



Genworth®  
Financial

# Underwriting Cancer

An LTCI Perspective  
LTCIF Annual Meeting

May 4, 2007

# 2006 Estimated US Cancer Cases\*

Men  
720,280

Women  
679,510

Prostate 33%

Lung & bronchus 13%

Colon & rectum 10%

Urinary bladder 6%

Melanoma of skin 5%

Non-Hodgkin lymphoma 4%

Kidney 3%

Oral cavity 3%

Leukemia 3%

Pancreas 2%

All Other Sites 18%



Breast 31%

Lung & bronchus 12%

Colon & rectum 11%

Uterine corpus 6%

Non-Hodgkin lymphoma 4%

Melanoma of skin 4%

Thyroid 3%

Ovary 3%

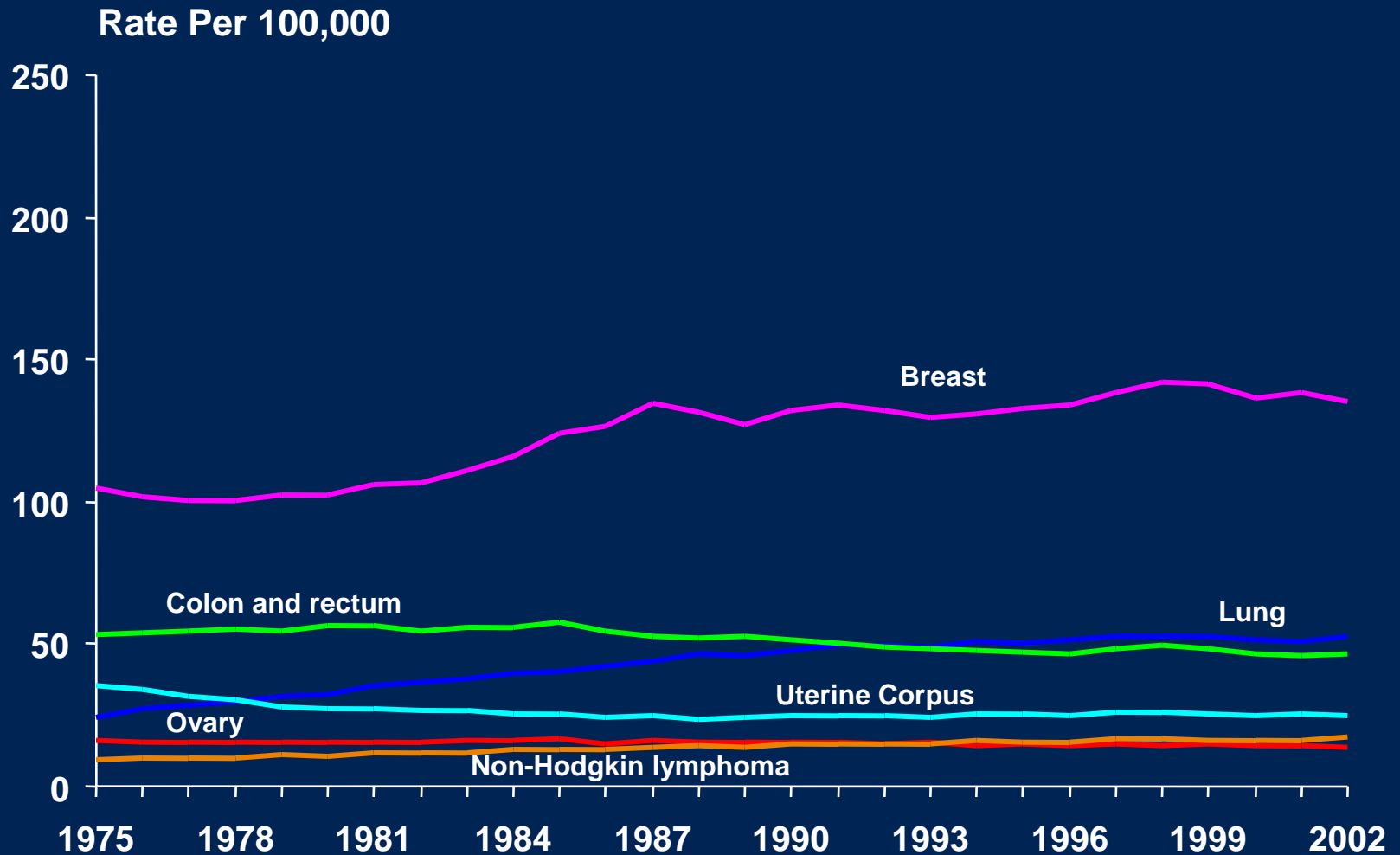
Urinary bladder 2%

Pancreas 2%

All Other Sites 22%

\*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.  
Source: American Cancer Society, 2006.

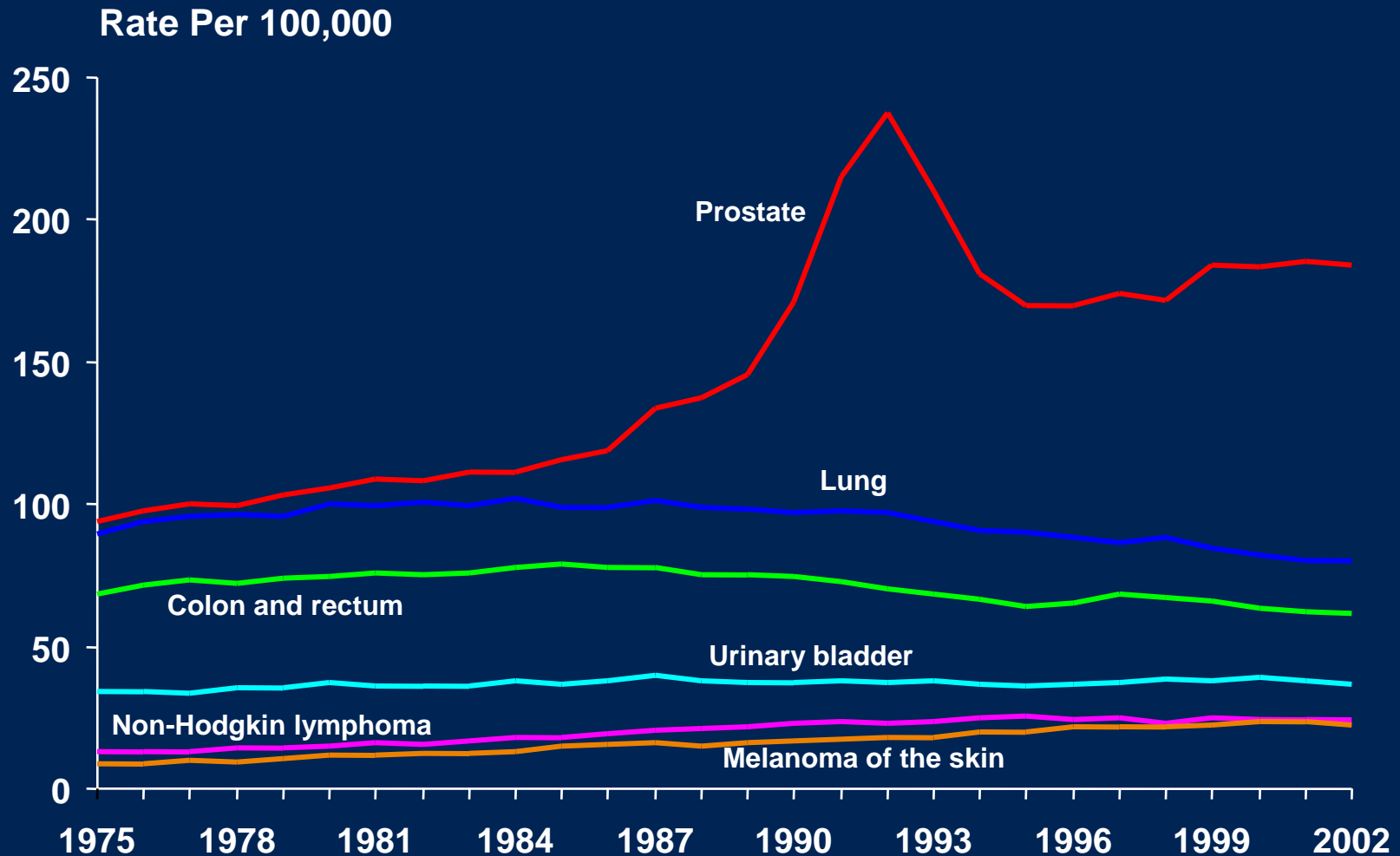
# Cancer Incidence Rates\* for Women, 1975-2002



\*Age-adjusted to the 2000 US standard population.

