

CANCER

A PREVENTABLE DISEASE?

ROLANDO BREIER, MD

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US Mortality

Rank	Cause of Death	No. of deaths	% of all deaths
• 1.	Heart Diseases	631,636	26.0
• 2.	Cancer	559,888	23.1
• 3.	Cerebrovascular diseases	137,119	5.7
• 4.	Chronic lower respiratory diseases	124,583	5.1
• 5.	Accidents (unintentional injuries)	121,599	5.0
• 6.	Diabetes mellitus	72,449	3.0
• 7.	Alzheimer disease	72,432	3.0
• 8.	Influenza & pneumonia	56,326	2.3
• 9.	Nephritis*	45,340	1.9
• 10.	Septicemia	34,234	1.4

Risk Factors & Risk Reduction

Nearly all cancers of the lung, bladder, mouth and skin could be prevented!

50-75% of cancer deaths are related to personal behaviors or habits!

30% or more of all cancer deaths related to cigarette smoking

30% of all cancer deaths in the U.S. are related to poor nutrition & inactivity leading to obesity

Risk may be reduced by increasing consumption of fruits & vegetables and limiting high-fat foods

Understanding Risk for Cancer

- **Genetics:**

- Family history
- Genetic testing

- **Environment:**

- Toxic exposures
 - Radiation
 - Asbestos

- **Lifestyle:**

- tobacco
- diet
- exercise

- **Personal history:**

- cancer
- pre-malignant disease
- chronic inflammatory diseases

2009 US Cancer Cases

Men
766,130

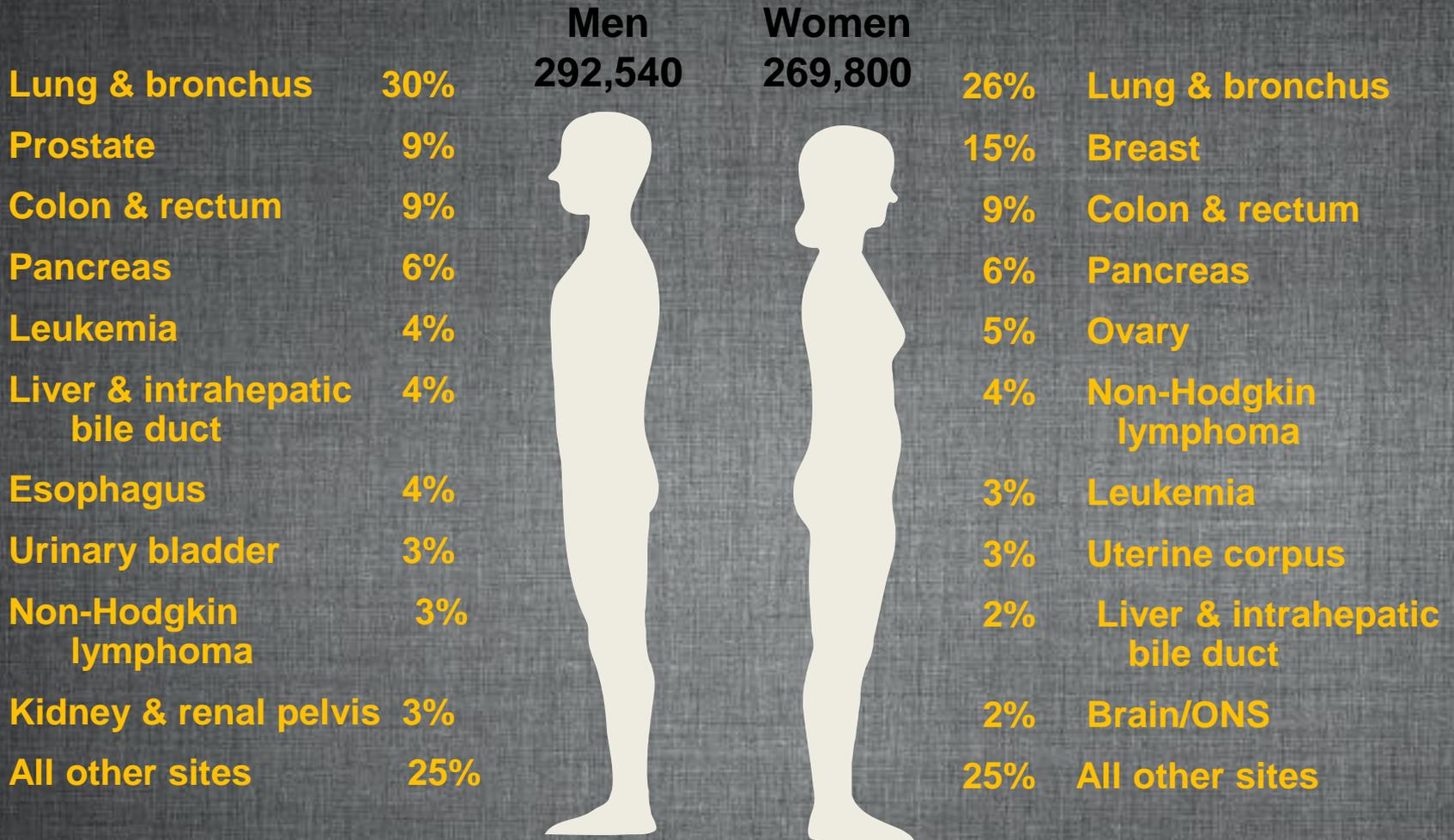
Women
713,220

Prostate	25%
Lung & bronchus	15%
Colon & rectum	10%
Urinary bladder	7%
Melanoma of skin	5%
Non-Hodgkin lymphoma	5%
Kidney & renal pelvis	5%
Leukemia	3%
Oral cavity	3%
Pancreas	3%
All Other Sites	19%

