



California Colorectal Cancer Coalition





## Epidemiology of Colorectal Cancer


San Diego Academy of Family Physicians  
November 14, 2009

Jon M. Greif, DO, FACS  
Attending Surgeon, Carol Ann Read Breast Health Center and Alta Bates Summit Medical Centers of Oakland and Berkeley, CA  
Past President, California Division, American Cancer Society and California Colorectal Cancer Coalition  
Associate Clinical Professor of Surgery, University of California, San Diego

## Epidemiology of Colorectal Cancer

### Incidence & Mortality

**Epidemiology** is the study of **factors affecting the health and illness of populations**, and serves as the **foundation and logic of interventions** made in the interest of public health and preventive medicine. It is considered a cornerstone methodology of public health research, and is highly regarded in **evidence-based medicine for identifying risk factors for disease and determining optimal treatment approaches** to clinical practice. In the study of communicable and non-communicable diseases, the work of epidemiologists ranges from outbreak investigation to study design, data collection and analysis including the development of statistical models to test hypotheses and the documentation of results for submission to peer-reviewed journals. Epidemiologists also study **the interaction of diseases in a population**, a condition known as a **syndemic**. Epidemiologists rely on a number of other scientific disciplines, such as **biology** (to better understand disease processes), **Geographic Information Science** (to store data and map disease patterns) and **social science disciplines** (to better understand proximate and distal risk factors).



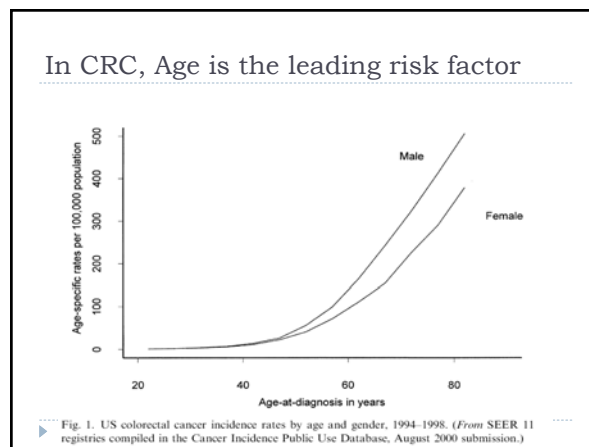
## Epidemiology of Colorectal Cancer

### Incidence & Mortality

**Table 5. Summary of Selected Risk Factors for Colorectal Cancer**

Factors that increase risk	Relative Risk*
<b>Hereditary and medical history</b>	
• Family history	
1 first-degree relative <sup>(1)</sup>	2.2
>1 first-degree relative <sup>(2)</sup>	4
Relative with diagnosis before age 45 <sup>(2)</sup>	3.9
• Inflammatory bowel disease <sup>(3)</sup>	
Crohn disease (colon)	2.6
Ulcerative colitis (colon)	2.8
Ulcerative colitis (rectum)	1.9
<b>Other factors</b>	
• Obesity (per 5-unit increase in BMI) <sup>(4)</sup>	
Men (colon)	1.3
Men (rectum)	1.1
Women (colon)	1.1
• Alcohol consumption <sup>(5)</sup>	
Red meat consumption <sup>(1)</sup>	1.3
• Diabetes <sup>(7)</sup>	1.2
• Processed meat consumption <sup>(8)</sup>	1.2
<b>Factors that decrease risk</b>	
• Milk consumption (<70 vs. >250 g/day) <sup>(9)</sup>	0.9
• Calcium (includes supplements) <sup>(10)</sup>	0.8
• Physical activity (active) <sup>(11)</sup>	
Men	0.8
Women	0.7

**Colorectal Cancer Facts & Figures 2008-2010**



## Epidemiology of Colorectal Cancer

### Incidence & Mortality

**Probability of Being Diagnosed With Certain Cancers Over Selected Age Intervals<sup>1</sup>, California, 2001-2005**


		Birth to 19	25 to 44	45 to 64	65 to 84	Birth to Death
		One in:	One in:	One in:	One in:	One in:
All Sites	Male	250	63	7	2	2
	Female	333	36	8	4	2
Breast	Female	*	100	20	14	8
Colon and Rectum	Male	*	1,000	77	26	19
	Female	*	1,000	100	32	20
Lung and Bronchus	Male	*	1,000	67	18	14
	Female	*	1,000	83	23	17
Prostate	Male	*	1,000	22	8	6

\* Assuming person is cancer free at the beginning of the age interval. \* Probability is extremely small.

**California Facts and Figures 2009**

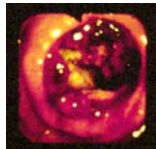
## Natural History: Polyps become Cancers...

**Polyp**



➔

**Advanced bleeding cancer**



➤ CRC almost always starts with a polyp  
➤ If polyp is removed before it becomes cancerous, CRC can be stopped before it starts

Colorectal Cancer Type	Risk Level	Percentage
Sporadic (average risk)	Average risk	65%–85%
Family history	Increased risk	10%–30%
Hereditary nonpolyposis colorectal cancer (HNPCC)	High risk	5%
Familial adenomatous polyposis (FAP)	Very high risk	1%
Rare syndromes	Very high risk	<0.1%

- ▶ **Familial Adenomatous Polyposis**
- ▶ **Hereditary Non-Polyposis Colorectal Cancer**
- ▶ **Rare Hereditary Syndromes**
  - ▶ Cowdens's Disease
  - ▶ Bannayan-Ruvalcaba-Riley Syndrome
  - ▶ Peutz-Jeghers Syndrome
  - ▶ Familial Juvenile Polyposis



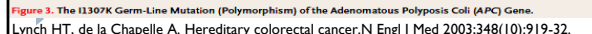
Lynch HT, de la Chapelle A. Hereditary colorectal cancer. *N Engl J Med* 2003;348(10):919-32.