Source: Surveillance, Epidemiology, and End Results Program, 1975-2002, Division of Cancer Control and Population Sciences, National Cancer Institute, 2005.

# Cancer Incidence Rates\* for Men, 1975-2002



\*Age-adjusted to the 2000 US standard population.

Source: Surveillance, Epidemiology, and End Results Program, 1975-2002, Division of Cancer Control and Population Sciences, National Cancer Institute, 2005.

# Lifetime Probability of Developing Cancer, by Site, Women, US, 2000-2002\*

Site	Risk
All sites <sup>†</sup>	1 in 3
Breast	1 in 8
Lung & bronchus	1 in 17
Colon & rectum	1 in 18
Uterine corpus	1 in 38
Non-Hodgkin lymphoma	1 in 55
Ovary	1 in 68
Melanoma	1 in 77
Pancreas	1 in 79
Urinary bladder <sup>‡</sup>	1 in 88
Uterine cervix	1 in 135

\* For those free of cancer at beginning of age interval. Based on cancer cases diagnosed during 2000 to 2002.

<sup>†</sup> All Sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.

<sup>‡</sup> Includes invasive and *in situ* cancer cases

Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.0 Statistical Research and Applications Branch, NCI, 2005. <http://srab.cancer.gov/devcan>

# Lifetime Probability of Developing Cancer, by Site, Men, 2000-2002\*

Site	Risk
All sites <sup>†</sup>	1 in 2
Prostate	1 in 6
Lung and bronchus	1 in 13
Colon and rectum	1 in 17
Urinary bladder <sup>‡</sup>	1 in 28
Non-Hodgkin lymphoma	1 in 46
Melanoma	1 in 52
Kidney	1 in 64
Leukemia	1 in 67
Oral Cavity	1 in 73
Stomach	1 in 82

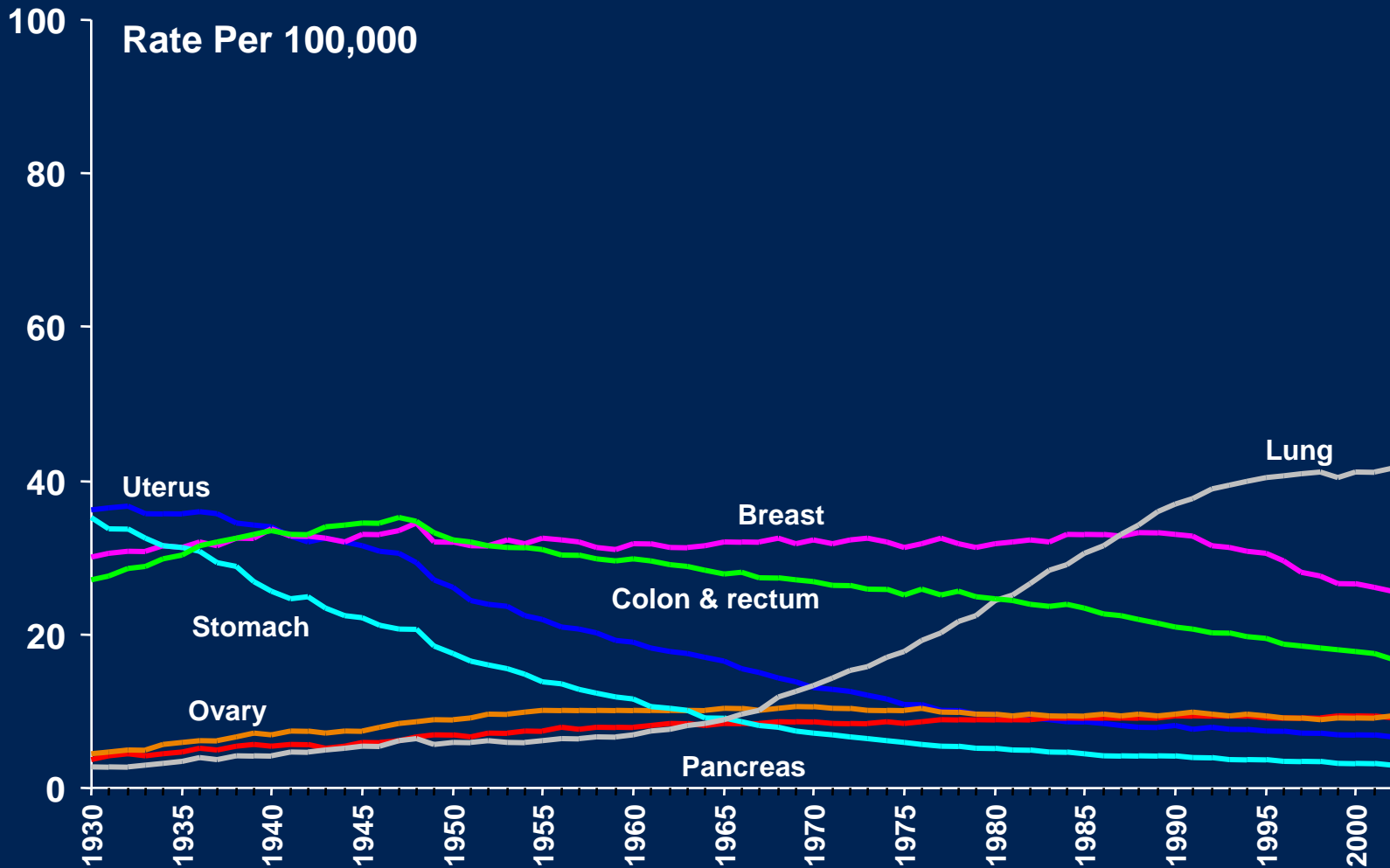
\* For those free of cancer at beginning of age interval. Based on cancer cases diagnosed during 2000 to 2002.

<sup>†</sup> All Sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.

<sup>‡</sup> Includes invasive and *in situ* cancer cases

Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.0 Statistical Research and Applications Branch, NCI, 2005. <http://srab.cancer.gov/devcan>

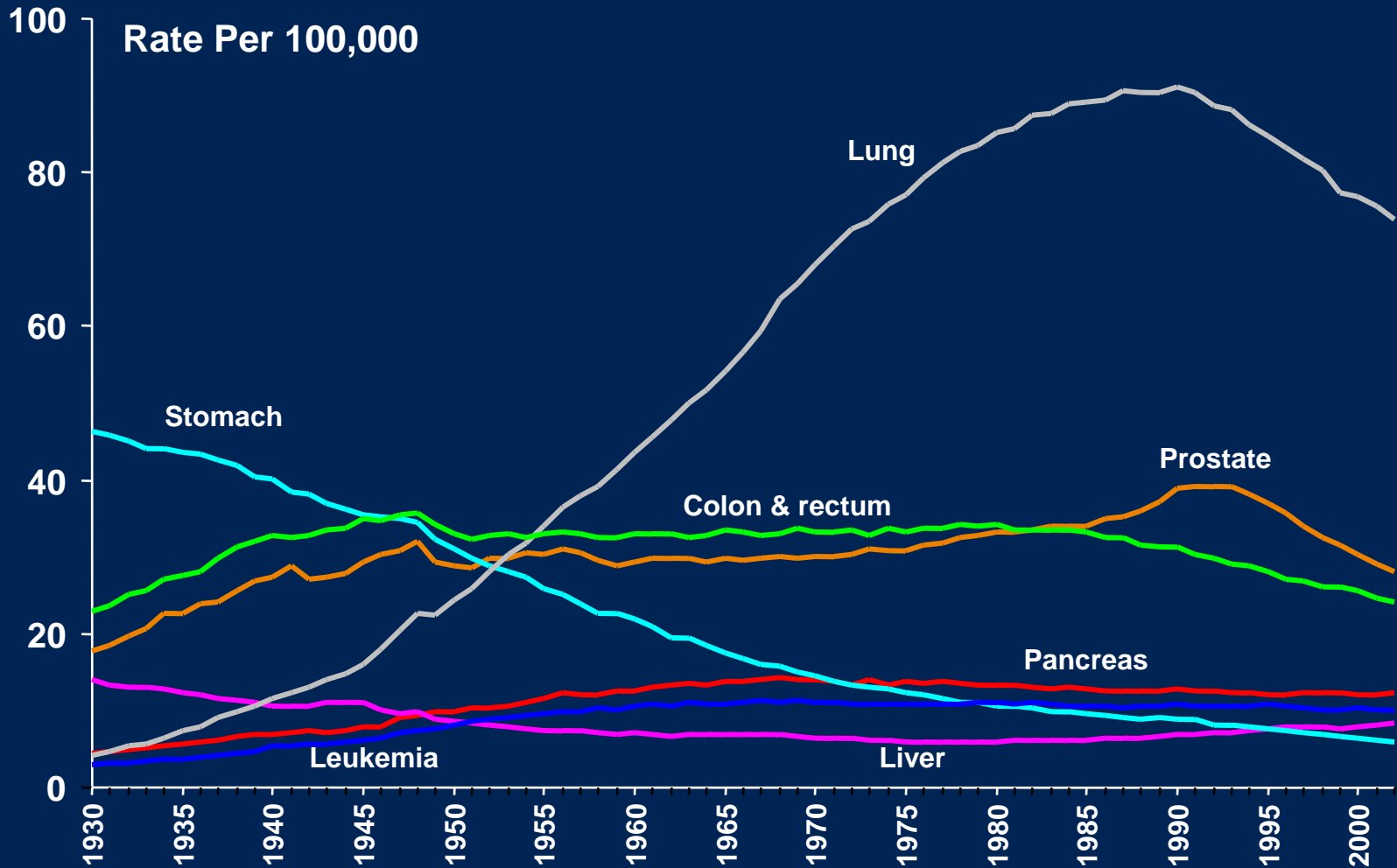
# Cancer Death Rates\*, for Women, US, 1930-2002



