung & bronchus	15.2	49.5	20.6	2.8	Urinary bladder	79.8	92.5	44.7	6.1
Melanoma of the skin	91.2	98.7	65.1	15.5	Uterine cervix	71.2	91.7	55.9	16.6
Oral cavity & pharynx	59.7	82.2	52.7	28.4	Uterine corpus	82.9	95.5	67.5	23.6

* Rates are adjusted for normal life expectancy and are based on cases diagnosed in the SEER 17 areas from 1996-2004, followed through 2005.
† Includes renal pelvis. ‡ Includes intrahepatic bile duct. § The rate for local stage represents local and regional stages combined.

Local: an invasive malignant cancer confined entirely to the organ of origin. **Regional:** a malignant cancer that 1) has extended beyond the limits of the organ of origin directly into surrounding organs or tissues; 2) involves regional lymph nodes by way of lymphatic system; or 3) has both regional extension and involvement of regional lymph nodes. **Distant:** a malignant cancer that has spread to parts of the body remote from the primary tumor either by direct extension or by discontinuous metastasis to distant organs, tissues, or via the lymphatic system to distant lymph nodes.

Source: Ries LAG, Melbert D, Krapcho M, et al. (eds). *SEER Cancer Statistics Review, 1975-2005*, National Cancer Institute, Bethesda, MD, seer.cancer.gov/csr/1975_2005/, 2008.

American Cancer Society, Surveillance and Health Policy Research, 2009

Imaging of Cancer Patients

Pre-op Imaging

- Apply tumor biology principles
- What would change the type or timing your operation?

Post-op Imaging

- Selective
- Patient anxiety
- Salvage surgery for recurrence is rare
- No prospective trial for “routine” post-op testing has shown a benefit in survival