### Amsterdam I criteria

### Amsterdam II criteria

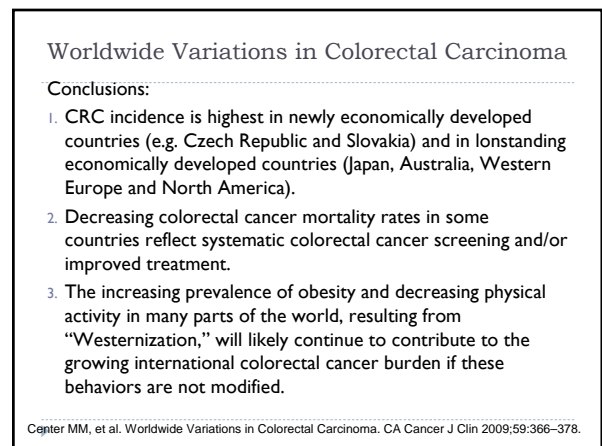
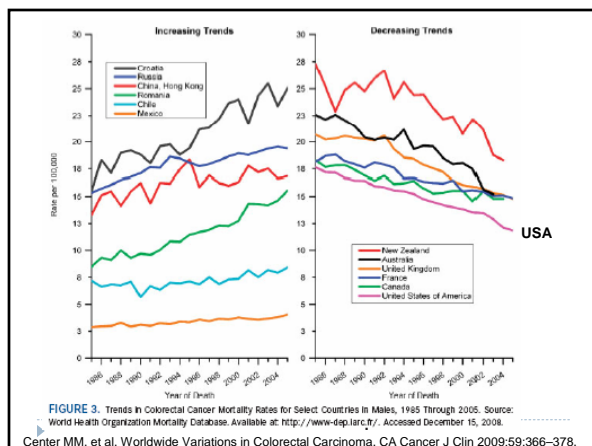
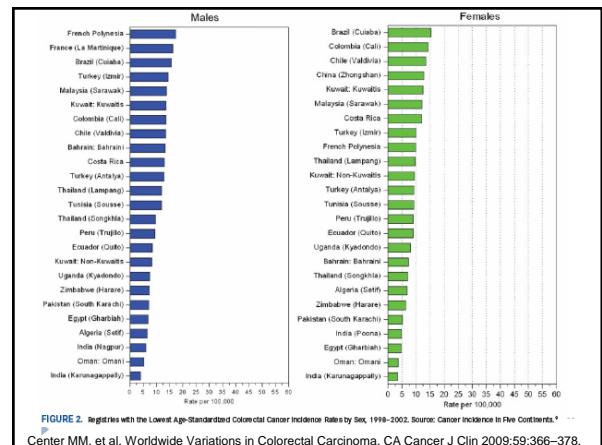
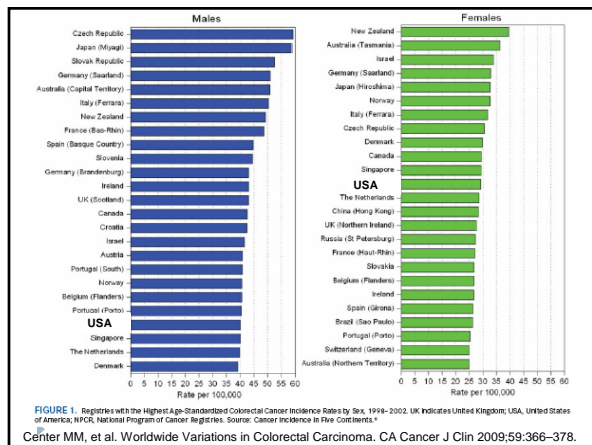
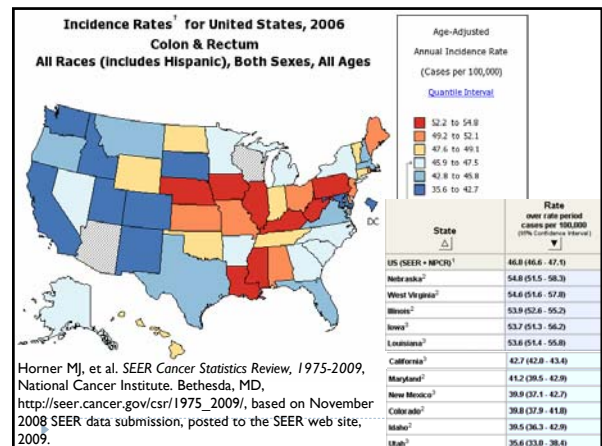
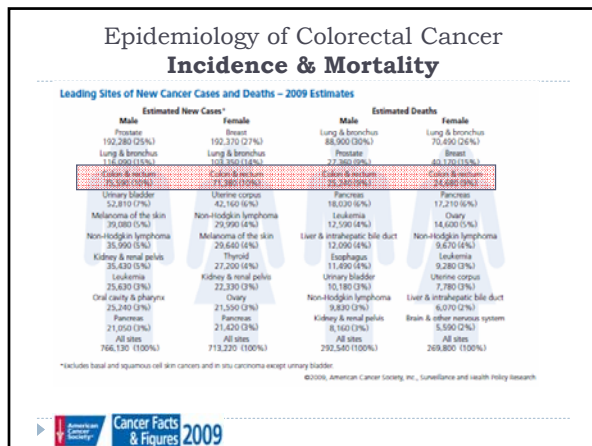
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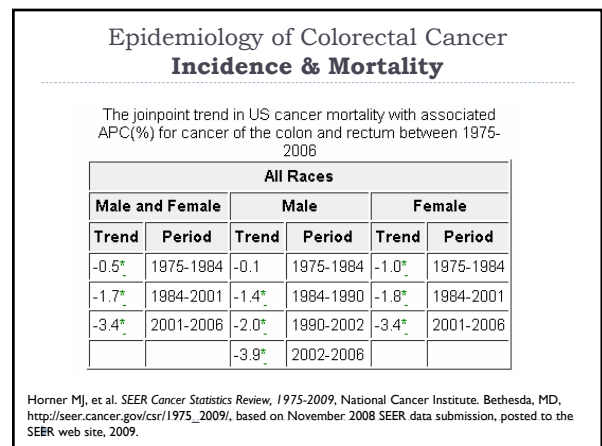
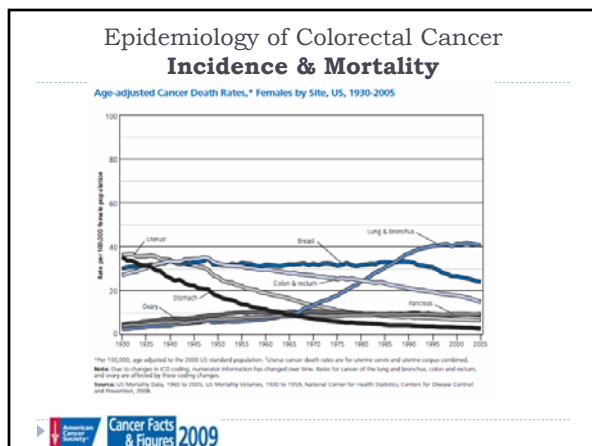
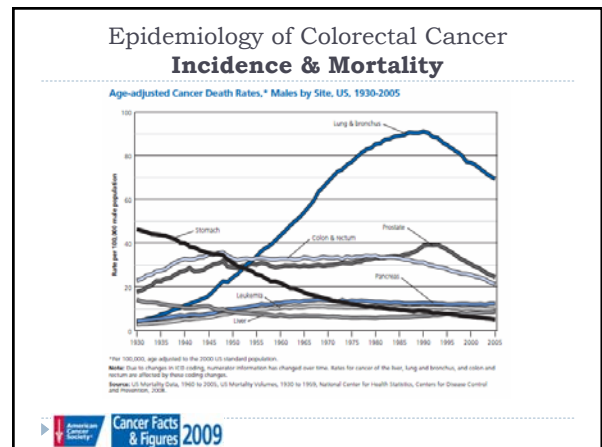
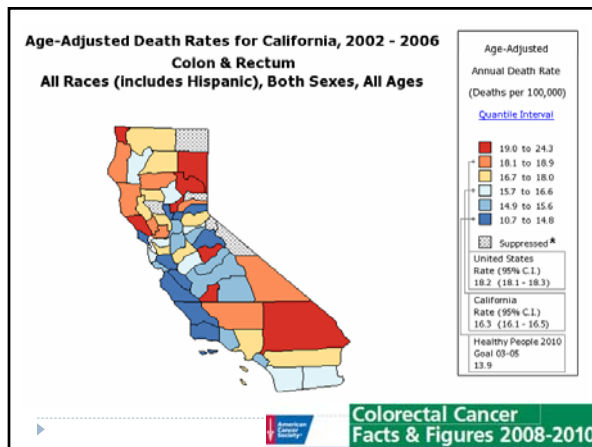
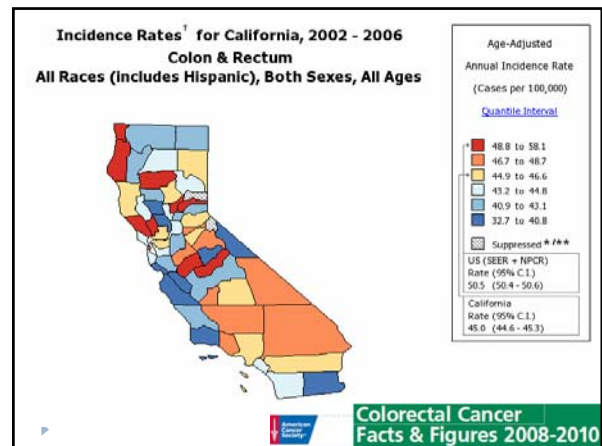
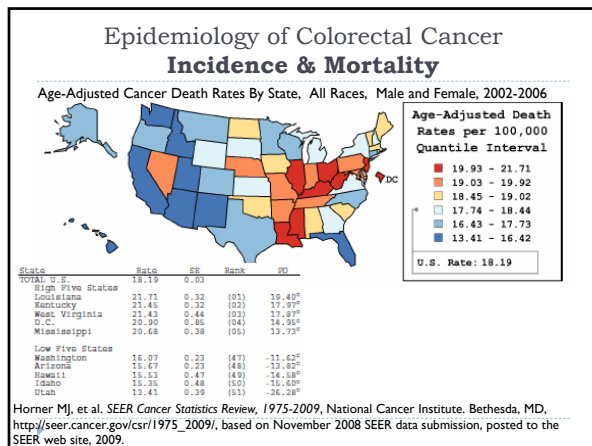
Lynch HT, de la Chapelle A. Hereditary colorectal cancer. *N Engl J Med* 2003;348(10):919-32.