\*Age-adjusted to the 2000 US standard population.

Source: US Mortality Public Use Data Tapes 1960-2002, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

# Cancer Death Rates\*, for Men, US, 1930-2002



\*Age-adjusted to the 2000 US standard population.

Source: US Mortality Public Use Data Tapes 1960-2002, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

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

Site	1974-1976	1983-1985	1995-2001
• All sites	50	53	65
• Breast (female)	75	78	88
• Colon	50	58	64
• Leukemia	34	41	48
• Lung and bronchus	12	14	15
• Melanoma	80	85	92
• Non-Hodgkin lymphoma	47	54	60
• Ovary	37	41	45
• Pancreas	3	3	5
• Prostate	67	75	100
• Rectum	49	55	65
• Urinary bladder	73	78	82

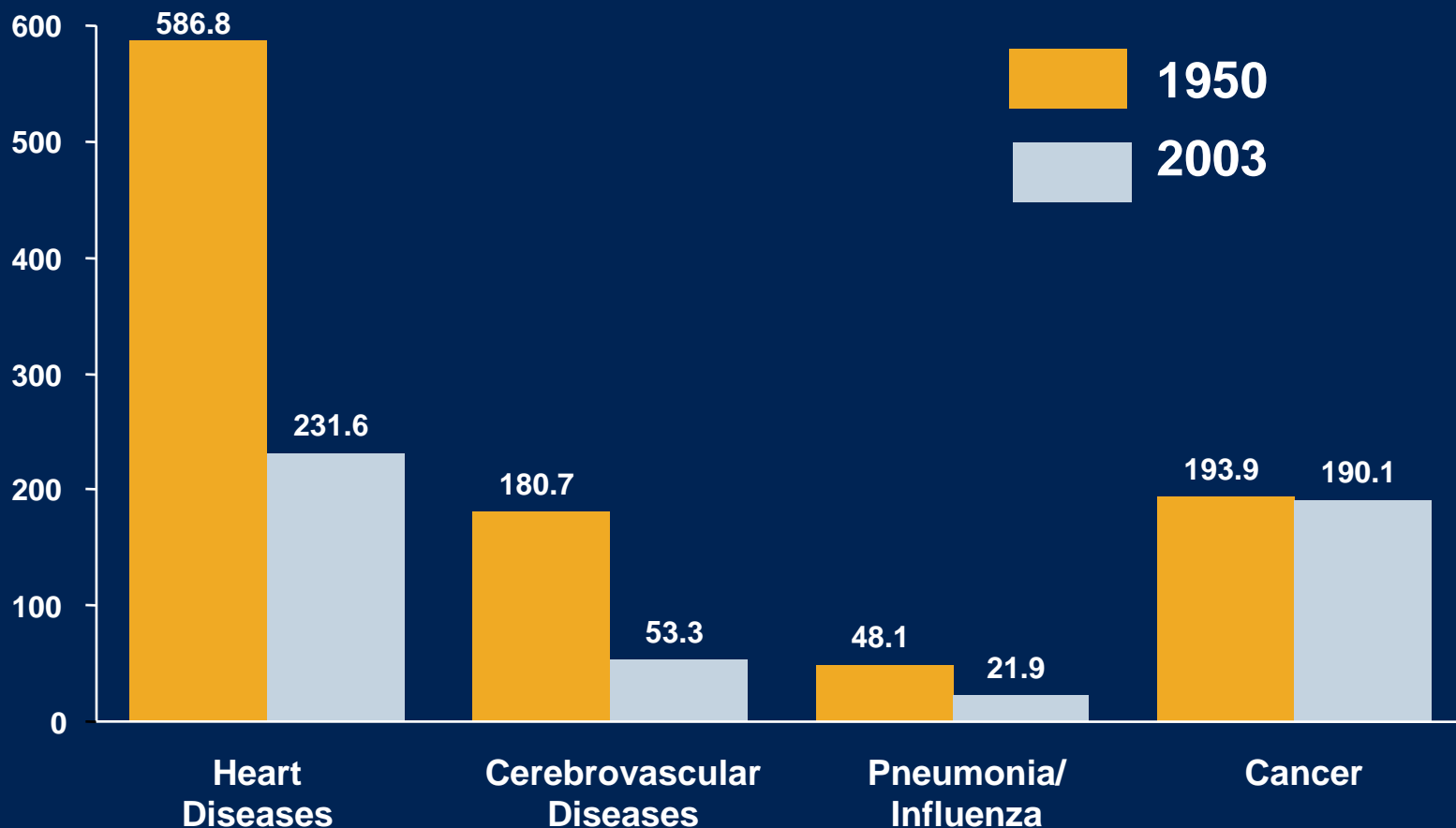
\*5-year relative survival rates based on follow up of patients through 2002.

†Recent changes in classification of ovarian cancer have affected 1995-2001 survival rates.

Source: Surveillance, Epidemiology, and End Results Program, 1975-2002, Division of Cancer Control and Population Sciences, National Cancer Institute, 2005.

