

INFLAMMATION AND CANCER

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PROTO-ONCOGENE

- **A normal gene that mutates and can give rise to cancer.**
- **Thousands of proto-oncogenes**



INFLAMMATION

- **The Good, The Bad, and the Ugly**
- **Inflammation is the immune system's response to various insults**
- **The Good – Protective**
- **The Bad – Overstimulation is pathologic**
- **The Ugly – If excessive, major scar tissue**



THE GOOD

- **Inflammation is the immune system's response to various insults**
- **Protective**
 - **Pain limits further damage**
 - **Clear bacteria and other pathogens**



THE GOOD

- **After cancer surgery, immune cells converge to stimulate healing**
- **High numbers of “Tumor Infiltrating Lymphocytes” (TIL’s) conveys a protective effect with better outcomes**
 - **CD3⁺ IM, CD8⁺ CCN**



THE BAD

- **Inflammation can lead to overstimulation of the immune system and lead to other diseases**
- **Inflammation associated with:**
 - **Cancer**
 - **Obesity**
 - **Heart disease**
 - **Stroke**
 - **Autoimmune disorders (Lupus, Celiac Dz)**



THE BAD

- **Excessive inflammatory conditions:**
 - Asthma
 - Chronic bladder infections
 - Squamous Cell Carcinoma
 - Inflammatory Bowel Diseases
 - Ulcerative Colitis
 - Crohn's Disease



THE UGLY

- **Excessive inflammation leads to scar tissue.**
- **But it's not scar tissue you can see from the outside.**