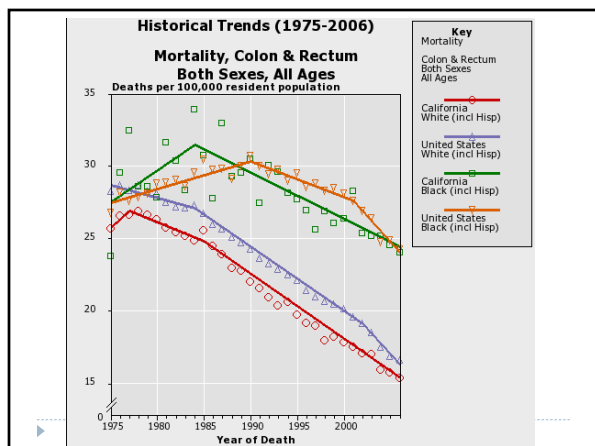
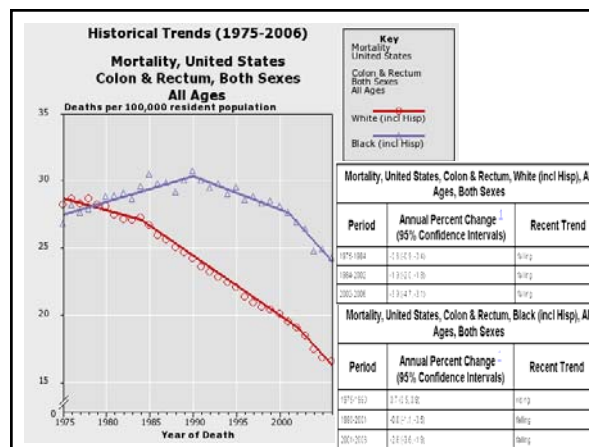
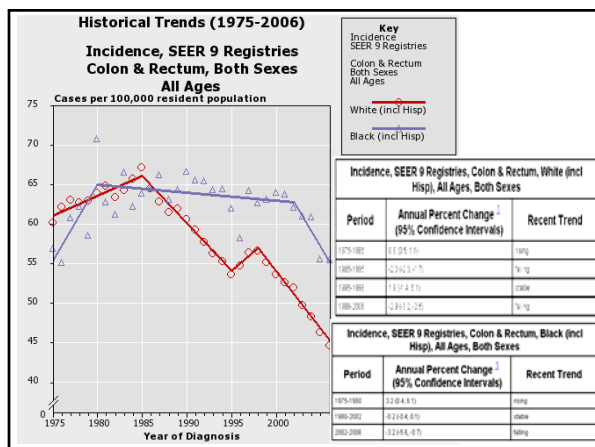
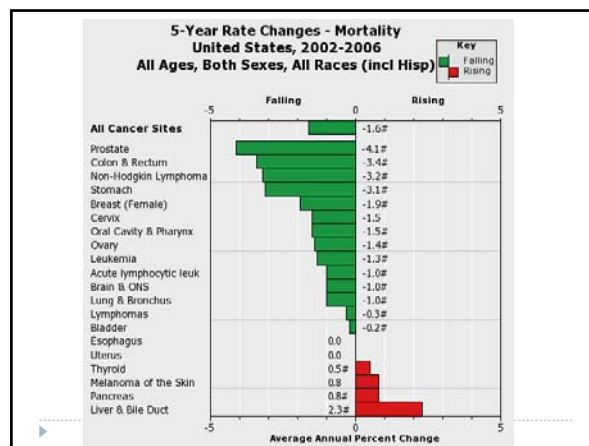
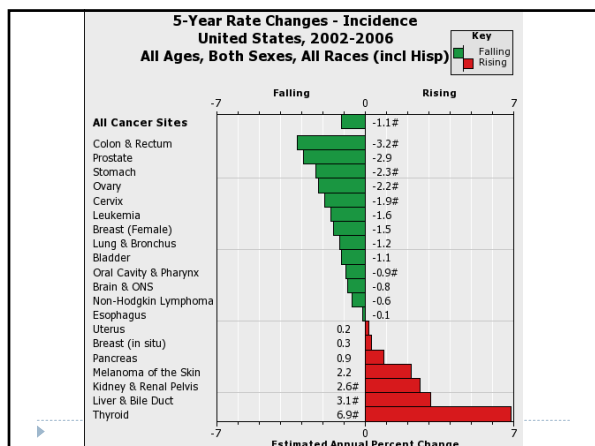