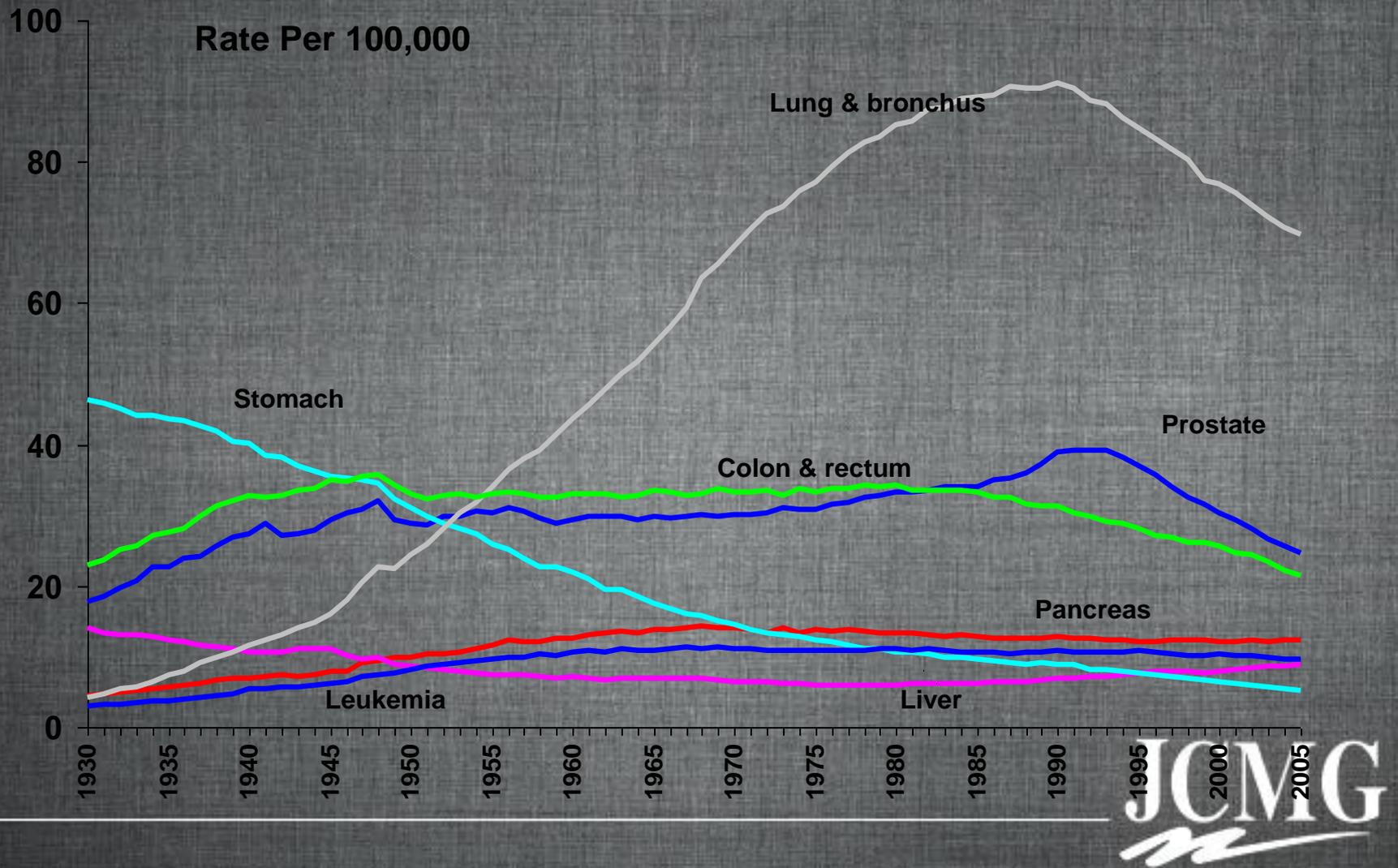


27%	Breast
14%	Lung & bronchus
10%	Colon & rectum
6%	Uterine corpus
4%	Non-Hodgkin lymphoma
4%	Melanoma of skin
4%	Thyroid
3%	Kidney & renal pelvis
3%	Ovary
3%	Pancreas
22%	All Other Sites

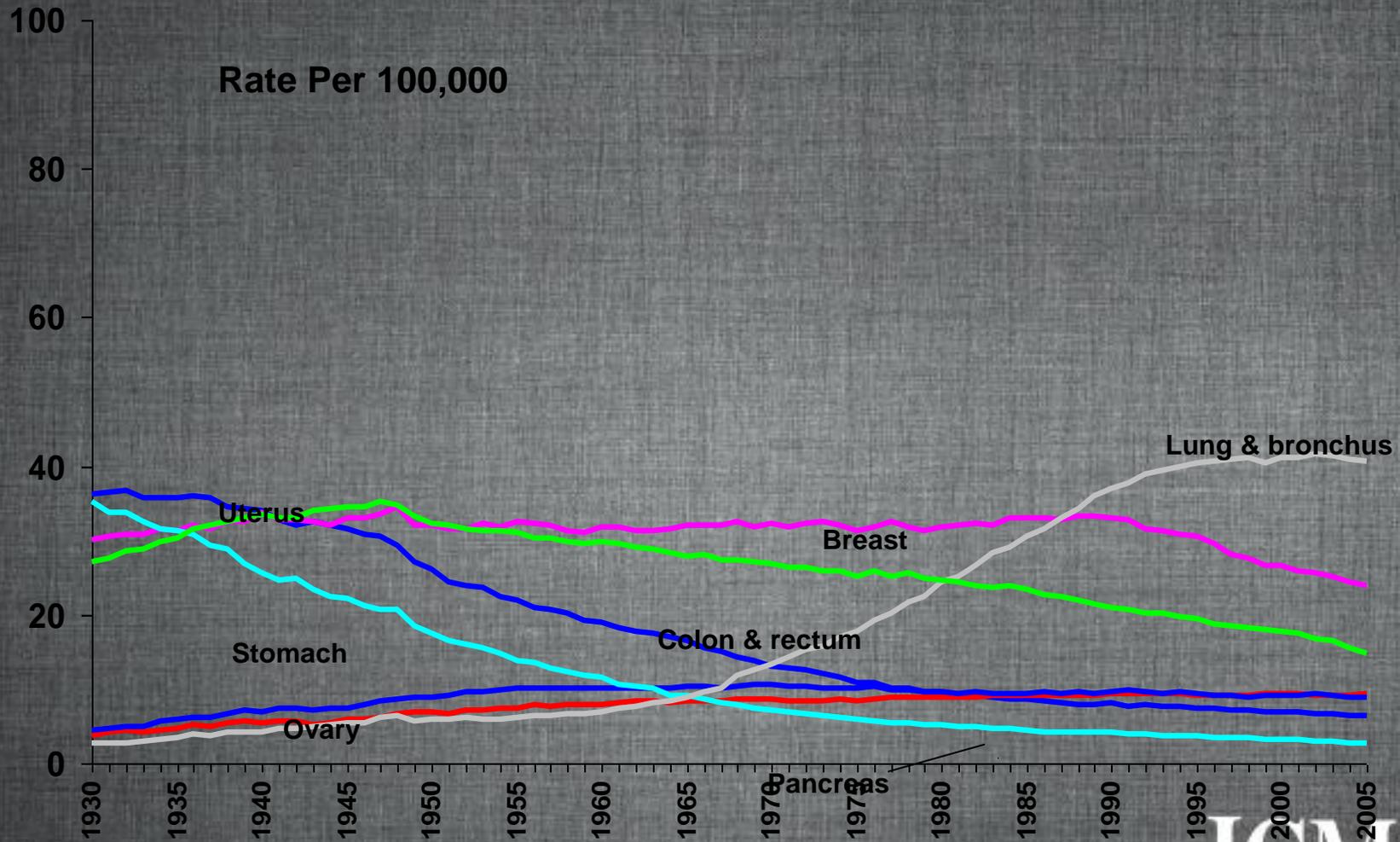
2009 US Cancer Deaths



Cancer Death Rates* Among Men, US, 1930-2005



Cancer Death Rates Among Women, US, 1930-2005



Breast Cancer

57,000 breast cancer deaths were averted between 1990 and 2005 due to screening, early detection, and aggressive treatment.

Most common cancer in women

180,000 new cases per year

Risk Factors:

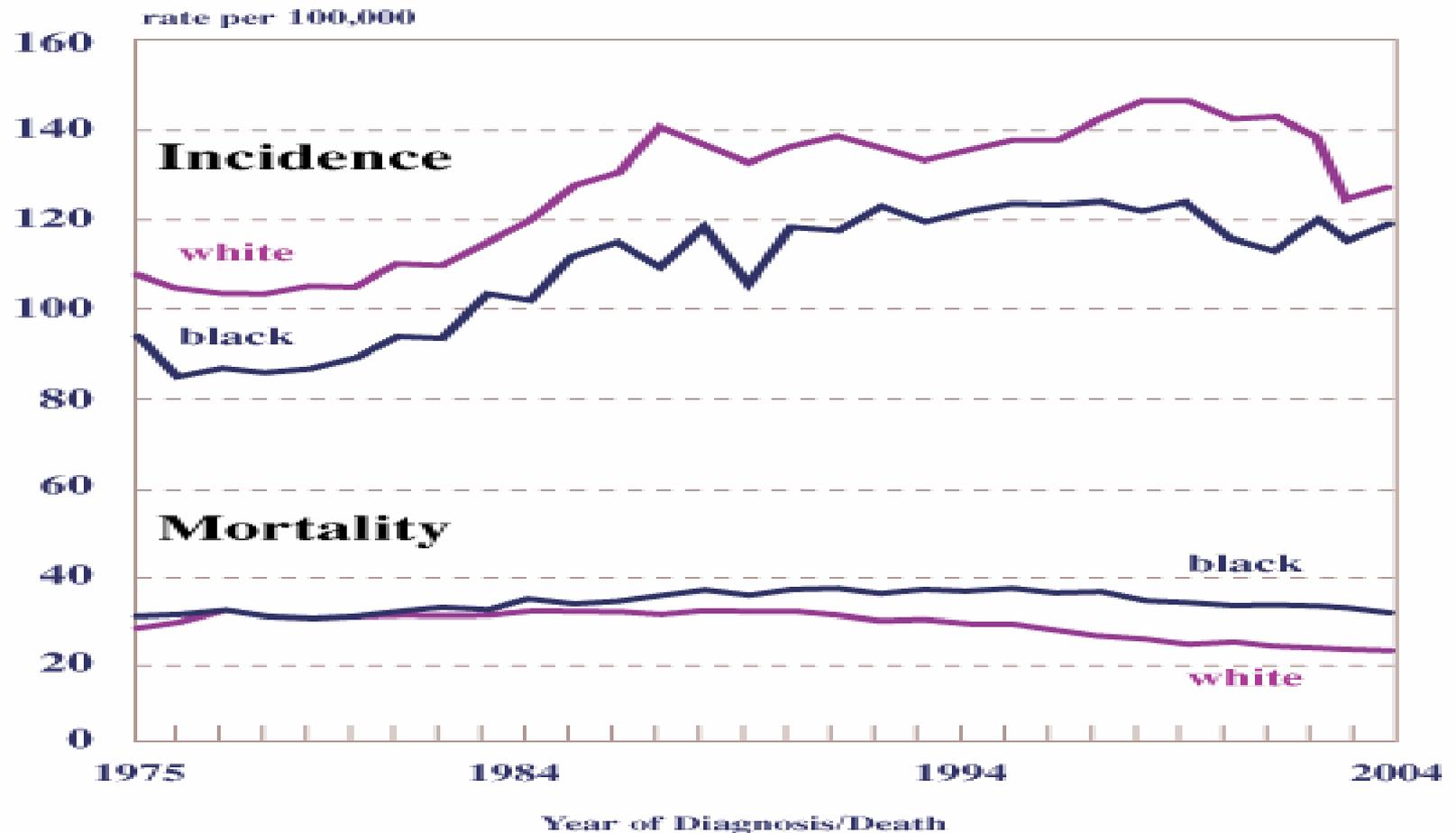
**Prior breast cancer, Age, Early Menarche,
Delayed childbearing and HRT**