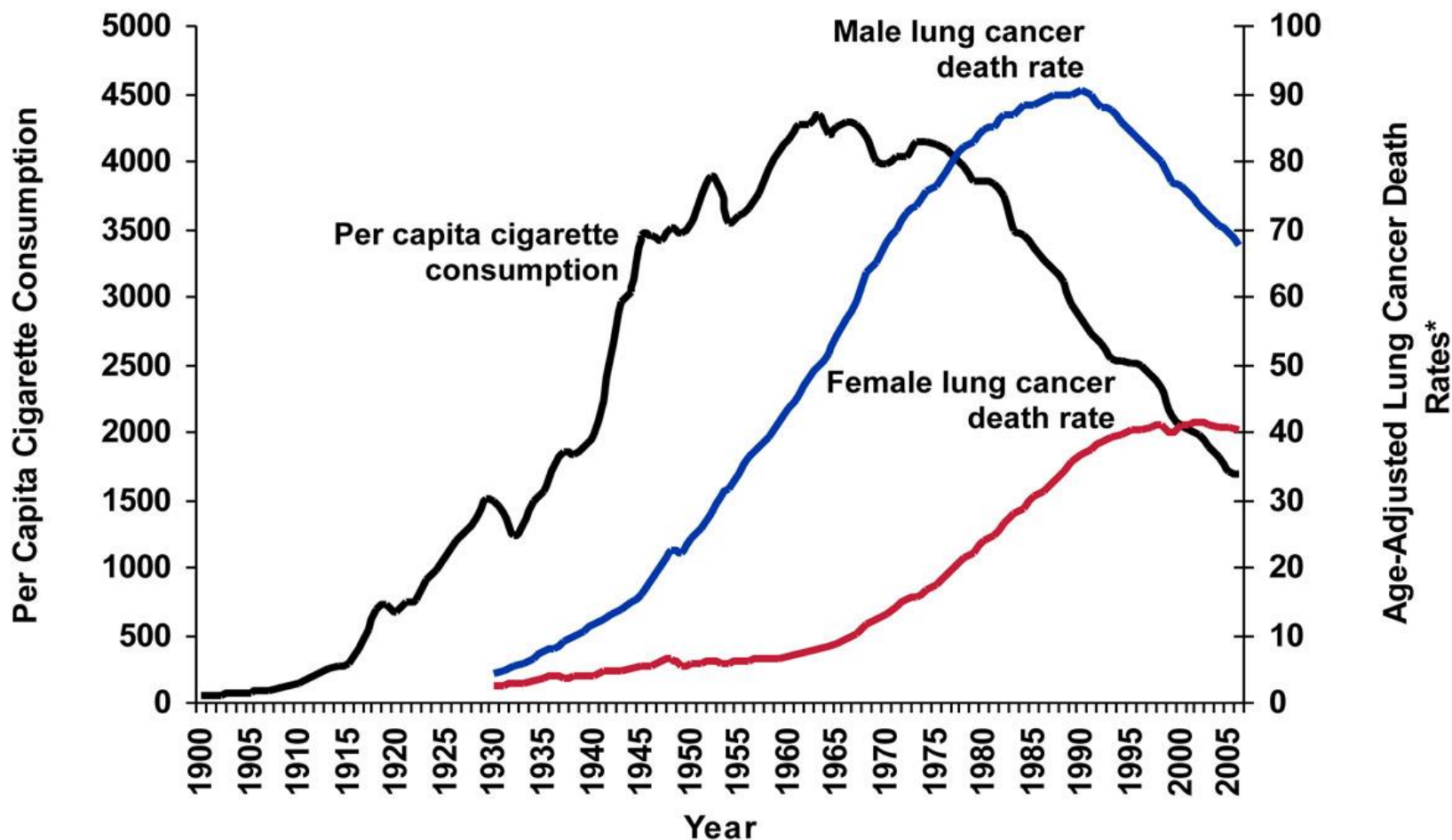


SMOKING STATISTICS

- **20% OF AMERICANS ARE SMOKERS**
- **# 1 RISK FACTOR FOR CANCER**
 - **>1/3 OF 500,000 US CANCER DEATHS**
- **# 2 RISK FACTORS**
 - **OBESITY, PHYSICAL INACTIVITY**
 - **1/3 OF 500,000 US CANCER DEATHS**
- **THUS ~2/3 OF CANCER DEATHS ARE POTENTIALLY PREVENTABLE**