**Figure 3. The I1307K Germ-Line Mutation (Polymorphism) of the Adenomatous Polyposis Coli (APC) Gene.**

➤ There has been progress in reducing colorectal cancer incidence and death rates in most US population groups; this progress has come about through the prevention and early detection of colorectal cancer through screening and better treatment.







**Epidemiology of Colorectal Cancer**  
**Incidence & Mortality**

Incidence Rates by Race

Race/Ethnicity	Male	Female
All Races	57.3 per 100,000 men	42.8 per 100,000 women
White	56.9 per 100,000 men	42.1 per 100,000 women
Black	69.3 per 100,000 men	53.5 per 100,000 women
Asian/Pacific Islander	46.9 per 100,000 men	34.6 per 100,000 women
American Indian/Alaska Native <sup>2</sup>	43.1 per 100,000 men	41.2 per 100,000 women
Hispanic <sup>3</sup>	46.3 per 100,000 men	32.2 per 100,000 women

Horner MJ, et al. SEER Cancer Statistics Review, 1975-2009, National Cancer Institute. Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2009/](http://seer.cancer.gov/csr/1975_2009/), based on November 2008 SEER data submission, posted to the SEER web site, 2009.



## Epidemiology of Colorectal Cancer Incidence & Mortality

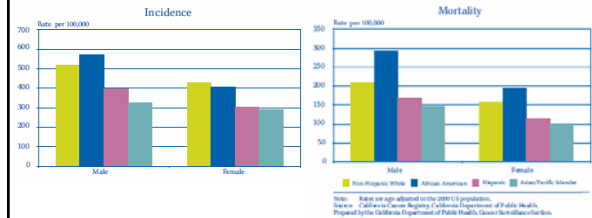
Death Rates by Race

Race/Ethnicity	Male	Female
All Races	21.9 per 100,000 men	15.4 per 100,000 women
White	21.4 per 100,000 men	14.9 per 100,000 women
Black	31.4 per 100,000 men	21.6 per 100,000 women
Asian/Pacific Islander	13.8 per 100,000 men	10.0 per 100,000 women
American Indian/Alaska Native	20.0 per 100,000 men	13.7 per 100,000 women
Hispanic	16.1 per 100,000 men	10.7 per 100,000 women

Horner MJ, et al. SEER Cancer Statistics Review, 1975-2009, National Cancer Institute, Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2009/](http://seer.cancer.gov/csr/1975_2009/), based on November 2008 SEER data submission, posted to the SEER web site, 2009.