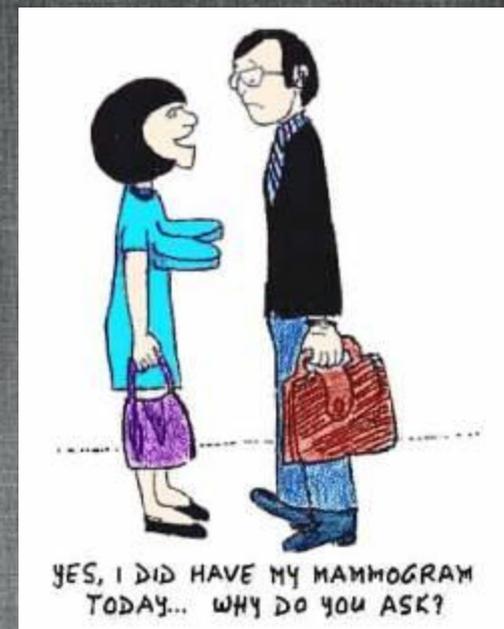
Prevalence: Caucasians >> African Americans

Mortality: African Americans >> Caucasians

**Breast cancer in men (2,000 cases/year with 400
deaths/year)**

Breast Cancer Incidence and Mortality, White Females vs. Black Females





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[Signature]

Breast cancer

USPSTF recommendations

- Screening mammography with or without clinical breast exam (CBE) every 1-2 years starting at age 40
- Insufficient evidence for or against teaching or performing routine self breast exams

Hereditary Breast Cancer

BRCA 1 & 2: BReast **CA**ncer Susceptibility **1 & 2**

Higher risk for Hereditary Breast and Ovarian Cancer at **EARLY AGE** (before menopause)

Who should get tested??

Multiple family members with Breast Ca (<50).



Bilateral Breast Ca. Ovarian Ca.

Male Breast Ca.

Ashkenazi Jews (5x incidence) Norwegian, Dutch, Iceland

2% of general population

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For women who are not of Ashkenazi Jewish descent:

Two first-degree relatives (mother, daughter, or sister) diagnosed with breast cancer, one of whom was diagnosed at age 50 or younger; three or more first-degree or second-degree (grandmother or aunt) relatives diagnosed with breast cancer regardless of their age at diagnosis; a combination of first- and second-degree relatives diagnosed with breast cancer and ovarian cancer (one cancer type per person); a first-degree relative with cancer diagnosed in both breasts (bilateral breast cancer); a combination of two or more first- or second-degree relatives diagnosed with ovarian cancer regardless of age at diagnosis; a first- or second-degree relative diagnosed with both breast and ovarian cancer regardless of age at diagnosis; and breast cancer diagnosed in a male relative.

For women of Ashkenazi Jewish descent:

Any first-degree relative diagnosed with breast or ovarian cancer; and two second-degree relatives on the same side of the family diagnosed with breast or ovarian cancer.

5 years OS Breast Cancer

- **Stage 0:** 100%
- **Stage I:** 100%
- **Stage IIA:** 92%
- **Stage IIB:** 81%
- **Stage IIIA:** 67%
- **Stage IIIB:** 54%
- **Stage IV:** 20%



IF WOMEN CONTROLLED MEDICINE



The Manogram

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Colorectal Cancer Risk

- Family history
 - Familial cancer predisposition syndromes
 - Primary family member with colorectal cancer or adenomas
- Age
- Personal history
 - Identification of adenomas
 - Inflammatory bowel disease
 - History of treated colorectal cancer

FAP Familial Adenomatous Polyposis



**Mutation on the APC
(Tumor Suppressor Gene)**

**Prophylactic colectomy by
age 25 if >100 polyps**

**100% colon cancer
by age 40**

1 in 10.000 births

HNPPCC (Lynch Sd)

80% lifetime risk of Colon Cancer

(Endometrial Ca, Ovarian Ca and Gastric Ca)

Right sided, poorly differentiated & mucinous

Amsterdam Criteria: 3-2-1 rule

Three or more family members with a confirmed diagnosis of colorectal cancer, one of whom is a first degree (parent, child, sibling) relative of the other two

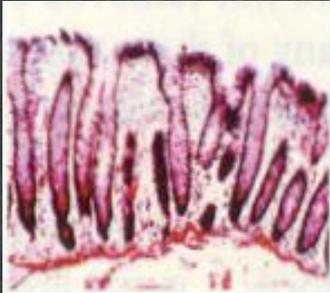
Two successive affected generations

One or more colon cancers diagnosed under age 50 years

- FAP has been excluded

Colorectal Carcinogenesis

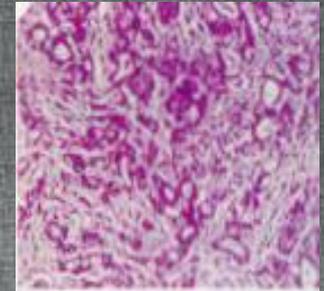
initiated



adenomas



invasive



10-20 years

Activation of Oncogenes: K-ras, CTTNB1, c-myc

Loss of Tumor Suppressor Genes: APC, p53, TGF β RII, MLH1

Screening Guidelines for the Early Detection of Colorectal Cancer and Adenomas, American Cancer Society 2008

Beginning at age 50, men and women should follow one of the following examination schedules:

- A flexible sigmoidoscopy (FSIG) every five years
- A colonoscopy every ten years
- A double-contrast barium enema every five years
- A Computerized Tomographic (CT) colonography every five years
- A guaiac-based fecal occult blood test (FOBT) **or** a fecal immunochemical test (FIT) every year
- A stool DNA test (interval uncertain)
 - Tests that detect adenomatous polyps and cancer
 - Tests that primarily detect cancer