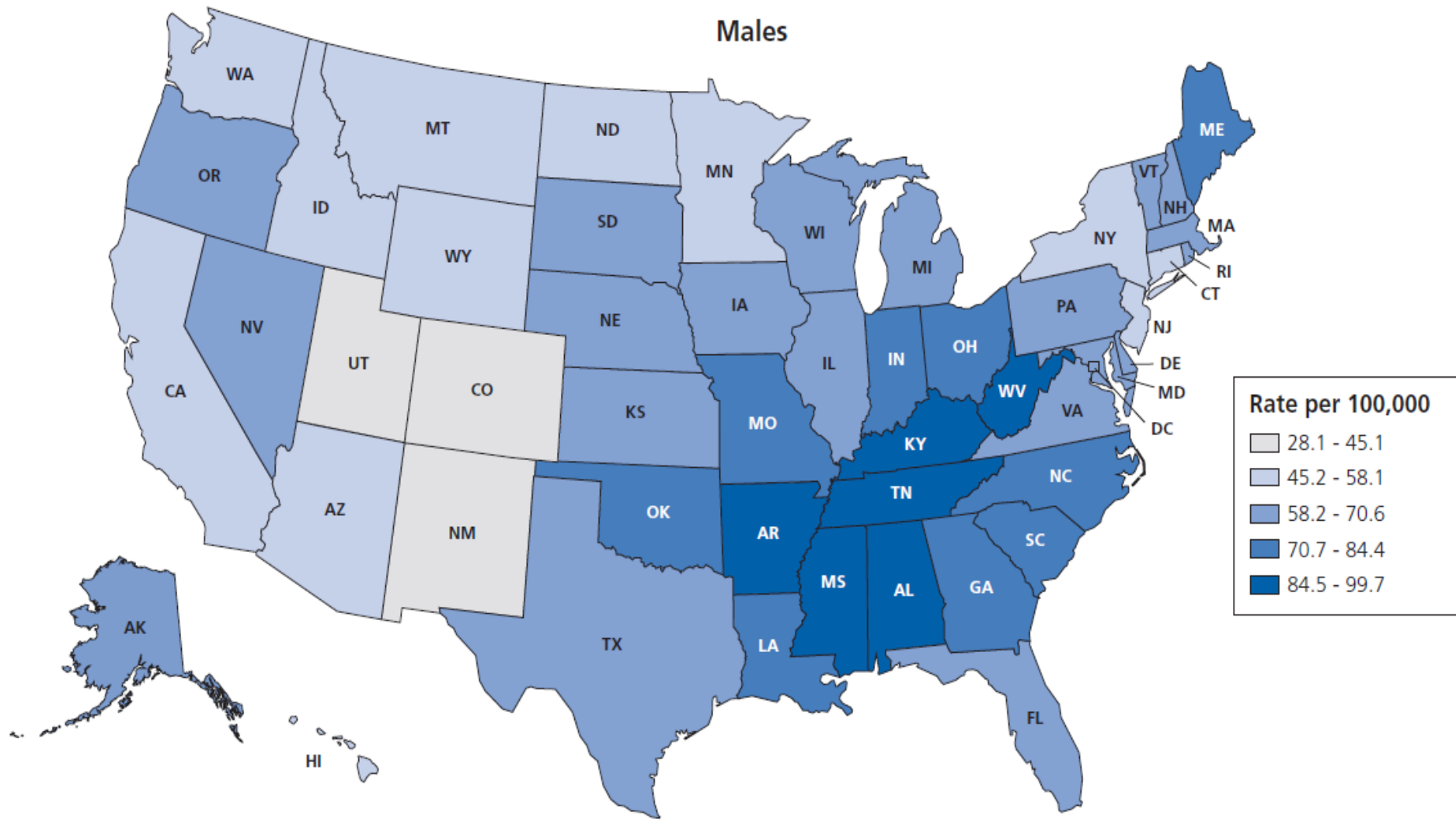
Tobacco Use in the US, 1900-2006



*Age-adjusted to 2000 US standard population.

Source: Death rates: US Mortality Data, 1960-2006, US Mortality Volumes, 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2009. Cigarette consumption: US Department of Agriculture, 1900-2007.

Geographic Patterns in Lung Cancer Death Rates* by State, US, 2005-2009



PROTO-ONCOGENE

- **Lung cancer and COPD (emphysema) are related.**
- **Both strongly associated with tobacco.**
- **COPD doubles the risk of lung cancer.**
- **c-Src is mutated with cigarette smoke**
- **Inflammatory chemicals create a chain reaction**
 - MMP-9, -12, cathepsin G, K, IL-17, TNF- α , MCP-1 and KC
- **Creates environment conducive to cancer.**



WE'VE COME
A LONG WAY,
BABY!!

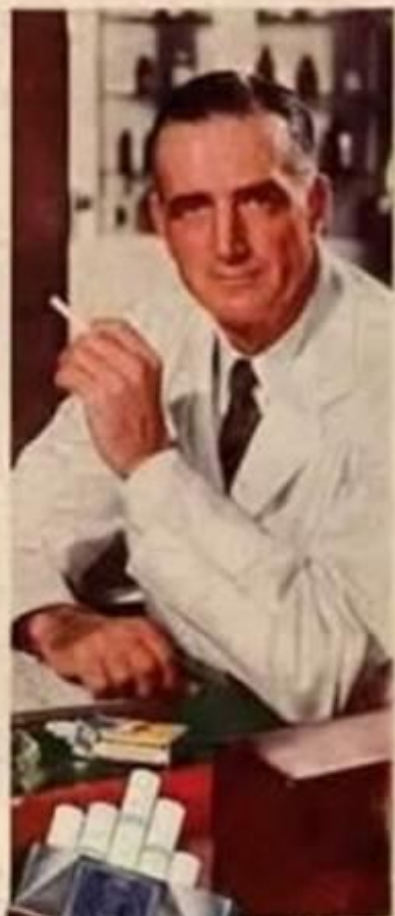
According to repeated nationwide surveys,

More Doctors Smoke **CAMELS** than any other cigarette!

Doctors in every
branch of medicine
were asked, "What
cigarette do you smoke?"
The brand named most
was Camel!

You'll enjoy Camels for the same reasons
so many doctors enjoy them. Camels have
that cool, mild, milky, pack after pack,
and a flavor unmatched by any other cigarette.
Make this available now - smoke only
Camels for 30 days and see how well Camels
please your taste. How well they will
favor them as your steady smoke. You'll
see how enjoyable a cigarette can be!