# Change in the US Death Rates\* by Cause, 1950 & 2003

Rate Per 100,000

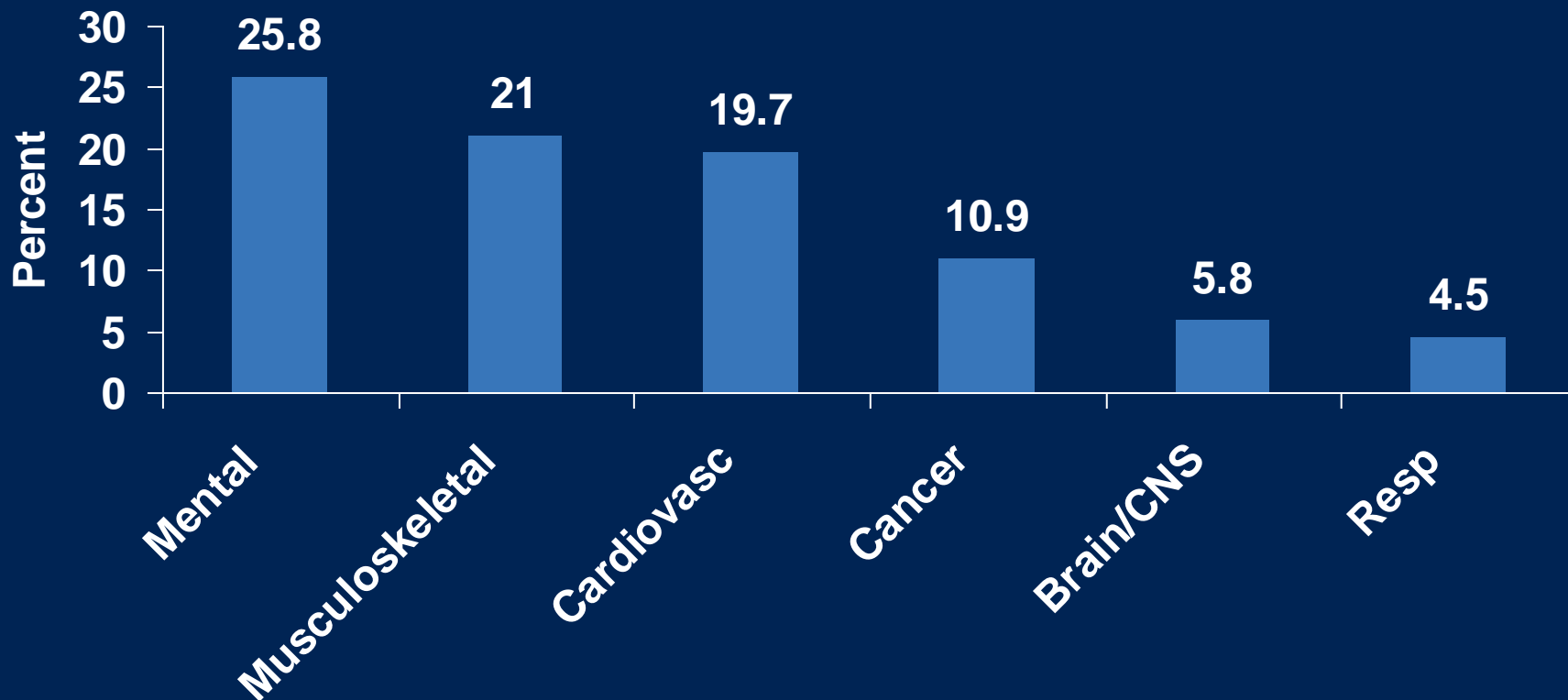


\* Age-adjusted to 2000 US standard population.

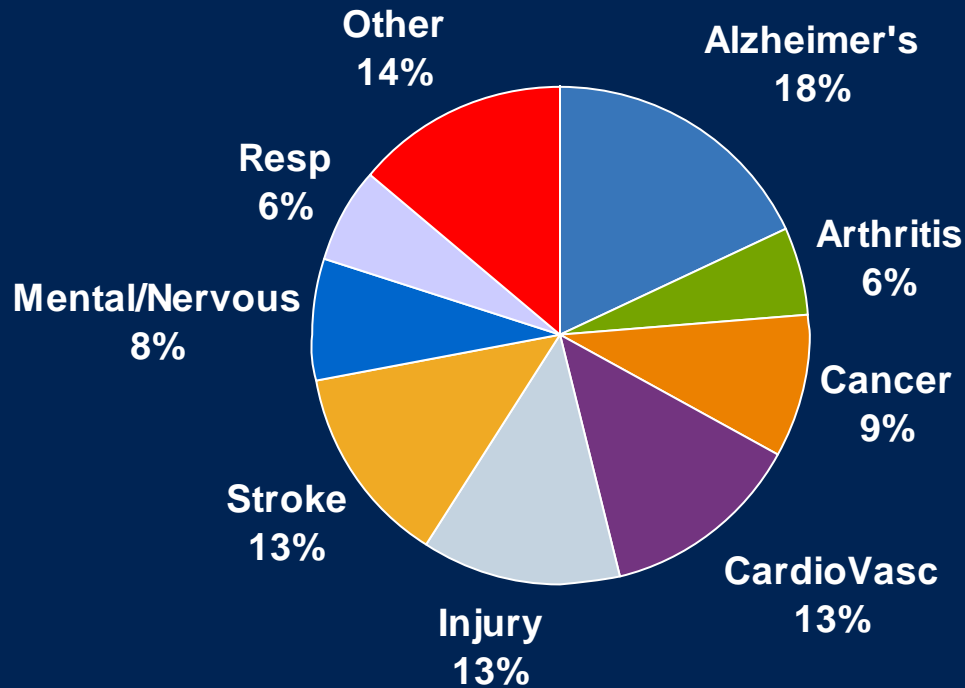
Sources: 1950 Mortality Data - CDC/NCHS, NVSS, Mortality Revised.