No further screening after age 75 if negative screens since age 50

Testing 10 years before first diagnosed family member

Colorectal Cancer

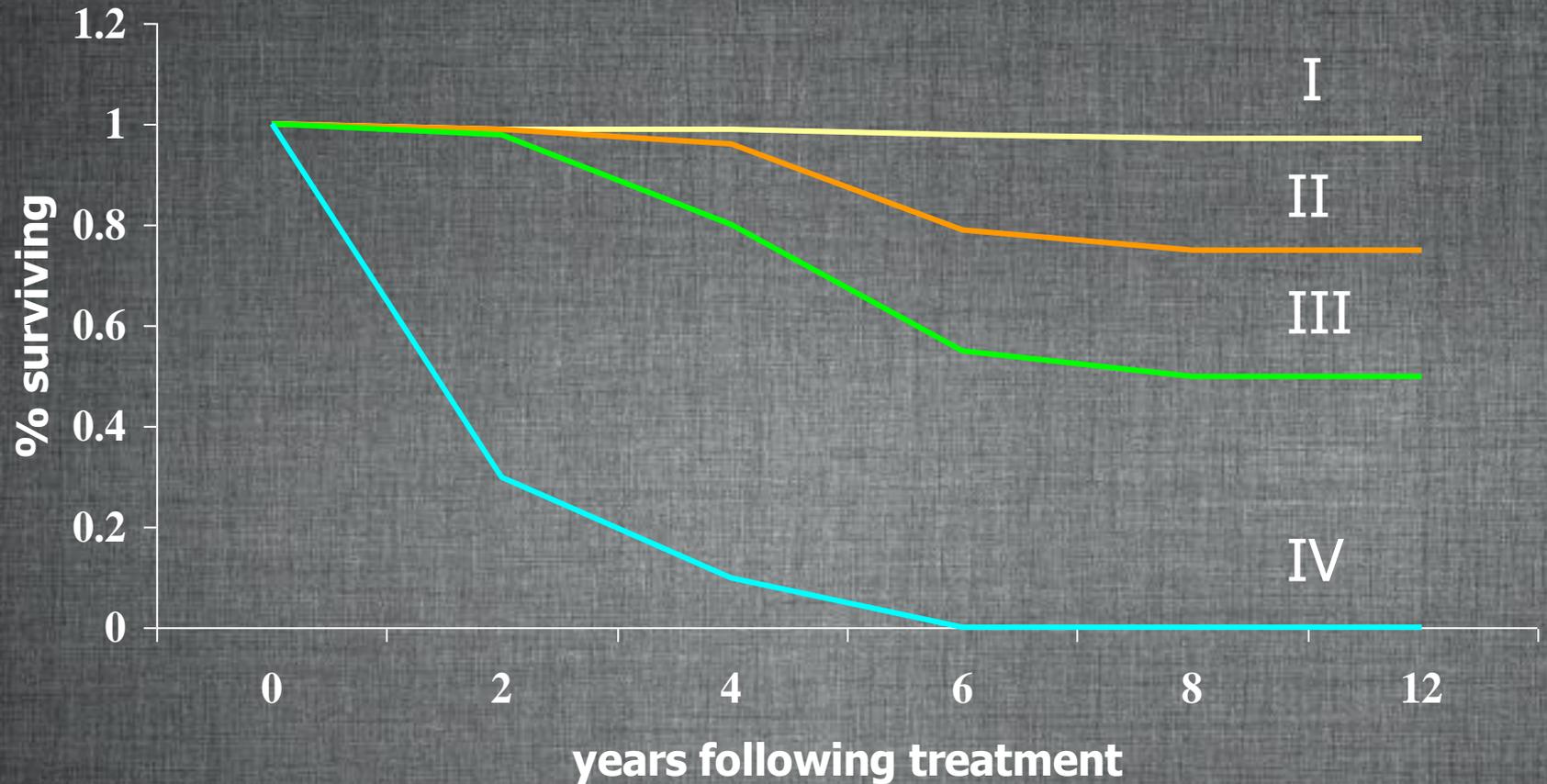
77,000 colorectal cancer deaths were averted between 1990 and 2005 due to screening, early detection, and aggressive treatment.

Why is colorectal cancer still so common?

- Not Fun: many people avoid it
 - Risk: Perforation, bleeding
~3-5 per 1000 procedures

~30-40% of those at risk get a colonoscopy

Survival following treatment for colorectal cancer



Colorectal Cancer Chemoprevention: Results from Prospective Randomized Trials



- Dietary modification



unsuccessful



- Calcium supplements



20-30% fewer advanced lesions



- Aspirin



~30% fewer advanced lesions



- Selective Cox-2 inhibitors

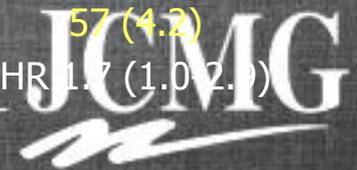


57-74% fewer advanced lesions

ICMG

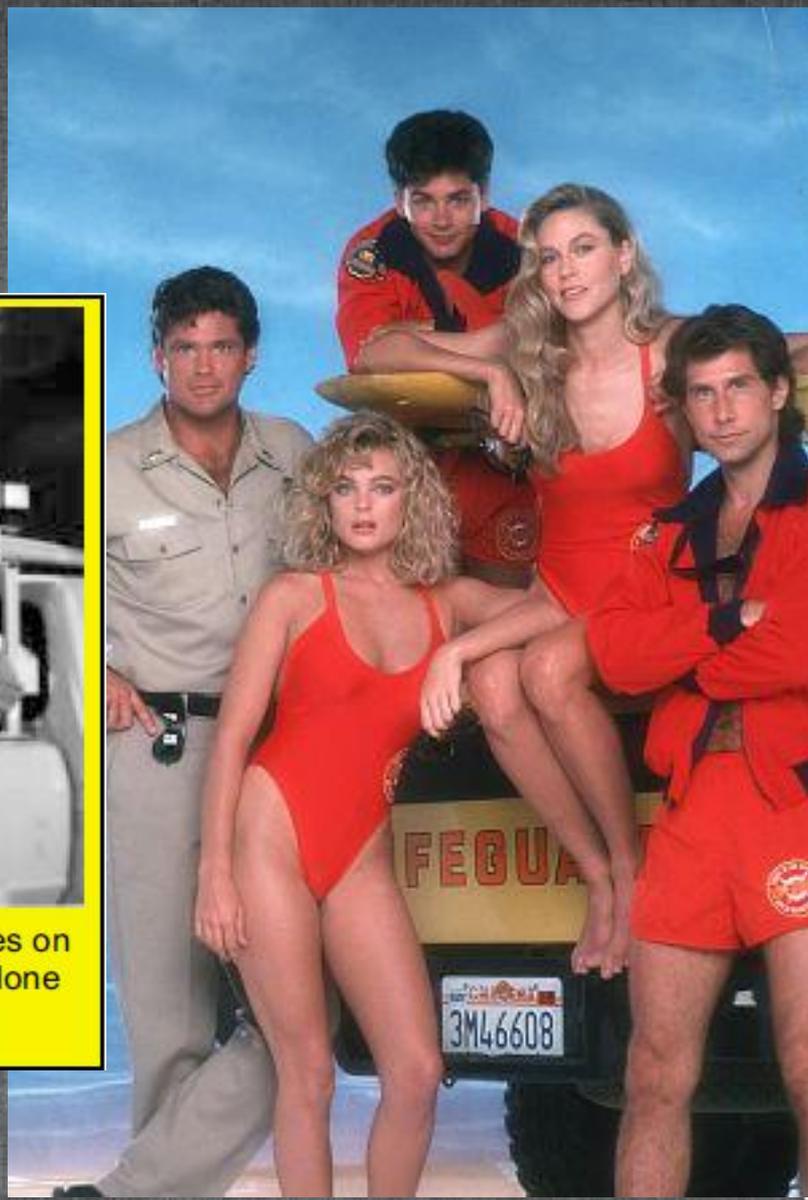
APC: Cardiovascular Events

End Point	Placebo (n = 679) (%)	Celecoxib 200 mg bid (n = 685)	Celecoxib 400 mg bid (n = 671)	Both Celecoxib Groups (n = 1356)
CV Death	1 (0.1)	3 (0.4) HR 3.0 (0.3– 28.6)	6 (0.9) HR 6.1 (0.7-50.3)	9 (0.7) HR 4.5 (0.6-35.5)
CV Death or nonfatal MI	4 (0.6)	12 (1.8) HR 3.0 (1.0-9.3)	15 (2.2) HR 3.8 (1.3-11.5)	27 (2.0) HR 3.4 (1.2-9.7)
CV Death, nonfatal MI, stroke, or heart failure	7 (1.0)	16 (2.3) HR 2.3 (0.9- 5.5)	23 (3.4) HR 3.4 (1.5- 7.8)	39 (2.9) HR 2.8 (1.3- 6.3)
CV Death, nonfatal MI, stroke, heart failure, or angina	11 (1.6)	18 (2.6) HR 1.6 (0.8-3.4)	25 (3.7) HR 2.3 (1.1-4.7)	43 (3.2) HR 2.0 (1.0 – 3.8)
CV Death, nonfatal MI, stroke, heart failure, or angina, or need for a CV procedure	17 (2.5)	26 (3.8) HR 1.5 (0.8-2.8)	31 (4.6) HR 1.9 (1.0 – 3.3)	57 (4.2) HR 1.7 (1.0-2.9)





During its run, *Baywatch* aired in 142 countries on every continent except Antarctica. The cast alone used up four bottles of sunscreen each day!