THE DOCTORS' CHOICE IS AMERICA'S CHOICE!



For 30 days, test Camels in your "T-Zone" (T for Throat, T for Taste).



FLORIDA OBESITY STATISTICS

- **ADOLESCENTS BMI**
 - **15% OVERWEIGHT**
 - **11% OBESE**
- **ADULTS BMI**
 - **38% OVERWEIGHT**
 - **24% OBESE**



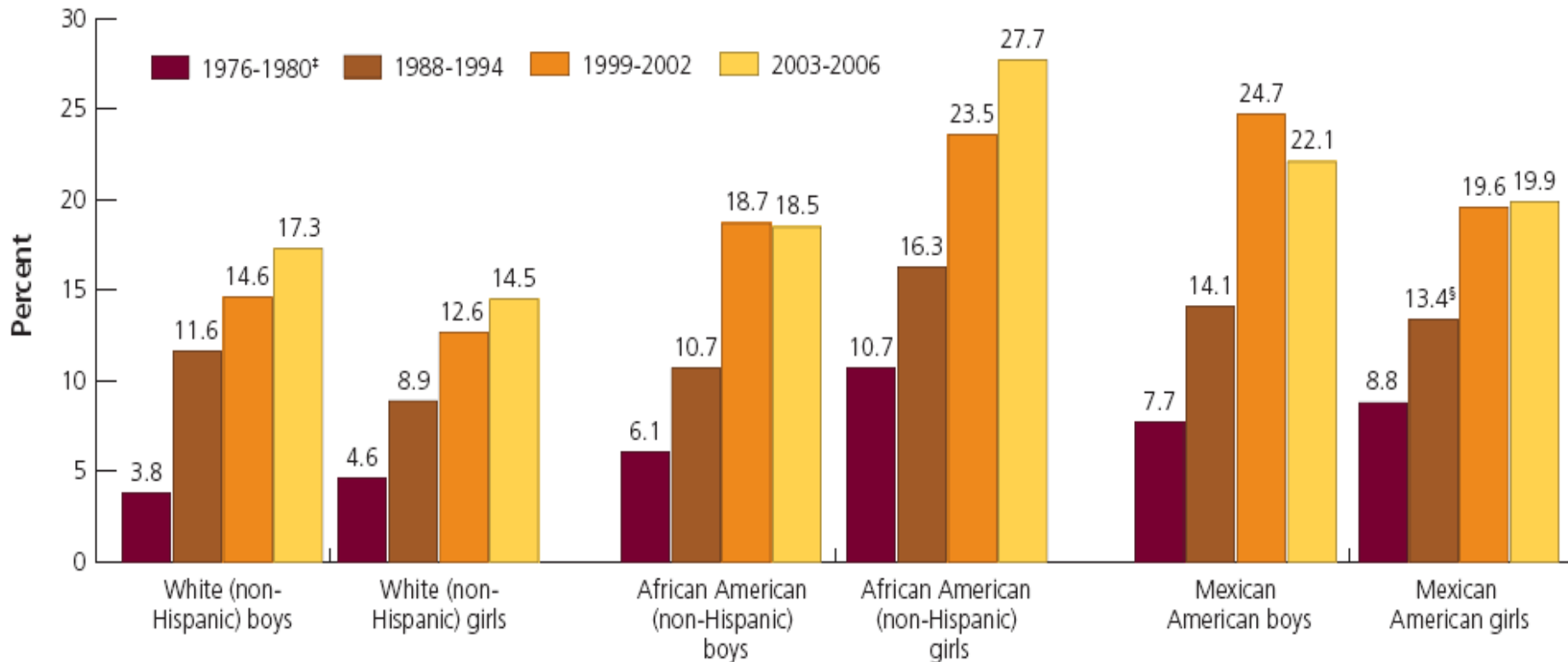
Height (feet, inches)	Body weight (pounds)		
	Overweight*	Obese [†]	Extremely Obese [‡]
6'4"	205	246	328
6'3"	200	240	319
6'2"	194	233	311
6'1"	189	227	302
6'0"	184	221	294
5'11"	179	215	286
5'10"	174	209	278
5'9"	169	203	270
5'8"	164	197	262
5'7"	159	191	255
5'6"	155	186	247
5'5"	150	180	240
5'4"	145	174	232
5'3"	141	169	225
5'2"	136	164	218
5'1"	132	158	211
5'0"	128	153	204
4'11"	124	148	198
4'10"	119	143	191