2003 Mortality Data: US Mortality Public Use Data Tape, 2003, NCHS, Centers for Disease Control and Prevention, 2006

# Claimant Diagnosis - Genworth



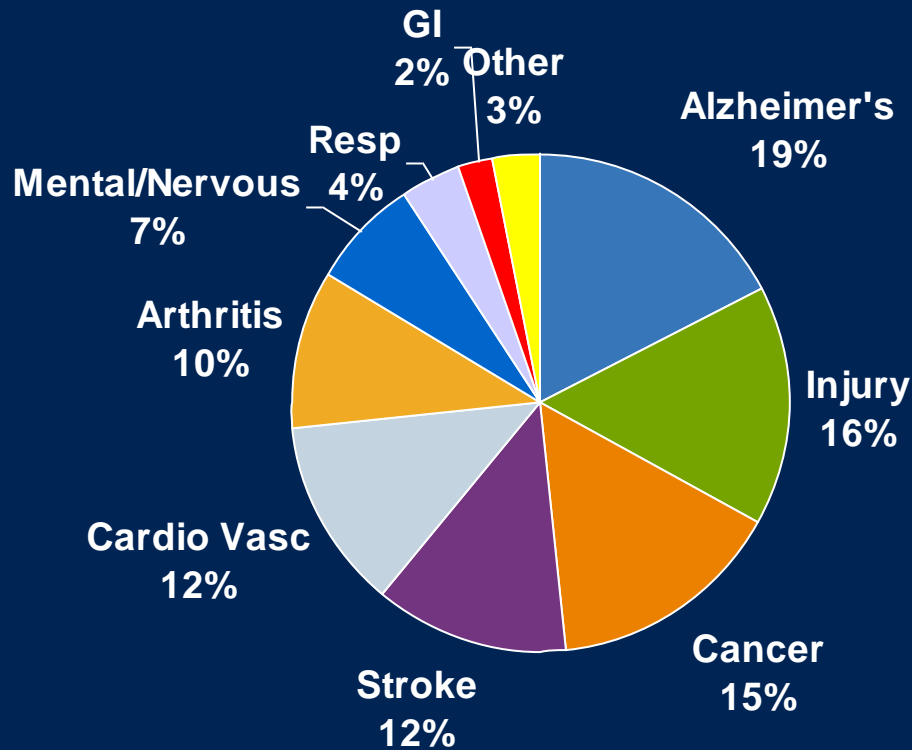
# Claimant Diagnoses – Nursing Home



## NH Claims by Diagnosis

SOA Intercompany Experience Study 1984-2001

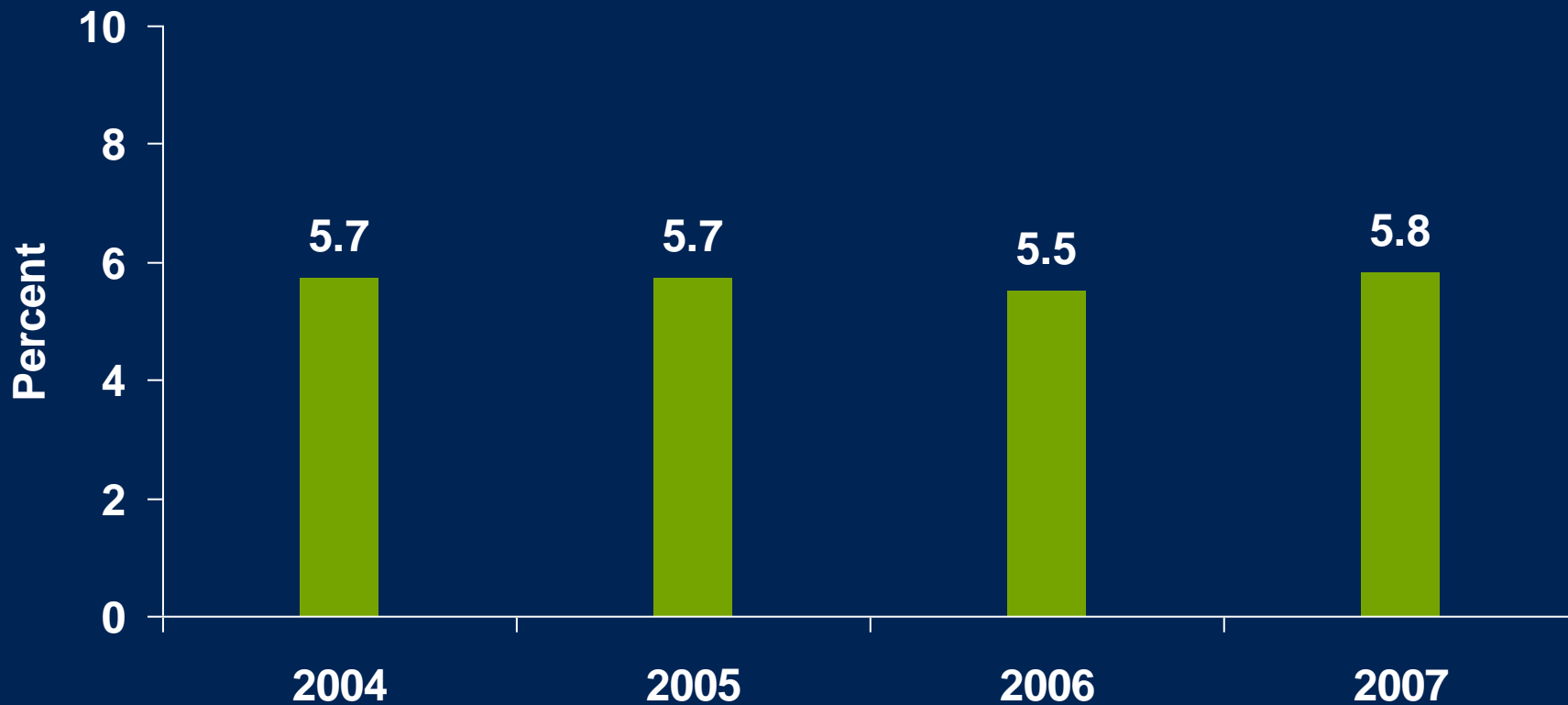
# Claimant Diagnoses – Home Care



## HC Claims by Diagnosis

SOA Intercompany Experience Study 1984-2001

# Cancer Diagnosis – At Application



# Underwriting Tools

- **Application**
- **Phone/Face-to-Face Interviews**
- **Medical Records**
  - Primary Care Provider
  - Oncologist
  - Radiation Oncologist
  - Surgeon
  - Other specialist (e.g., urologist)
- **Pathology Reports**
  - Biopsy Report
  - Final Pathology Report
  - Second Opinion Reports (e.g., AFIP, dermatopathologist)

# TNM Classification

- **T – Primary Tumor**
  - T0 – no evidence primary tumor
  - Tis – carcinoma in situ
  - T1-4 – increasing size and/or local extent of tumor
- **N – Regional Lymph Nodes**
  - N0 – no regional lymph node metastasis
  - N1-3 – increasing regional lymph node involvement
- **M – Distant Metastasis**
  - M0 – no distant metastasis
  - M1 – distant metastasis

*AJCC Cancer Staging Manual, 6<sup>th</sup> ed; 2002*

# TNM Classification

- **Histologic Grade**
  - GX – grade cannot be assessed
  - G1 – well differentiated
  - G2 – moderately differentiated
  - G3 – poorly differentiated
  - G4 - undifferentiated
- **Classification**
  - cTNM – clinical
  - pTNM – pathologic
  - rTNM – retreatment
  - aTNM - autopsy

*AJCC Cancer Staging Manual, 6<sup>th</sup> ed; 2002*

# Breast Cancer Staging (AJCC 6<sup>th</sup> Ed)

<b>Stage 0</b>	Tis	N0	M0
<b>Stage I</b>	T1	N0	M0
<b>Stage IIA</b>	T0	N1	M0
	T1	N1	M0
	T2	N0	M0
<b>Stage IIB</b>	T2	N1	M0
	T3	N0	M0
<b>Stage IIIA</b>	T0	N2	M0
	T1	N2	M0
	T2	N2	M0
	T3	N1	M0
<b>Stage IIIB</b>	T3	N2	M0
	T4	N0	M0
	T4	N1	M0
<b>Stage IIIC</b>	T4	N2	M0
	Any T	N3	M0
<b>Stage IV</b>	Any T	Any N	M1