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Lifetime expectancy for being diagnosed with melanoma

Born in 1935: 1/1500

Born in 1980: 1/250

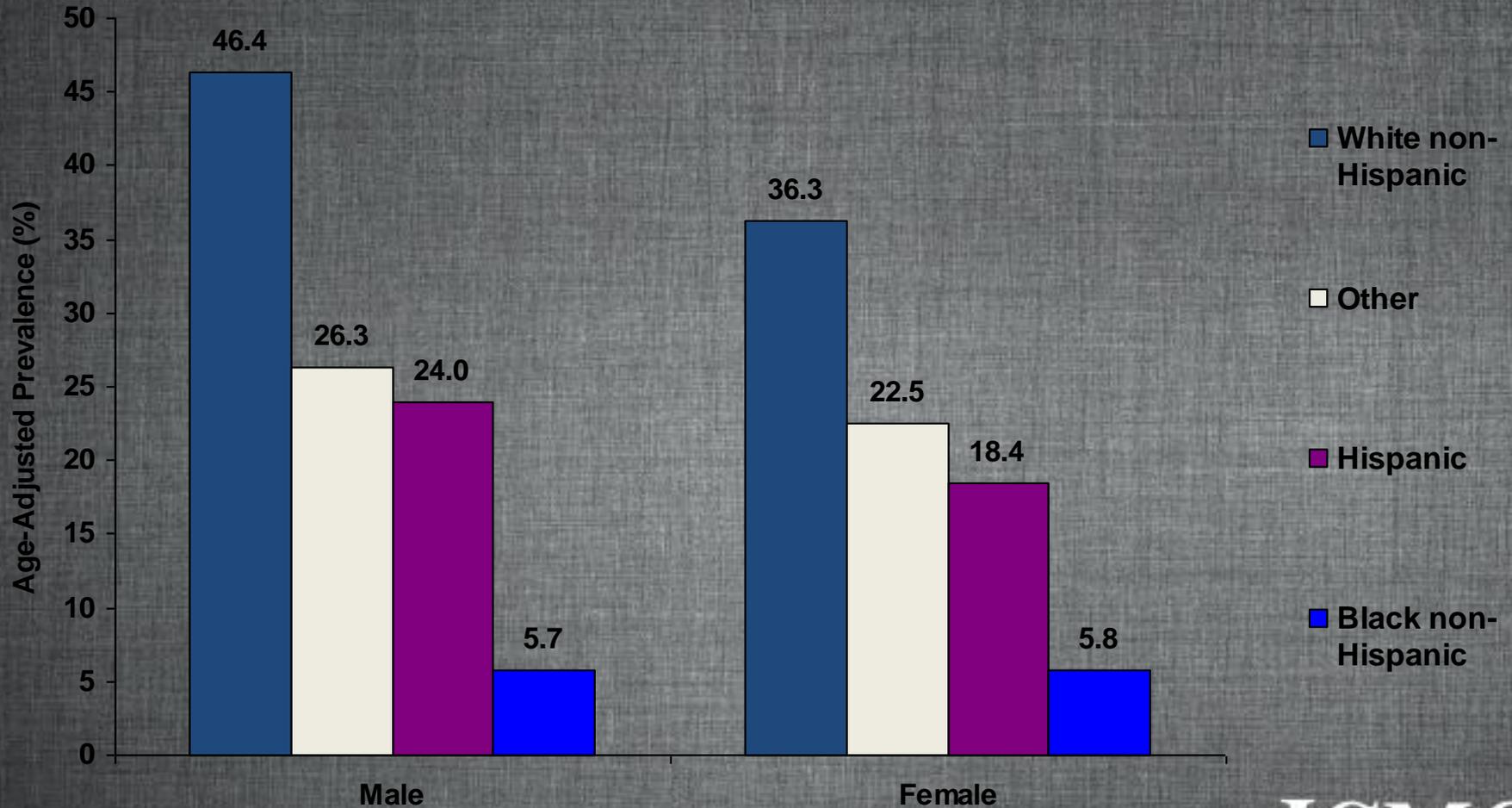
Born in 2002: 1/59

Normal Mole	Melanoma	Sign	Characteristic
		Asymmetry	when half of the mole does not match the other half
		Border	when the border (edges) of the mole are ragged or irregular
		Color	when the color of the mole varies throughout
		Diameter	if the mole's diameter is larger than a pencil's eraser

Photographs Used By Permission: National Cancer Institute

**Estimates are that 60-80% of
melanomas are caused by UV
exposure**

Sunburn Prevalence Adults 18 and Older, US, 2004



UV Radiation Exposure Behaviors Prevalence Adults 18 and Older, US



Table 1: Risk Factors

Risk Factor	Examples
Skin type	Fair skin Freckles Blonde or red hair Blue eyes
Environmental exposure	Excessive exposure to sunlight or tanning booths Tendency to burn, not tan History of severe sunburns
Preexisting skin lesions	Atypical moles (dysplastic nevi) Many benign moles
History	Personal history of melanoma Personal history of other skin cancers Family history of melanoma Immunosuppression

Source: References 8, 9.

5 years Survival by T Stage

DEPTH

ULCERATION

-

+

<1.0mm

95%

91%

1.01 – 2.0mm

89%

77%

2.01-4.0

78%

63%

>4mm (0.15 in)

67%

45%

STAY SAFE IN THE SUN!

1. **DO NOT BURN.** Avoid sun tanning and tanning beds. Ultraviolet light from the sun and tanning beds cause cancer.
2. **GENEROUSLY APPLY SUNSCREEN** to all exposed skin using an SPF of at least 30. Re-apply every two hours, even on cloudy days, and after swimming or sweating.
3. **WEAR PROTECTIVE CLOTHING** such as a long sleeve shirt, pants, a wide brimmed hat and sunglasses where possible.
4. **SEEK SHADE** when appropriate, remembering that the sun's rays are the strongest between 10 a.m. and 4 p.m.
5. **USE EXTRA CAUTION NEAR WATER, SNOW, AND SAND,** as they reflect the damaging rays of the sun which can increase your chance of sunburn.



The Friday before Memorial Day is

Don't Fry

DYING FOR A TAN

The Truth about Tanning Beds



There is
No Safe Tan.
Tanning Beds
Can Cause
Melanoma
and other
Skin Cancers!



...the voice
for melanoma
prevention,
detection,
care and cure.

www.melanomaresource.org

410-857-4890

IF WOMEN CONTROLLED MEDICINE



The Manogram

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PROSTATE CANCER

3rd leading cause of cancer death in men

- Beginning at Age 50:
- DRE
- PSA

1 in 6 men will be diagnosed

218,000 cases/year, with 23,000 deaths annually

Median age of death: 80 years

African Americans >>Caucasians in terms of
incidence and mortality

Overdiagnosis as high as 45% by PSA screen

Family History!

– PSA

- Sensitivity: 40-60% vs 91% (aggressive cases)
- Can be falsely elevated by BPH / prostatitis
- 75% of men with PSA 4-10 do not have cancer
- NO screen over age 75?

– DRE

- Largely unknown statistics with and without PSA

USPSTF recommendations

- Insufficient evidence to assess the balance of benefits and harms of prostate cancer screening in men younger than age 75
- Recommends against screening for prostate cancer in men > 75



THE
Marlboro
WEEKEND



Now the world's
No.1 selling cigarette.