BODY MASS INDEX

- **OVERWEIGHT**
– BMI 25-29.9
- **OBESE**
– BMI 30-39.9
- **EXT OBESE**
– BMI >40

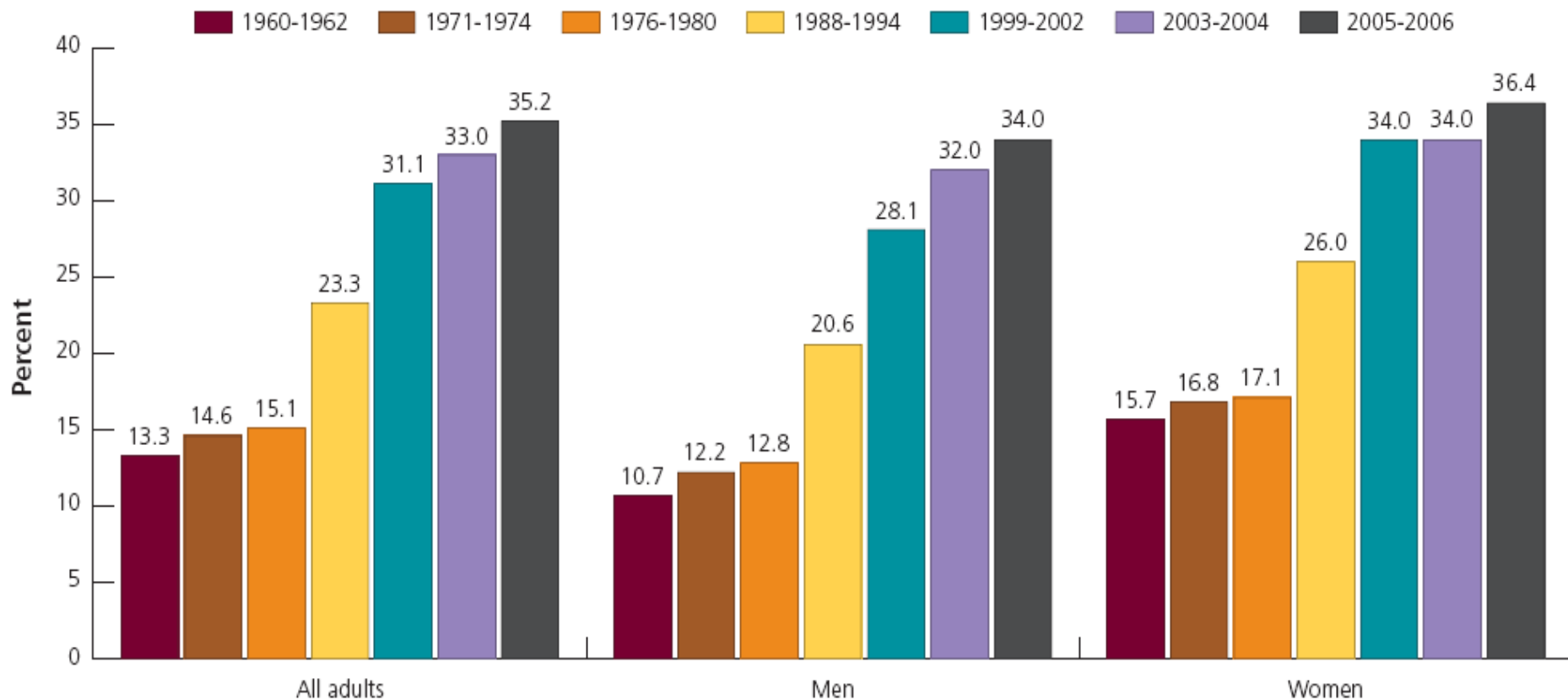
ADOLESCENT OBESITY

Figure 2A. Obesity*, Adolescents 12-19 Years, by Gender & Race/Ethnicity†, US, 1976-2006