T1 =  $\leq 2$  cm

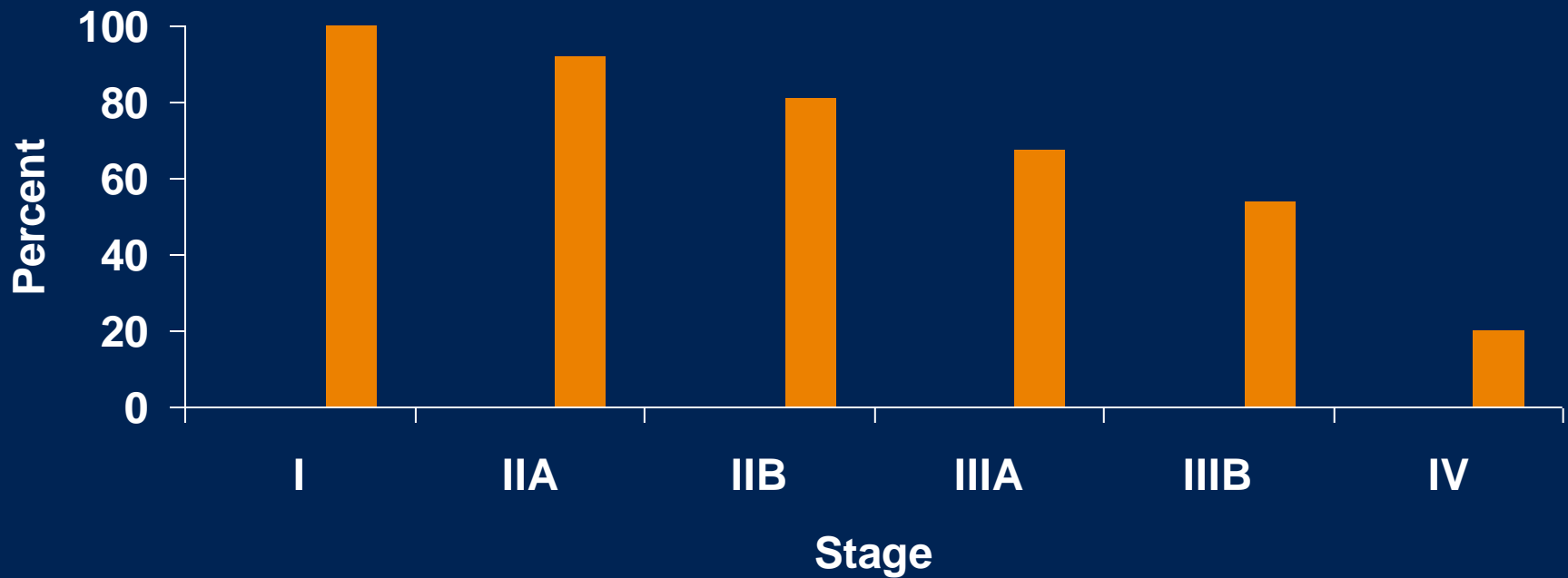
T2 =  $>2; \leq 5$  cm

T3 =  $>5$  cm

T4 = skin, chest wall involvement

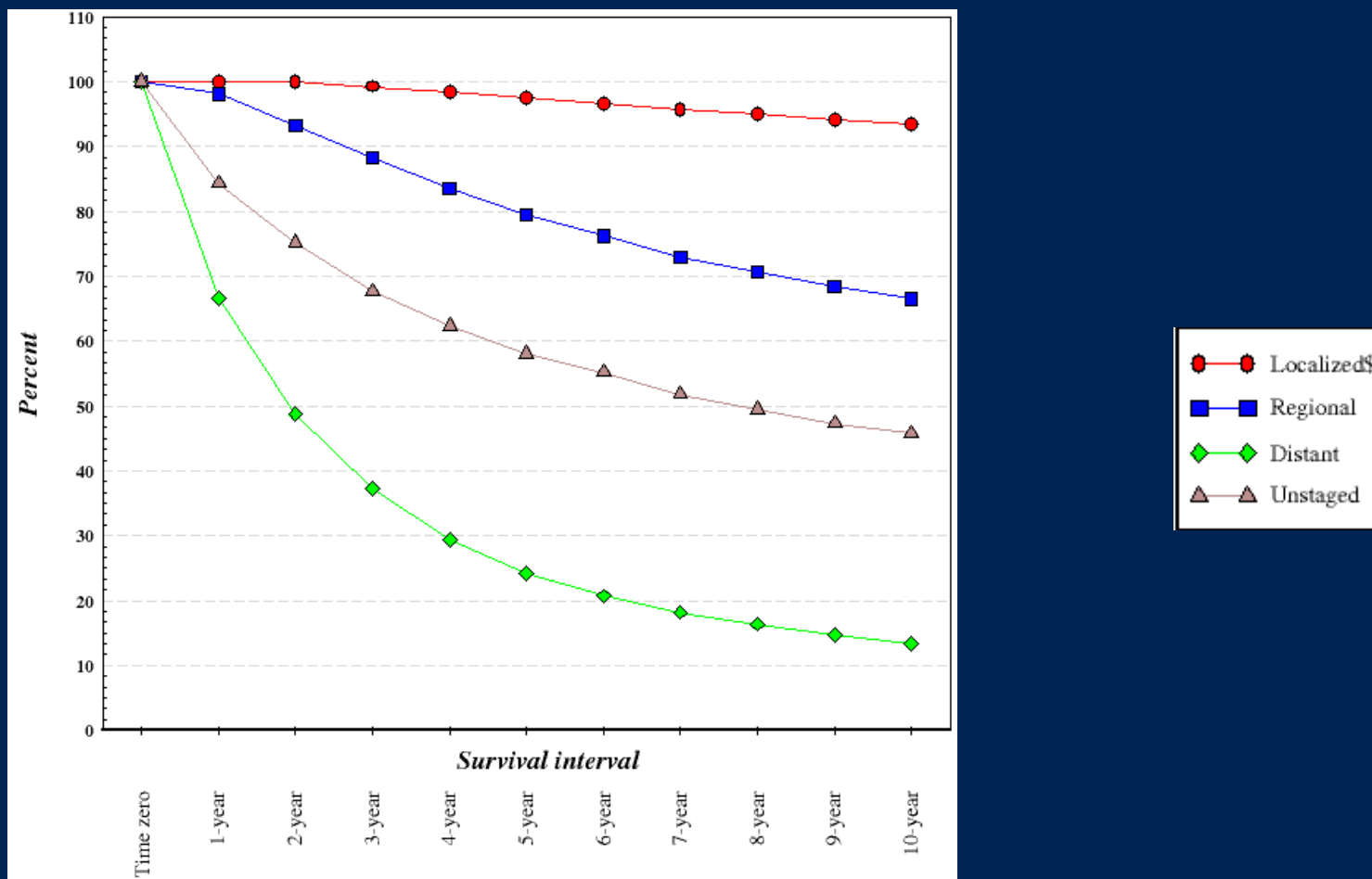
# Breast Cancer Survival

## 5-Year Relative Survival Rate



American Cancer Society

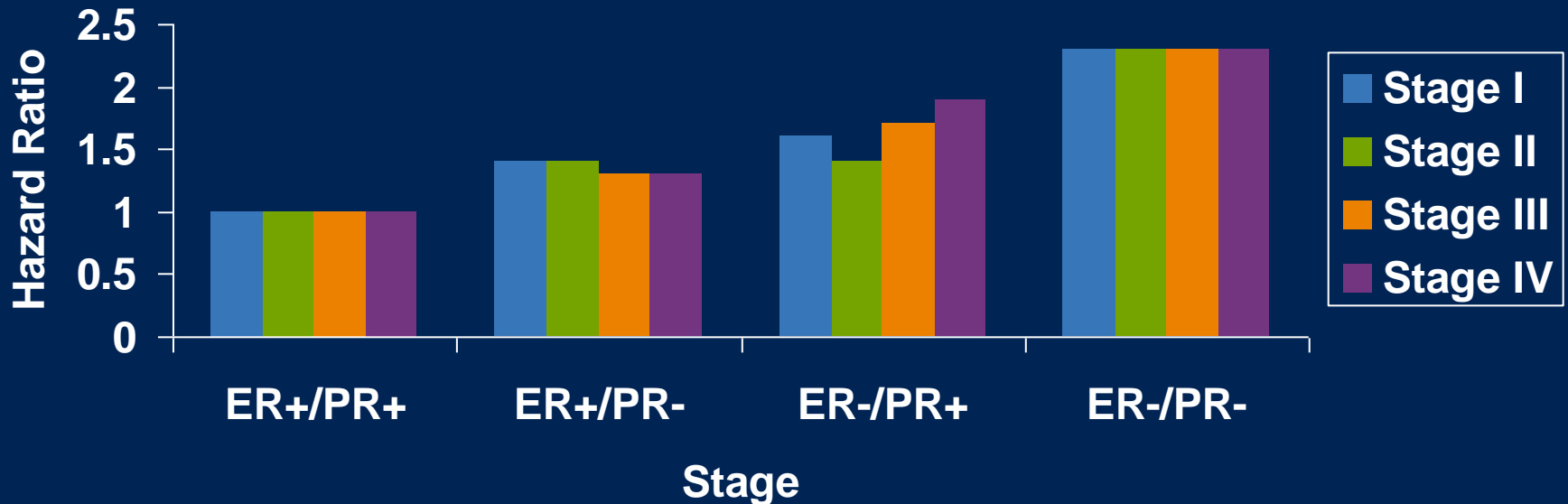
# Breast Cancer Survival



<http://seer.cancer.gov>

# Breast Cancer – Prognostic Factors

## Breast Cancer Mortality by Hormone Receptor Status



Dunnwald, LK, et al. *Breast Cancer Res* 2007;9:R6

# Breast Cancer – Prognostic Factors

Relapse-Free Survival at 5 Years

Variable	Hazard Ratio	P Value
<b>Patient Age</b>		
<35 vs $\geq$ 35	3.1	.0066
<b>Tumor Size</b>		
1-2 vs $\leq$ 1	1.7	.244
>2 vs $\leq$ 1	2.8	.020
<b>Histologic Grade</b>		
2 vs 1	1.5	.275
3 vs 1	2.2	.053
<b>Steroid Receptor Status</b>		
ER- vs ER+	1.4	.139
PR- vs PR+	1.3	.267

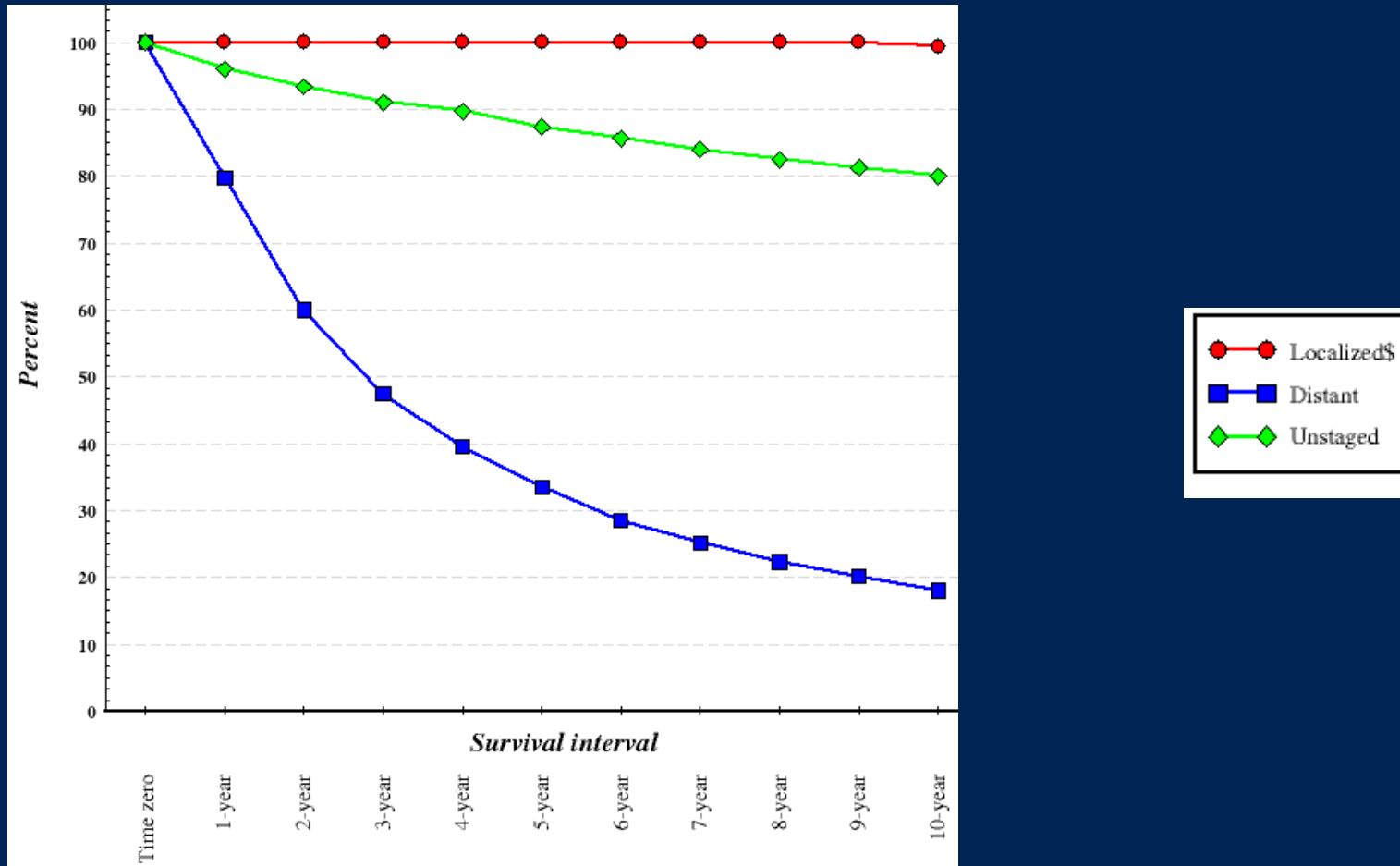
Daidone, MG, Silvestrini, R. *J Natl Cancer Inst Monogr* 2001;30:27