Leo Burnett 2.1353

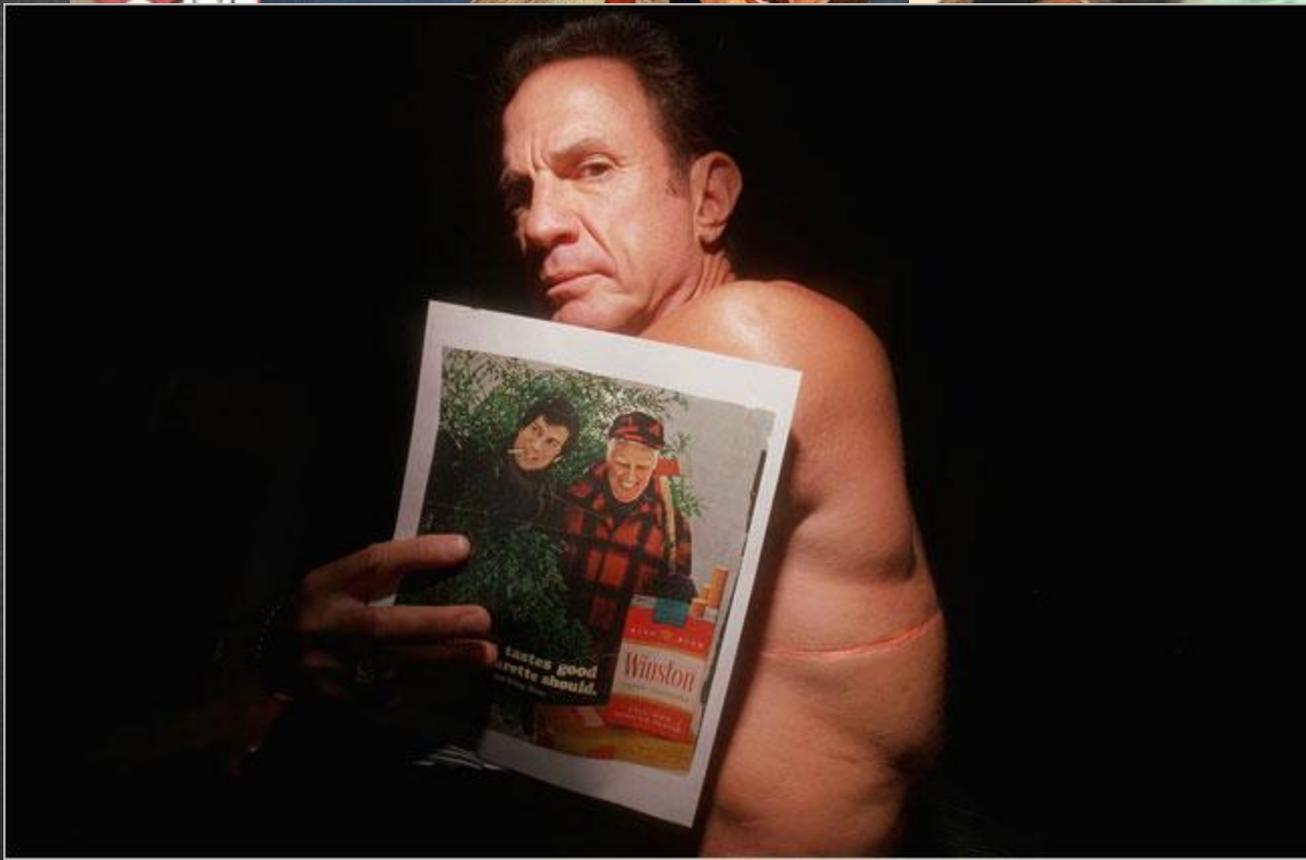
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Smoke a **LUCKY**
to feel your **LEVEL** best!

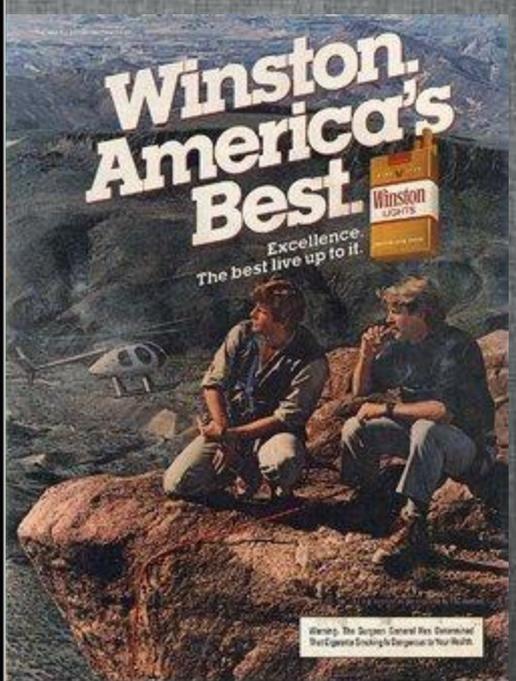
Luckies' fine tobacco picks you up when you're low... calms you down when you're tense!

lboro



tastes good
cigarette should.

Winston



Winston.
America's
Best.

Excellence.
The best live up to it.

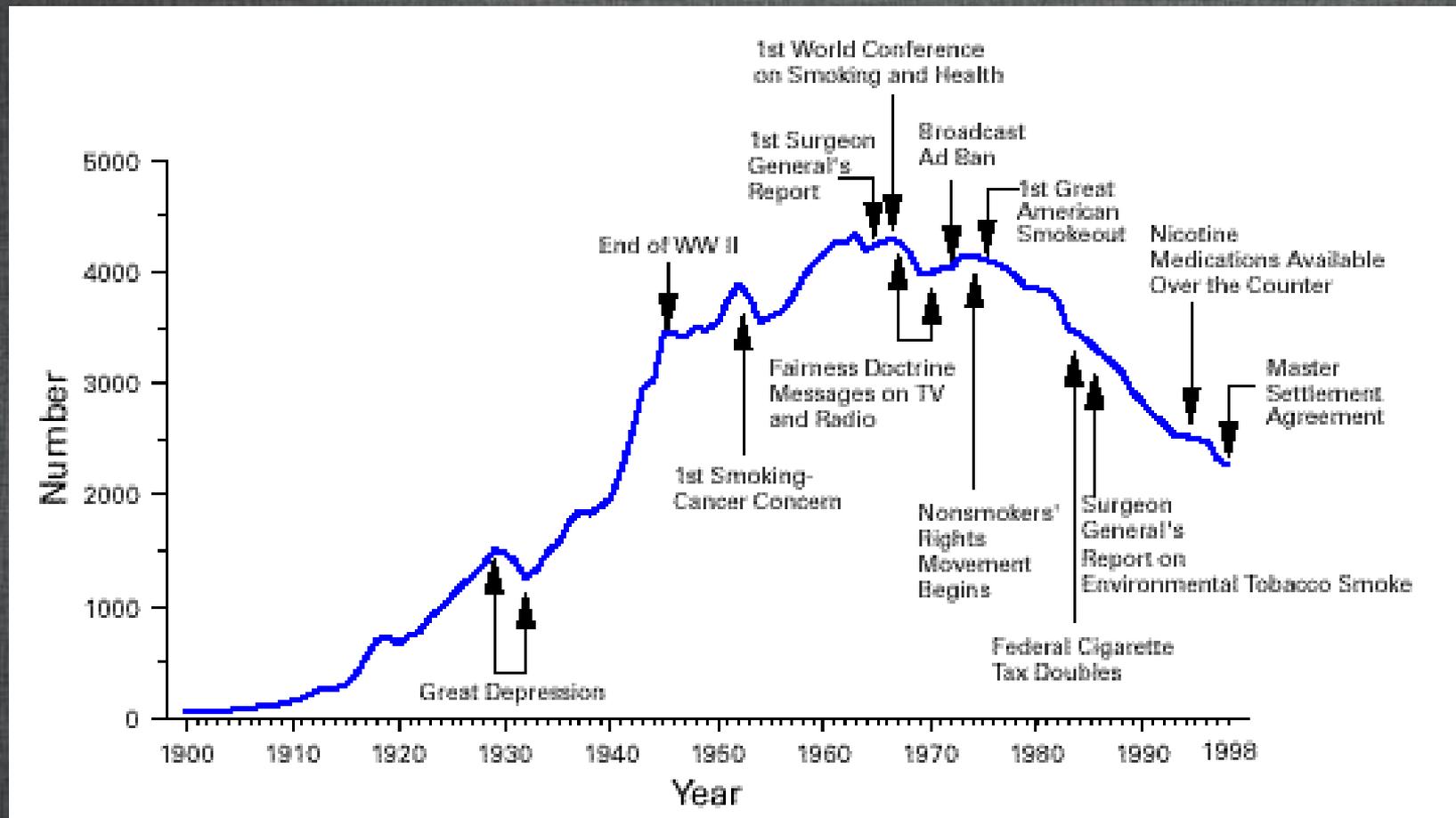


Warning: The Surgeon General Has Determined That Cigarette Smoking Causes Lung Cancer, Emphysema, and May Complicate Pregnancy.