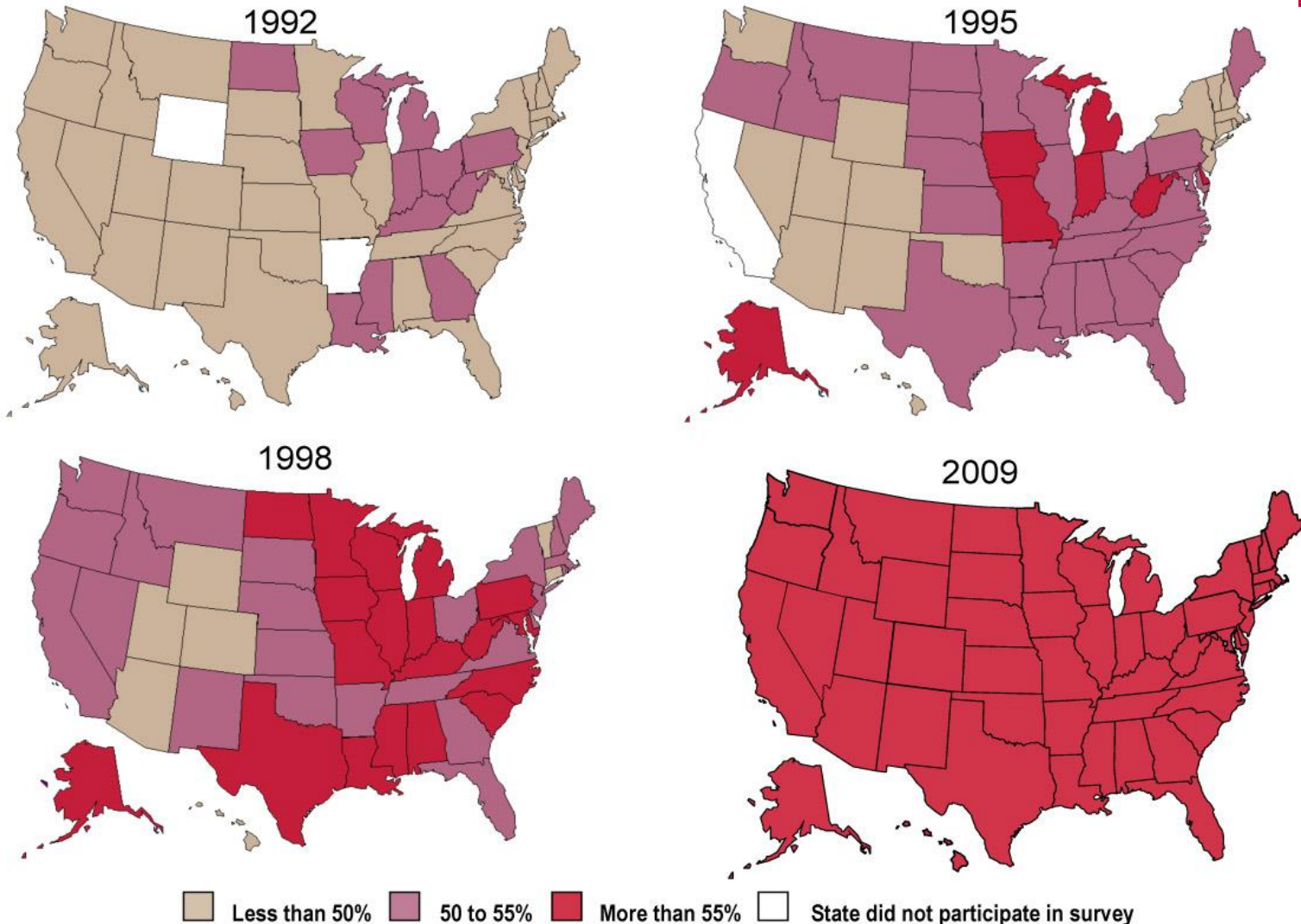


ADULT OBESITY TRENDS

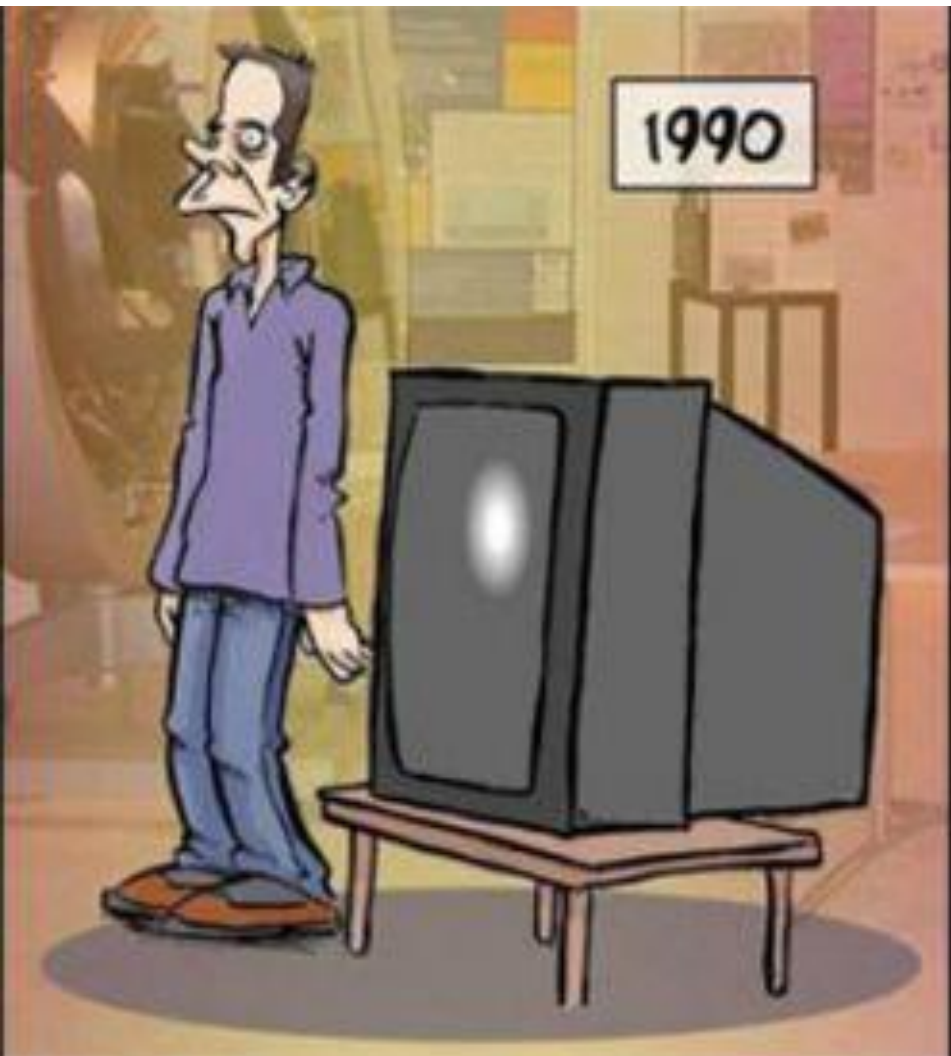
Figure 2B. Obesity*, Adults 20-74 years, by Gender, US, 1960-2006[†]



Trends in Overweight* Prevalence (%), Adults 18 and Older, US, 1992-2009



*Body mass index of 25.0 kg/m² or greater. Source: Behavioral Risk Factor Surveillance System, CD-ROM (1984-1995, 1998) and Public Use Data Tape (2004-2009), National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2010.