## Epidemiology of Colorectal Cancer Incidence & Mortality

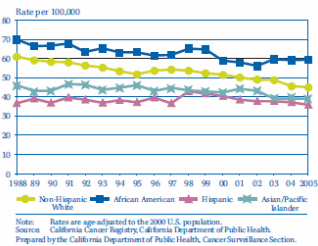
Cancer by Race/Ethnicity and Sex in California, 2005<sup>a</sup>



California Facts and Figures 2009

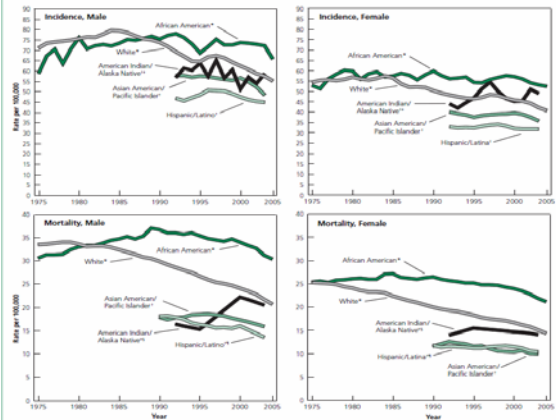
## Epidemiology of Colorectal Cancer Incidence & Mortality

Trends in Invasive Colon and Rectum Cancer Incidence by Race/Ethnicity in California, 1988-2005<sup>a</sup>



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Figure 2. Trends in Colorectal Cancer Incidence and Mortality Rates by Race/Ethnicity and Sex, 1975-2005



## Epidemiology of Colorectal Cancer Incidence & Mortality

Five-Year Relative Survival by Stage at Diagnosis in California, 1988-2005				
Cancer Type	All Stages	Localized	Regional	Distant
Female breast	88%	97%	79%	20%
Cervix uteri	72%	92%	56%	17%
Uterus	85%	95%	68%	19%
Ovary	45%	91%	73%	28%
Prostate	94%	100%	93%	32%
Testis	94%	99%	94%	70%
Oesophagus	58%	78%	50%	7%
Colon & Rectum	65%	90%	66%	9%
Pancreas	5%	17%	6%	2%
Lung & Bronchus	15%	50%	21%	3%
Melanoma	89%	94%	56%	14%
Hodgkin Lymphoma	82%	---	---	---
NHL*	56%	---	---	---
Leukemia	46%	---	---	---
Childhood (0-19)	72%	---	---	---
Adult (20+)	41%	---	---	---

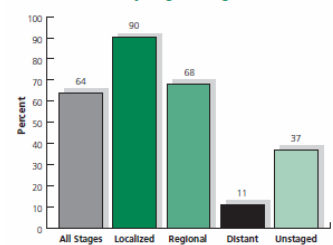
\*NHL, Non-Hodgkin Lymphoma. Note: Follow-up to through December 2005. Source: California Cancer Registry, California Department of Public Health, Prepared by the California Department of Public Health, Cancer Surveillance Section.



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## Epidemiology of Colorectal Cancer Incidence & Mortality