LUNG CANCER

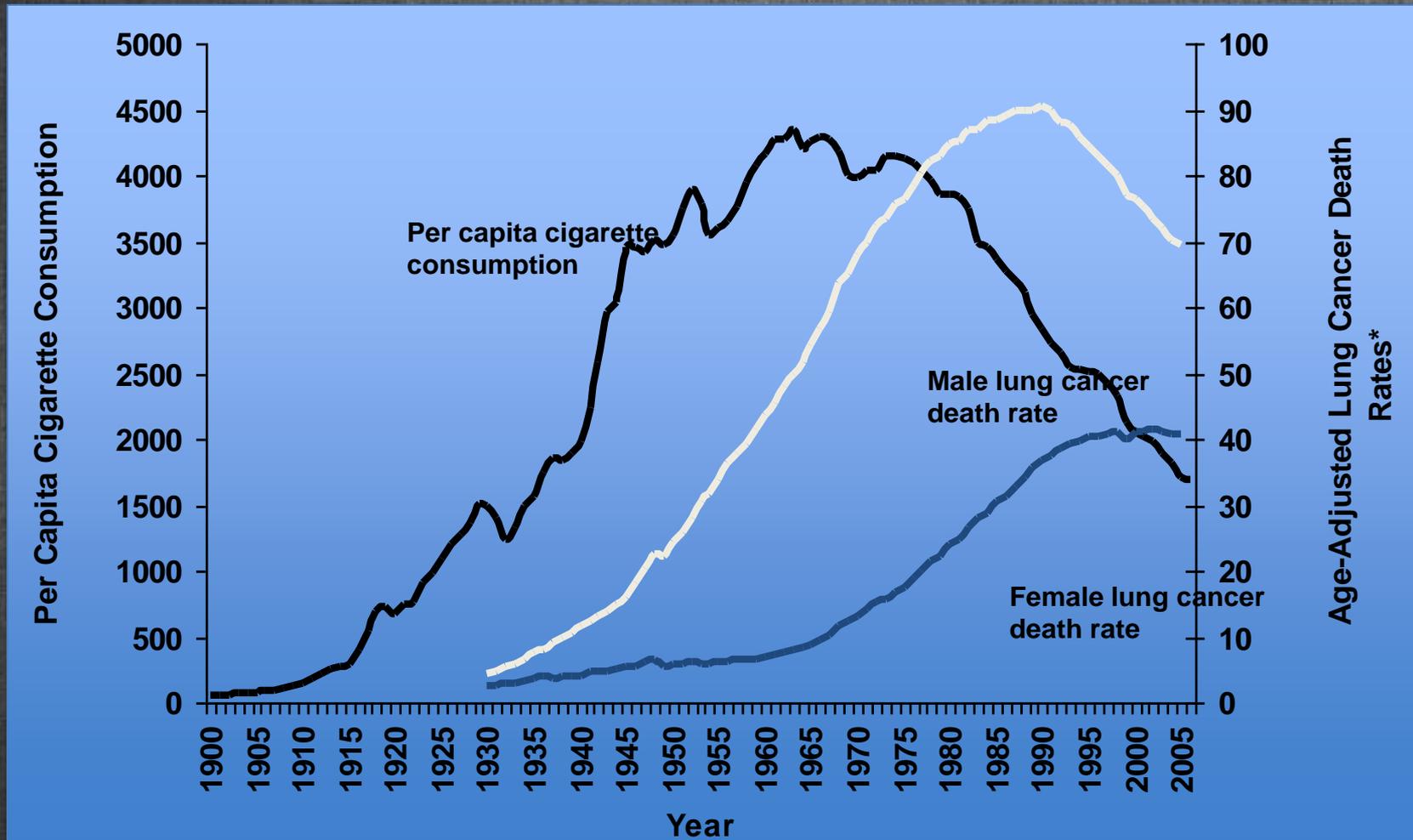
LEADING CAUSE of CANCER DEATHS...

Annual adult per capita cigarette consumption and major smoking and health events United States 1900-1998



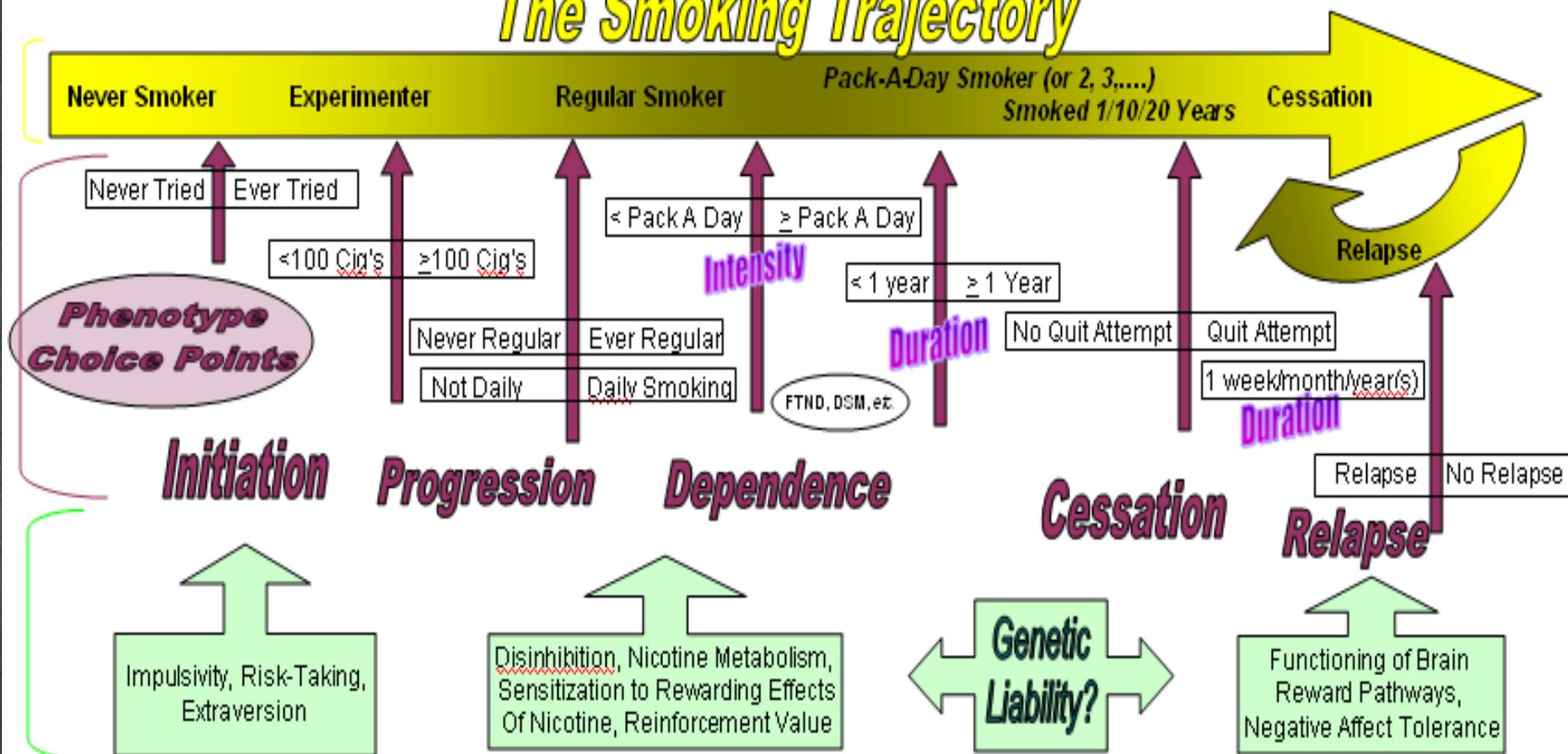
Sources: United States Department of Agriculture; 1986 Surgeon General's Report