# Prostate Cancer Staging (AJCC 6<sup>th</sup> Ed)

Stage I	T1a	N0	M0	G1
Stage II	T1a	N0	M0	G2, 3-4
	T1b	N0	M0	Any G
	T1c	N0	M0	Any G
	T1	N0	M0	Any G
	T2	N0	M0	Any G
Stage III	T3	N0	M0	Any G
Stage IV	T4	N0	M0	Any G
	Any T	N1	M0	Any G
	Any T	Anu N	M1	Any G

**T1 = no apparent tumor**  
**T1a = tumor  $\leq$ 5% tissue**  
**T1b = tumor  $>$ 5% tissue**  
**T1c = tumor by biopsy**  
**T2 = confined to prostate**  
**T3 = tumor through capsule**  
**T4 = invade/fixed adjacent tissue**

# Prostate Cancer Survival



<http://seer.cancer.gov>

# Prostate Cancer –Prognostic Factors

Predictors of Disease-Free Survival (DFS) 10 Years After Prostatectomy

<b>Good: &gt;75% DFS</b>	<b>Intermediate: 50-74% DFS</b>	<b>Poor: &lt;50% DFS</b>
<b>Gleason score 2-4</b>	<b>Gleason 5-6, capsular penetration, positive margin</b>	<b>Gleason score 7, extensive capsular penetration, positive margin</b>
<b>Gleason score 5-6, organ confined</b>	<b>Gleason score 7, organ confined</b>	<b>Gleason score 8+</b>
<b>Gleason 5-6, focal capsular penetration + positive margin, or extensive capsular penetration</b>	<b>Gleason 7, focal capsular penetration + positive margin, or extensive capsular penetration</b>	<b>Positive seminal vesicles or lymph nodes</b>

Hamdy, FC. *Cancer Treatment Rev* 2001;27:143

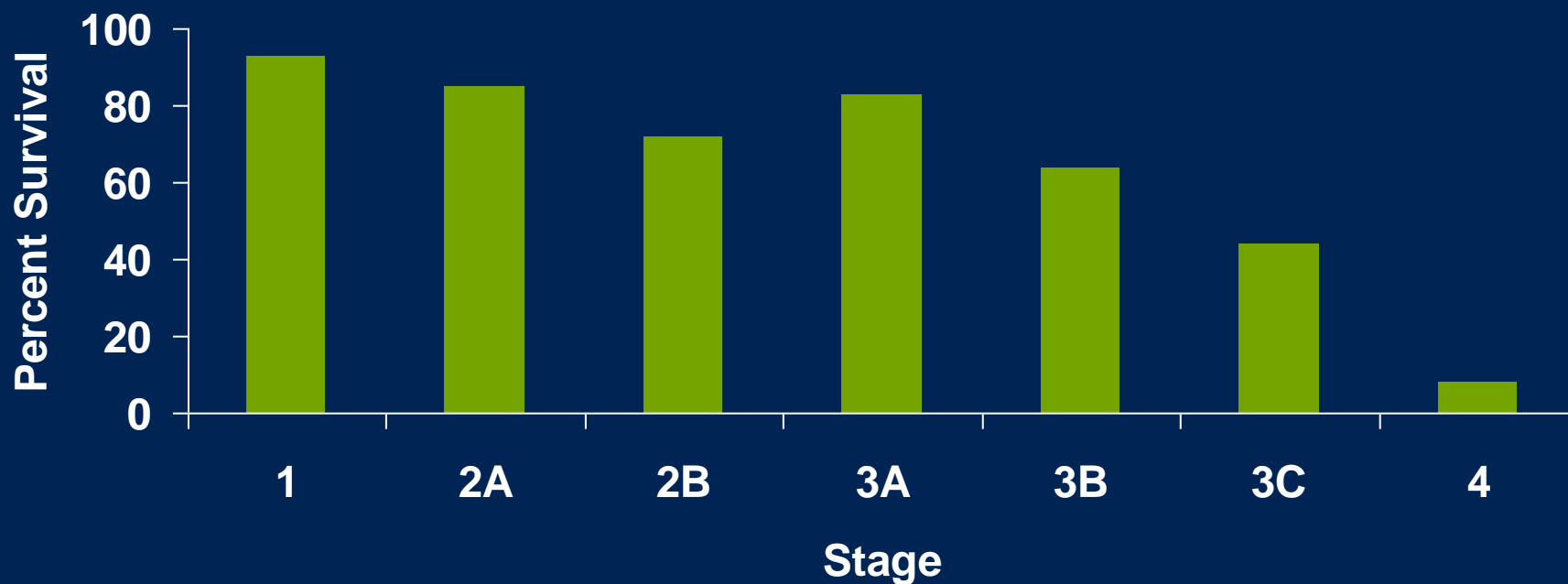
# Colon Cancer Staging (AJCC 6<sup>th</sup> Ed)

Stage 0	Tis	N0	M0	
Stage I	T1	N0	M0	Dukes A
	T2	N0	M0	
Stage IIA	T3	N0	M0	Dukes B
Stage IIB	T4	N0	M0	
Stage IIIA	T1-2	N1	M0	Dukes C
Stage IIIB	T3-4	N1	M0	
Stage IIIC	Any T	N2	M0	
Stage IV	Any T	Any N	M1	Dukes D

T1 = submucosa  
 T2 = muscularis  
 T3 = through muscularis or into pericolic tissue  
 T4 = tumor invades other organs/structures

# Colon Cancer Mortality

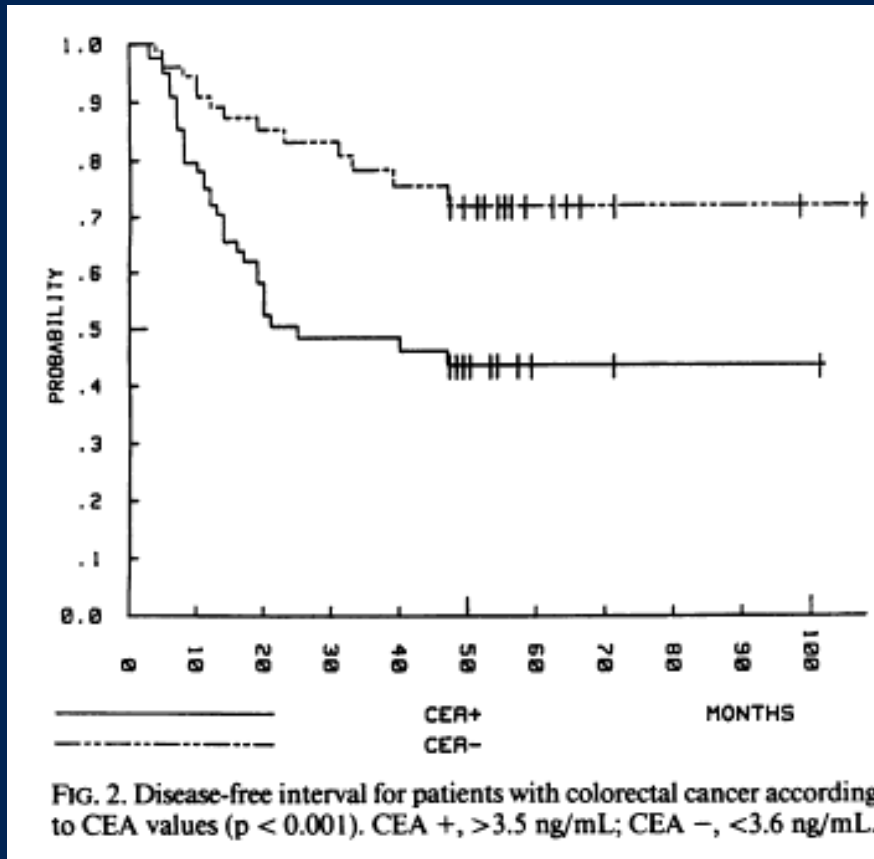
## Five-Year Survival



[http://coloncancer.about.com/od/cancerstatistics/a/US\\_Survival\\_CC.htm](http://coloncancer.about.com/od/cancerstatistics/a/US_Survival_CC.htm)