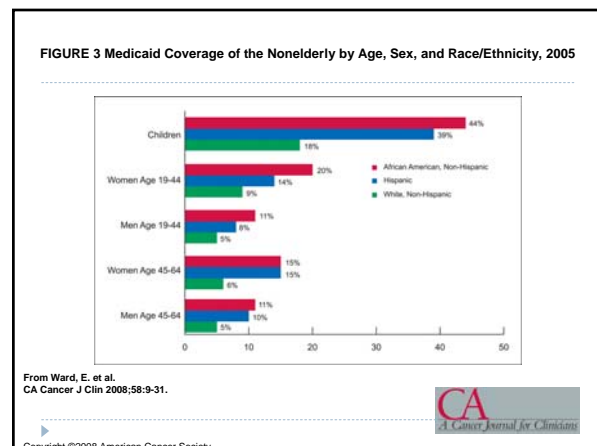
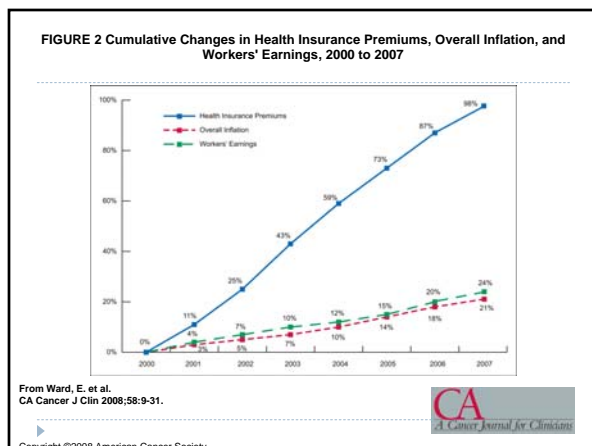
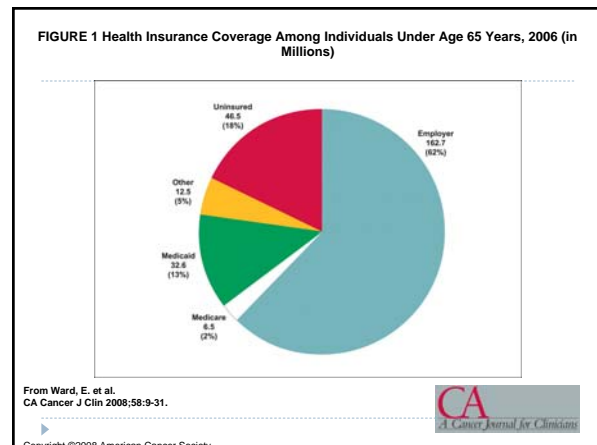
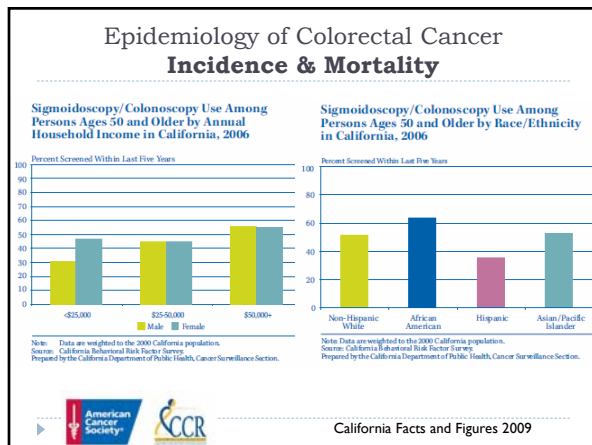
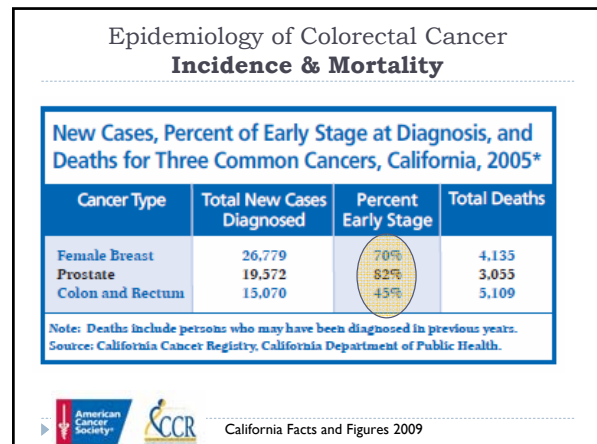
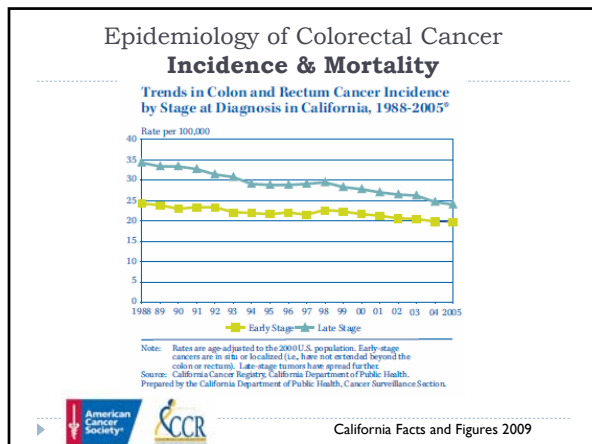
Figure 4. Five-Year Relative Survival Rates for Colorectal Cancer by Stage at Diagnosis, 1996-2004



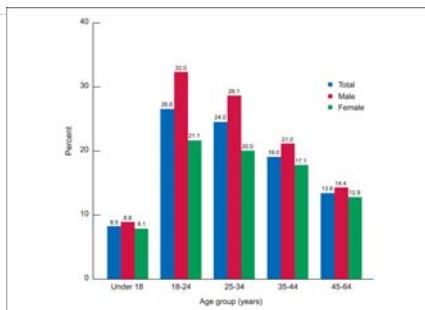
Source: Surveillance, Epidemiology, and End Results (SEER) Program.<sup>15</sup>



Colorectal Cancer Facts & Figures 2008-2010



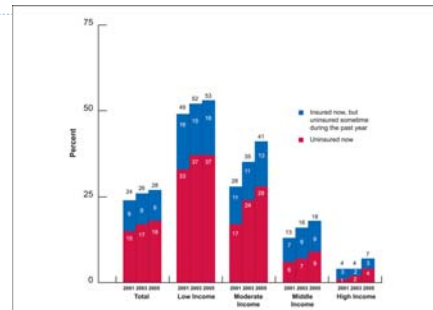
**FIGURE 4 Percentage of Persons Under Age 65 Years Without Health Insurance Coverage at the Time of Interview by Age Group and Sex, January to March, 2007**



From Ward, E. et al.  
CA Cancer J Clin 2008;58:9-31.

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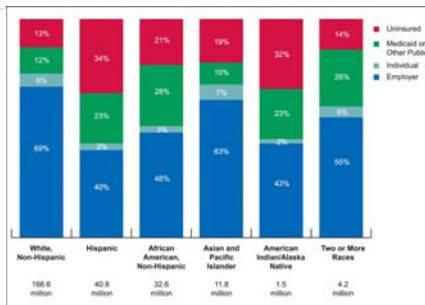
**FIGURE 5 Uninsured Rates Among Adults Aged 19 to 64 Years by Income Level, 2001 to 2005**



From Ward, E. et al.  
CA Cancer J Clin 2008;58:9-31.

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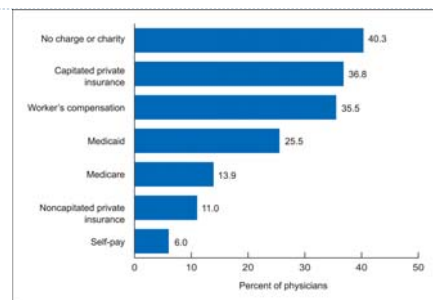
**FIGURE 6 Health Insurance Coverage of the Nonelderly by Race/Ethnicity, 2005**



From Ward, E. et al.  
CA Cancer J Clin 2008;58:9-31.