Tobacco Use in the US, 1900-2005



Smoking is Complex & Developmental

The Smoking Trajectory



Lung Cancer 5 years OS

Stage	5 yrs OS
IA	49%
IB	45%
IIA	30%
IIB	31%
IIIA	14%
IIIB	5%
IV	1%

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Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

The National Lung Screening Trial Research Team*

ABSTRACT

BACKGROUND

The aggressive and heterogeneous nature of lung cancer has thwarted efforts to reduce mortality from this cancer through the use of screening. The advent of low-dose helical computed tomography (CT) altered the landscape of lung-cancer screening, with studies indicating that low-dose CT detects many tumors at early stages. The National Lung Screening Trial (NLST) was conducted to determine whether screening with low-dose CT could reduce mortality from lung cancer.

METHODS

From August 2002 through April 2004, we enrolled 53,454 persons at high risk for lung cancer at 33 U.S. medical centers. Participants were randomly assigned to undergo three annual screenings with either low-dose CT (26,722 participants) or single-view posteroanterior chest radiography (26,732). Data were collected on cases of lung cancer and deaths from lung cancer that occurred through December 31, 2009.

RESULTS

The rate of adherence to screening was more than 90%. The rate of positive screening tests was 24.2% with low-dose CT and 6.9% with radiography over all three rounds. A total of 96.4% of the positive screening results in the low-dose CT group and 94.5% in the radiography group were false positive results. The incidence of lung cancer was 645 cases per 100,000 person-years (1060 cancers) in the low-dose CT group, as compared with 572 cases per 100,000 person-years (941 cancers) in the radiography group (rate ratio, 1.13; 95% confidence interval [CI], 1.03 to 1.23). There were 247 deaths from lung cancer per 100,000 person-years in the low-dose CT group and 309 deaths per 100,000 person-years in the radiography group, representing a relative reduction in mortality from lung cancer with low-dose CT screening of 20.0% (95% CI, 6.8 to 26.7; $P=0.004$). The rate of death from any cause was reduced in the low-dose CT group, as compared with the radiography group, by 6.7% (95% CI, 1.2 to 13.6; $P=0.02$).

CONCLUSIONS

Screening with the use of low-dose CT reduces mortality from lung cancer. (Funded by the National Cancer Institute; National Lung Screening Trial ClinicalTrials.gov number, NCT00047385.)

The members of the writing team (who are listed in the Appendix) assume responsibility for the integrity of the article. Address reprint requests to Dr. Christine D. Berg at the Early Detection Research Group, Division of Cancer Prevention, National Cancer Institute, 6130 Executive Blvd., Suite 3112, Bethesda, MD 20892-7346, or at bergc@mail.nih.gov.

*A complete list of members of the National Lung Screening Trial research team is provided in the Supplementary Appendix, available at NEJM.org.

This article (10.1056/NEJMoa1102873) was published on June 29, 2011, at NEJM.org.

N Engl J Med 2011;365:395-409.

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2002 – 2004 with follow up to 2009: 54.000 smokers

26.000 CXR every six months

26.000 CT Scan chest every six months

26.000 CXR every six months: **7% abnormal**

26.000 CT Scan chest every six months: **25% abnormal**

CXR: 95% FALSE POSITIVE

CT Scan 97% FALSE POSITIVE

Diagnosed 1060 cancers with CT Scan & 941 cancers with CXR

356 deaths CT Scan group & 443 deaths CXR group

799 deaths by lung cancer: 40% 

The New England Journal of Medicine

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THE EFFECT OF VITAMIN E AND BETA CAROTENE ON THE INCIDENCE OF LUNG CANCER AND OTHER CANCERS IN MALE SMOKERS

THE ALPHA-TOCOPHEROL, BETA CAROTENE CANCER PREVENTION STUDY GROUP*

Abstract *Background.* Epidemiologic evidence indicates that diets high in carotenoid-rich fruits and vegetables, as well as high serum levels of vitamin E (alpha-tocopherol) and beta carotene, are associated with a reduced risk of lung cancer.

Methods. We performed a randomized, double-blind, placebo-controlled primary-prevention trial to determine whether daily supplementation with alpha-tocopherol, beta carotene, or both would reduce the incidence of lung cancer and other cancers. A total of 29,133 male smokers 50 to 69 years of age from southwestern Finland were randomly assigned to one of four regimens: alpha-tocopherol (50 mg per day) alone, beta carotene (20 mg per day) alone, both alpha-tocopherol and beta carotene, or placebo. Follow-up continued for five to eight years.

Results. Among the 876 new cases of lung cancer diagnosed during the trial, no reduction in incidence was observed among the men who received alpha-tocopherol (change in incidence as compared with those who did not, -2 percent; 95 percent confidence interval, -14 to 12 percent). Unexpectedly, we observed a higher incidence of lung cancer among the men who received beta caro-

tene than among those who did not (change in incidence, 18 percent; 95 percent confidence interval, 3 to 36 percent). We found no evidence of an interaction between alpha-tocopherol and beta carotene with respect to the incidence of lung cancer. Fewer cases of prostate cancer were diagnosed among those who received alpha-tocopherol than among those who did not. Beta carotene had little or no effect on the incidence of cancer other than lung cancer. Alpha-tocopherol had no apparent effect on total mortality, although more deaths from hemorrhagic stroke were observed among the men who received this supplement than among those who did not. Total mortality was 8 percent higher (95 percent confidence interval, 1 to 16 percent) among the participants who received beta carotene than among those who did not, primarily because there were more deaths from lung cancer and ischemic heart disease.

Conclusions. We found no reduction in the incidence of lung cancer among male smokers after five to eight years of dietary supplementation with alpha-tocopherol or beta carotene. In fact, this trial raises the possibility that these supplements may actually have harmful as well as beneficial effects. (N Engl J Med 1994;330:1029-35.)

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Quit Now. It's already late...

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[Signature]



12/21/12

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ZOMBIELAND

SURVIVAL

Esophagus

Pancreas

Colon and rectum

Breast (after menopause)

Endometrium (lining of the uterus)

Kidney

Thyroid

Gallbladder



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BMI: BODY MASS INDEX

$$\text{Weight}/(\text{height})^2$$

Underweight = <18.5

Normal weight = $18.5\text{--}24.9$

Overweight = $25\text{--}29.9$

Obesity = BMI of 30 or greater

BMI of the Speaker: 172cm / 96kg: 32.2

<http://www.nhlbisupport.com/bmi/>

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Cervical Cancer

- 11,000 cases diagnosed annually
- 4,000 deaths
- Found in women mostly age 20-50
- Hispanic>>Black>>Caucasian
- Overall 5-year survival rate 72%
- Risk factors: HPV, **Smoking**, STD's
- 10th leading cause of cancer death

ACS:

- Onset-first sexual activity or age 21
- Annual screening until age 30, then every 3 years

ACOG, ACPM, AAFP, AMA, AAP:

- Onset of sexual activity or age 18
- discontinue after 65-70 with 3 negative screens

Strategies for Cancer Prevention

- Stop using tobacco
- Maintain a reasonable weight
- Increase physical activity
- Eat 5-9 fruits and vegetables daily
- Increase fiber and reduce fat
- Limit alcohol consumption
- Limit exposure to the sun

Risk Factors & Risk Reduction

Nearly all cancers of the lung, bladder, mouth and skin could be prevented

50-75% of cancer deaths are related to personal behaviors or habits

30% or more of all cancer deaths related to cigarette smoking

30% of all cancer deaths in the U.S. are related to poor nutrition & inactivity leading to obesity

Risk may be reduced by increasing consumption of fruits & vegetables and limiting high-fat foods

Thank You

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