OBESITY AND CANCER

- Inflammation can lead to overstimulation of the immune system and lead to other diseases
- Clear association
 - Breast
 - Colon
 - Endometrium
 - Esophagus
 - Kidney



OBESITY AND CANCER

- **RISK OF CANCER INCREASED FOR**
 - **PANCREAS**
 - **GALLBLADDER**
 - **THYROID**
 - **OVARIAN**
 - **CERVIX**
 - **MULTIPLE MYELOMA**
 - **HODGKIN'S LYMPHOMA**
 - **AGGRESSIVE PROSTATE CANCER**



OBESITY AND CANCER

- **Surgery for morbid obesity**
 - Reduced mortality from diabetes, heart disease and cancer.
- **Obesity is considered a low grade inflammatory disease**



DIABETES

- **Glucose rises, insulin rises to surpress**
- **Chronically elevated glucose overwhelms and insulin can't keep up**
- **Leads to Metabolic Syndrome**
 - **Increase risk for heart disease**
 - **Increases risk for cancer through growth factor stimulation**



METABOLIC SYNDROME

- **Risk factors that increase risk of heart disease, stroke and cancer**
- **Having 3 of 5 diagnostic for Met. Syndrome**
 - **Large waistline (apple shape)**
 - **High Triglycerides (or being on meds for it)**
 - **Low HDL (the good cholesterol)**
 - **High Blood Pressure (or being on meds for it)**
 - **High fasting blood sugar**



APPLE SHAPE

- **Fatty deposition in the abdomen is a greater risk for heart disease than on the hips (pear shape).**
- **Chemicals released by abdominal fat are different than those in other parts of the body.**



HIGH TRIGLYCERIDES

- **Fat that is circulating in the blood stream**
- **Patients think that because they are on medication that their risk is back to baseline but that is false.**



LOW HDL

- **HDL helps remove cholesterol from the arteries.**
- **You can have totally normal LDL, cholesterol, and triglyceride levels but a low HDL increases risk of heart disease.**



HIGH BLOOD PRESSURE

- **Elevated pressure in the arteries causes damage. The damage incites an inflammatory response. That is what leads to the plaque build-up that clogs arteries**
- **Clogged carotid arteries increases risk of stroke**
- **Clogged heart arteries causes heart attacks**



HIGH FASTING BLOOD SUGAR

- Mildly high glucose may be an early sign of diabetes.



METABOLIC SYNDROME

- **One study estimated that 25% of US population has it.**
- **You don't have complete control.**
- **Genetics plays a role.**
 - Triglycerides, low HDL are familial
- **BUT for most overweight/obese adults, weight reduction and a healthy lifestyle will lower BP and glucose, many can stop meds and reduce risk.**



ROLE OF PLATELETS

- **Platelets are what allows our blood to clot**
- **They have a direct relationship with inflammation through interaction with immune cells and endothelial cells.**
- **Damage to the lining of arteries causes platelets to recruit other cells that eventually leads to atherosclerosis.**



MODIFIERS

- **Aspirin and Cyclooxygenase(COX)-2 inhibitors (like Celebrex)**
 - **Blocks certain inflammatory pathways**
 - **Protective against heart disease**
 - **ASA has some protection for colon cancer**
- **Side effects**
 - **Bleeding, stomach ulcers**



BACTERIA

- **Infection stimulates an immune response**
- **Bacterial endocarditis linked to oral health**
- **Gut microbes linked to certain GI cancers**



HEALTHY LIVING

- **There is no food, pill, herb, liquid, or other concoction that is currently known to selectively attract the “good” immune cells and block the “bad”.**
- **Be skeptical of products that “work with your immune system” or “boost your immune system”**



LIFESTYLE RECOMMENDATIONS

- **POSTMENOPAUSAL WOMEN**
- **CALCIUM 1,200-1,500 mg/d**
- **VITAMIN D 800U/d**
- **WEIGHT-BEARING EXERCISE**
- **MODERATE ALCOHOL USE**
 - **≥ 1 DRINK / DAY**
- **SMOKING CESSATION**



HEALTHY LIFESTYLE

- **EAT LOTS OF FRUITS, VEGGIES, & WHOLE GRAINS**
- **EXERCISE REGULARLY**
- **MAINTAIN HEALTHY WEIGHT**
- **USE SUNSCREEN**
- **AVOID TANNING SALONS**
- **AVOID TOBACCO PRODUCTS**
- **WEAR YOUR SEATBELT**
- **ALCOHOL AND DRIVING DON'T MIX AND NEITHER DO CELL PHONES**





Health
First

Cancer Services



Dr. Nani Golden