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**FIGURE 7 Percentage of Office-based Physicians Not Accepting New Patients According to Method of Payment, 2003 to 2004**



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CA Cancer J Clin 2008;58:9-31.

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**TABLE 1 Access to Healthcare and Preventive Services by Health Insurance Status in Adults Aged 18 to 64 Years, 2005**

Proportion (%)	All	Private	Medicaid	Uninsured (at Time of Interview)	Uninsured for >12 Months
Have no usual source of care	18.9	9.9	10.8	53.6	58.7
Did not get care due to cost	8.4	3.8	10.3	22.8	24.4
Delayed care due to cost	10.7	6.1	11.1	25.8	27.1
Did not get prescription drugs due to cost	9.3	4.4	15.2	22.9	23.1
Had no health care visits in the past 12 months	21.6	16.6	12.5	43.2	49.0
<b>Counseling by a health care provider*</b>					
Smokers advised to quit†	58.2	58.1	67.0	50.4	48.2
Obese adults (BMI ≥ 30) advised to lose weight‡	51.7	53.9	51.2	40.3	35.6

\*Among individuals with at least one health care visit in the past 12 months.

†Adults who reported that they were advised to quit using tobacco by a health care provider in the past 12 months; information available only in NHIS 2005.

‡Adults who reported that they were advised to control or lose weight by a doctor or health professional in the past 12 months.

Source: National Health Interview Survey Public Use Data File 2005, 2006, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006, 2007.

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CA Cancer J Clin 2008;58:9-31.

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**TABLE 2 Cancer Screening by Health Insurance Status in Adults, 2005**

Proportion (%)	All	Private	Medicaid	Uninsured (at Time of Interview)	Uninsured for >12 Months
Women aged 40 to 64 years who had a mammogram in the past 2 years	67.9	74.5	56.1	38.1	32.9
Women aged 18 to 64 years who had a Pap test in the past 3 years	63.6	87.9	82.5	68.0	62.7
Adults aged 50 to 64 years who had a colorectal cancer screening test*	44.2	48.3	39.6	18.8	14.9
Men aged 50 to 64 years who had a prostate-specific antigen test in the past year	33.5	37.1	20.8	14.0	11.5

\*Had a fecal occult blood test in the past year or an endoscopy in the past 10 years.

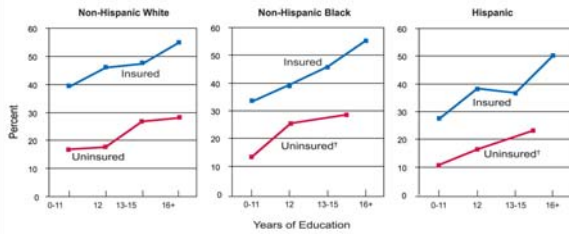
Source: National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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**FIGURE 9 Colorectal Cancer Screening\*, Ages 50 to 64 Years, by Race/Ethnicity, Years of Education, and Insurance Status, 2003 to 2005**

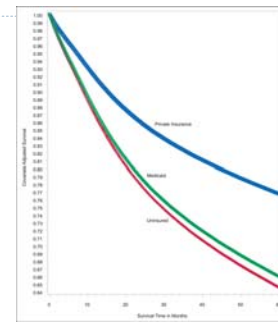


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**FIGURE 10 Cancer Survival by Insurance Status\***



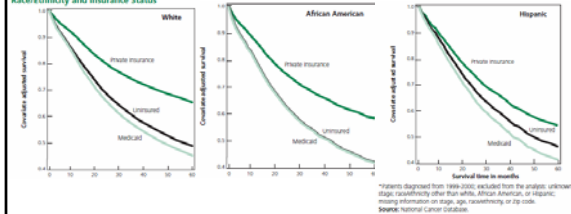
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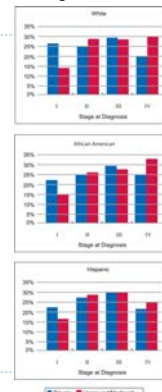
## Epidemiology of Colorectal Cancer Incidence & Mortality

**Figure 5. Colorectal Cancer Survival by Race/Ethnicity and Insurance Status**



Colorectal Cancer Facts & Figures 2008-2010

**FIGURE 14 Colorectal Cancer Stage Distribution by Race and Insurance Status\***

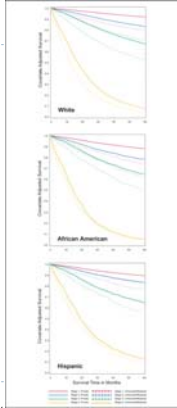


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**FIGURE 16 Colorectal Cancer Survival by Stage and Insurance Status\***



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## Association of Insurance with Cancer Care Utilization and Outcomes

### Conclusion:

There is substantial evidence that lack of adequate health insurance coverage is associated with less access to care and poorer outcomes for cancer patients. As our nation's investments in cancer research provide greater understanding of how to prevent cancer, detect it early, and treat it effectively, access to health care becomes even more important to the goal of eliminating cancer as a major public health problem.