# Colon Cancer - Prognostic Factors

## Pre-Op CEA Levels and Prognosis



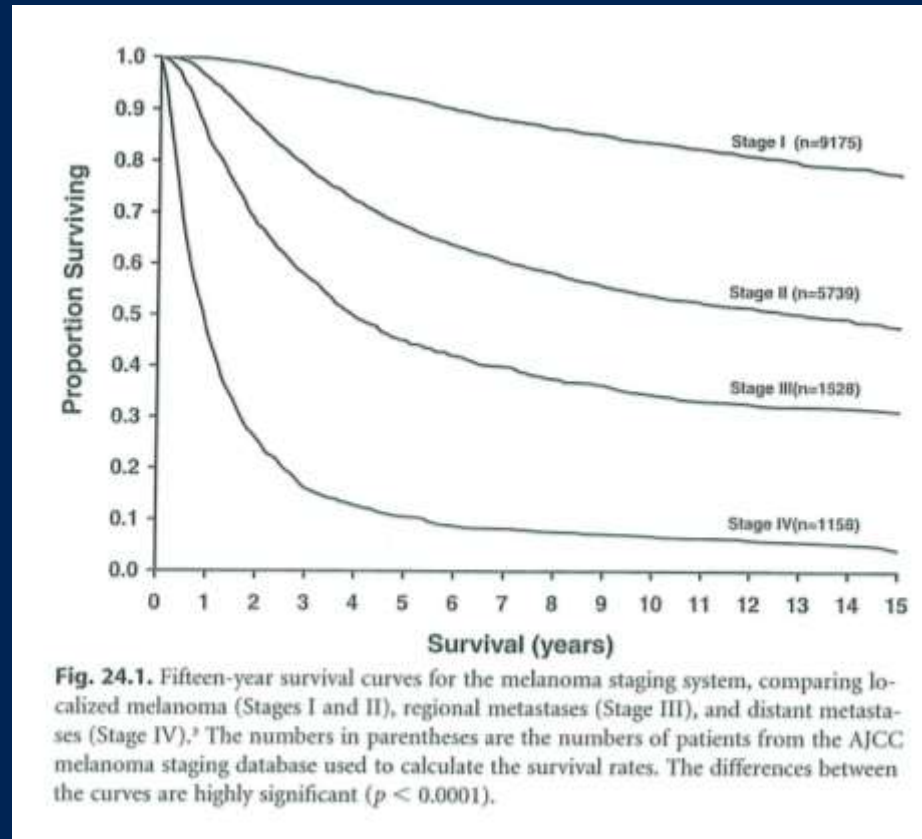
Filella, X, et al. *Ann Surg* 1992;216:55

# Melanoma Staging

**Table 1. Staging Criteria for Melanoma.\***

Pathological and TNM Stage	Thickness of Lesion <i>mm</i>	Ulceration	No. of Involved Lymph Nodes	Nodal Involvement	Distant Metastasis
IA	≤1.0	No	0	—	No
IB					
T1b	≤1.0	Yes or Clark level IV or V	0	—	No
T2a	1.01–2.0	No	0	—	No
IIA					
T2b	1.01–2.0	Yes	0	—	No
T3a	2.01–4.0	No	0	—	No
IIB					
T3b	2.01–4.0	Yes	0	—	No
T4a	>4.0	No	0	—	No
IIC	>4.0	Yes	0	—	No
IIIA					
N1a	Any	No	1	Microscopic	No
N2a	Any	No	2 or 3	Microscopic	No
IIIB					
N1a	Any	Yes	1	Microscopic	No
N2a	Any	Yes	2 or 3	Microscopic	No
N1b	Any	No	1	Macroscopic	No
N2b	Any	No	2 or 3	Macroscopic	No
IIIC					
N1b	Any	Yes	1	Macroscopic	No
N2b	Any	Yes	2 or 3	Macroscopic	No
N3	Any	Yes or no	4	Macroscopic or microscopic	No
IV					
M1a	Any	Yes or no	Any	Any	Skin, subcutaneous
M1b	Any	Yes or no	Any	Any	Lung
M1c	Any	Yes or no	Any	Any	Other visceral site

# Melanoma Mortality



From *AJCC Cancer Staging Manual 6<sup>th</sup> ed*

# Melanoma – Prognostic Factors

	<u>Five-Year Survival Rate (%)</u>	
	Ulceration	No Ulceration
Depth (mm)*		
≤1.0	91	95
1.01-2.0	77	89
2.01-4.0	63	79
>4.0	45	67

\* Node-negative disease

Homsi, J. *Cancer Control* 2005;12:223

# Allogenic Bone Marrow Transplant

## Study of 6691 ABMT Recipients Disease-Free at Two Years

- **Diseases Treated**
  - AML, ALL
  - CML
  - Aplastic Anemia
- **Long-term Survival**
  - If disease free at two years, probability living 5 more years is 89% (mortality still higher than “normal” population)
  - Aplastic anemia – after sixth year, mortality reached “normal” population
- **Cause of Death**
  - Leukemia – recurrent disease primary cause
  - Aplastic Anemia – chronic graft-versus-host disease primary cause

Socie, GS, et al. *NEJM* 1999;341:14

# Stem-Cell Transplantation

- **Diseases Treated**
  - Autologous (30K/year)
    - Multiple Myeloma
    - HL, NHL
    - AML
    - Ovarian Cancer
  - Allogenic (15K/year)
    - AML, ALL
    - CML, CLL
    - Myelodysplastic Syndromes
    - HL/NHL
    - Multiple Myeloma
    - Aplastic Anemia

Copelan, EA. *NEJM* 2006;354:1813

# Stem-Cell Transplantation

**Table 2. Outcomes of Hematopoietic Stem-Cell Transplantation in Selected Diseases.\***

Disease	Most Common Preparative Regimen	100-Day Mortality Rate	5-Yr Event-free Survival
			<i>percent</i>
<b>Autologous transplantation</b>			
Diffuse large-cell non-Hodgkin's lymphoma	Carmustine, cyclophosphamide, and etoposide		
First chemotherapy-sensitive relapse		3-5	45-50
Second chemotherapy-sensitive relapse		5-8	30-35
Refractory		10-20	5-10
<b>Allogeneic transplantation†</b>			
Acute myeloid leukemia	Cyclophosphamide and total-body irradiation		
First complete remission		7-10	55-65
Second complete remission		10-20	30-40
Refractory		30-40	15-20
Chronic myeloid leukemia	Busulfan and cyclophosphamide		
Chronic phase <1 yr after diagnosis		5-10	70-80
Chronic phase >1 yr after diagnosis		10-15	50-60
Accelerated		15-20	30-35
Blastic		35-45	5-15

\* The estimated ranges of data are based on recent reports.  
† This category refers to the transplantation of hematopoietic stem cells from an HLA-identical sibling donor.

Copelan, EA. *NEJM* 2006; 354:1813

# Cancer Guidelines – LTC Comparison

<u>Site</u>	<u>Stage I</u>	<u>Stage II</u>	<u>Stage III</u>	<u>Stage IV</u>
<b>Breast</b>	1-2 yr	2-3 yr	3+ yr	D
<b>Prostate</b>	1-2 yr	1-2 yr	2 yr	D
<b>Colon</b>	1-2 yr	2 yr	3+ yr	10-D
<b>Melanoma</b>	1-2 yr	1-3 yr	IC-D	D

Summary of five field guides at standard rates without restriction

# Summary

- **A significant number of LTC applicants have a cancer history**
- **Many are acceptable for LTC insurance coverage**
- **Early stage tumors can often be taken after a short waiting period**
- **Proper underwriting requires accurate staging, treatment and follow up information**
- **In addition to stage, other factors to consider are cell type, applicant age, grade and biochemical markers**