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## Access to National Cancer Data Base (NCDB) to Assess and Improve Care

- ▶ Nationwide Oncology Outcomes Database For More Than 1400 Hospitals
- ▶ >22 Million Cases – from 1985 forward
- ▶ Most Extensive Data Base Dedicated to Assessing Quality of Care
- ▶ Contains Information on 80% of All Newly Diagnosed Cancer Patients

▶ <http://www.facs.org/cancer/ncdb/publicaccess.html>

## Access to National Cancer Data Base (NCDB) to Assess and Improve Care

cont'd

- ▶ Robust and Accurate Information Supports
  - ▶ Clinical investigation
  - ▶ Outcomes analysis
  - ▶ Establishment of benchmarks
  - ▶ Quality improvement initiatives
- ▶ Prospective Treatment
  - ▶ Incidence or recurrence
  - ▶ Detailed treatment
  - ▶ Staging

▶ <http://www.facs.org/cancer/ncdb/publicaccess.html>

## How Can Your Facility Use the NCDB?

- ▶ Compare your facility to other CoC-approved Programs
- ▶ Assess your facility's concordance with standards of care
- ▶ Track trends in diagnosis and treatment
- ▶ Improve the quality of care at your facility
- ▶ Assess quality of cancer registry data
- ▶ Participate in national studies to address cancer issues.
- ▶ Facilitate Response to Pay-for-Performance requirements.

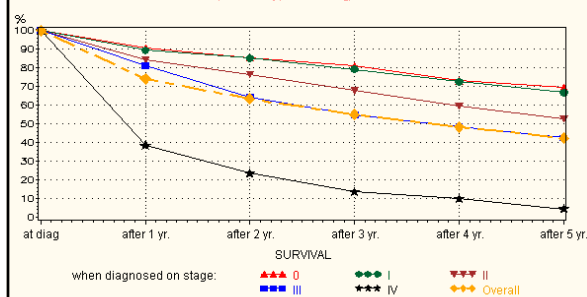
▶ <http://www.facs.org/cancer/ncdb/publicaccess.html>

## NCDB Hospital Benchmark Reports

▶ <http://www.facs.org/cancer/ncdb/publicaccess.html>

## NCDB Survival Reports

Five Year Surv. Rates for Colon Cancer Cases Diagnosed in 1994 and 1995  
ACS Division: South East / Data Reported from 18 Hospitals  
Hospitals of Type: Teaching/Research



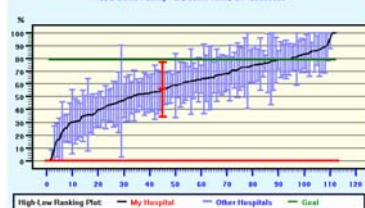
## Ranking Table

Stage III Colon Cancers by First Course Therapy  
NCDB Demon Facility - CA, Same Town, CA - 20000093

COMPARISON GROUP	HOSPITALS IN GROUP	QUARTILE RANK			ORIGINAL RANK		
		Surgery & ACT	Surgery Alone	Other Specified Rx	Surgery & ACT	Surgery Alone	Other Specified Rx
SD	1153	3	2	5	932	384	311
Category	529	3	2	3	381	151	124
State	119	3	2	1	70	53	31
ACS Division	119	3	2	2	70	53	31

NCDB, CoC, ACOS. / Colon Cancer Reports v1.0 / January 20, 2005

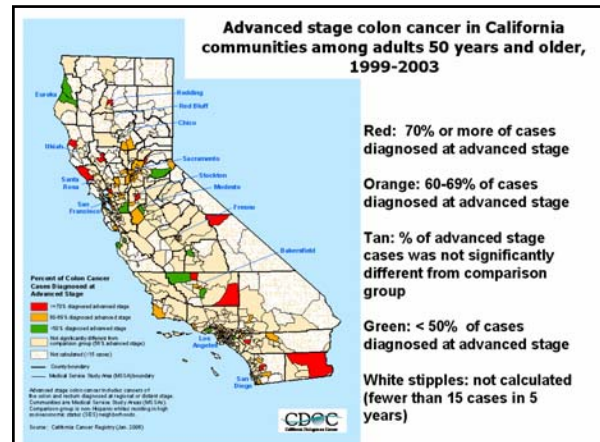
Surgery & ACT Treatment Ranking at State Level  
Weighted Average of Stage III Colon Cancers Receiving Surgery & ACT  
NCDB Demon Facility - CA, Same Town, CA - 20000093



## Utilizing Cancer Registry Data for Colorectal Cancer (CRC) Control Planning

- Study Goal: Identify/map California areas with excess % of CRC cases dx'd at advanced stage (III and IV) .
- Cases: 50,478 CRC cases dx'd 1999-2003, age 50+ (data from California Cancer Registry).
- Outcome: % of advanced stage CRC dx'd in a community unit relative to a statewide benchmark .
- Community Unit: Medical Service Study Area (MSSA - 541 MSSAs in California, average population ~63,000).
- Benchmark: % advanced stage CRC in high-income, non-Hispanic whites statewide (=56%).
- Results: age-adjusted, tested for statistical significance.

Janet H. Bates, MD, MPH; Jon M. Greif, DO, FACS; Brenda Hofer, MA; Margaret E. McCusker MD, MS; Holly Hodges, MPH  
From the California Dialogue on Cancer (CDOC); Public Health Institute/California Cancer Registry; Sacramento; and the Alta Bates Summit Medical Centers, Oakland and Berkeley, CA. Proceedings, Pacific Coast Surgical Ass'n, 2008.



## Utilizing Cancer Registry Data for Colorectal Cancer (CRC) Control Planning

- Over 50% of CRC cases are diagnosed at advanced stage, even in the most advantaged groups
- 17 high-risk communities identified where more than 70% of CRC cases were diagnosed at advanced stage
- These data will be used to establish a statewide agenda for implementing education and CRC screening programs in the highest risk areas and to serve as a baseline for evaluating progress.

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<http://cacoloncancer.org/>

California Colorectal Cancer Coalition



*Thankyou,*

Jon M. Greif, DO, FACS  
Bay Area Breast Surgeons, Inc.

Web: [www.babsurgeons.com](http://www.babsurgeons.com)  
Email: [jgreif@babsurgeons.com](mailto:jgreif@babsurgeons.com)

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