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## Where is LTCI Underwriting Headed

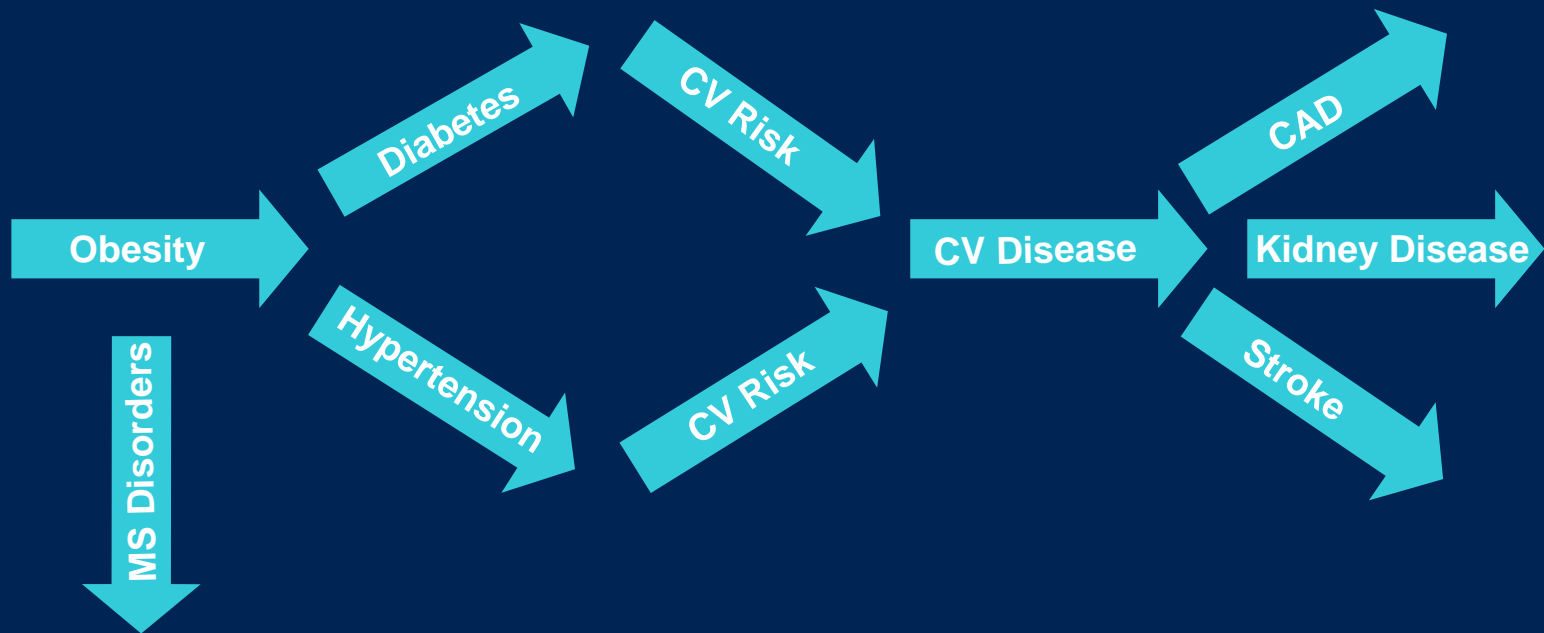
Obesity – Tipping the Morbidity  
Scale or Not

LTCi National Producers Summit  
November 5, 2006

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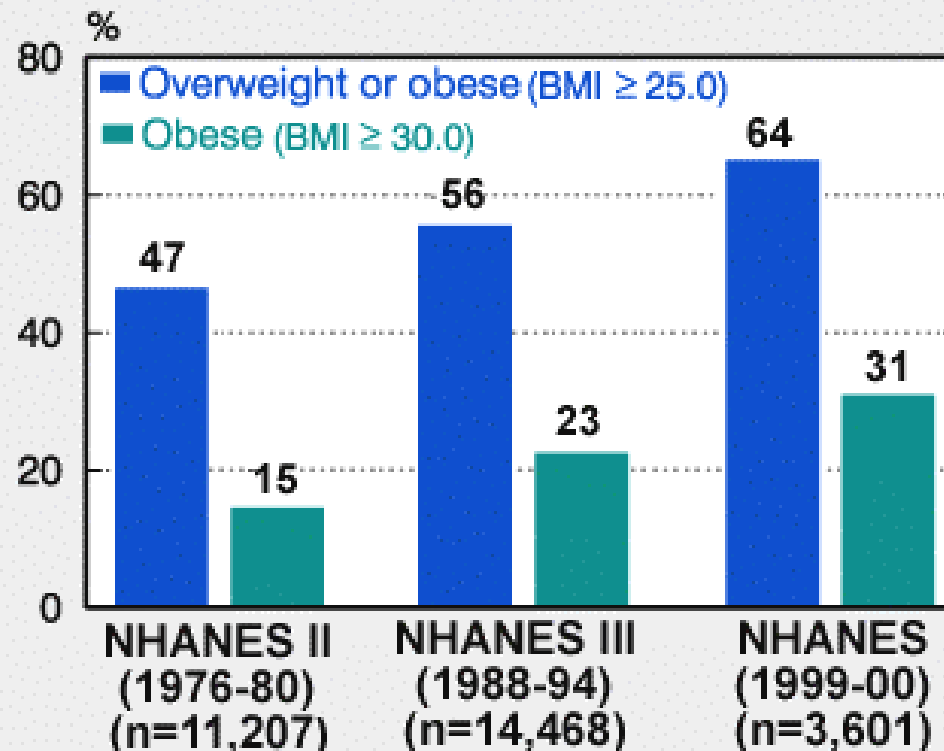
*Company Confidential*

# Obesity – Where It All Starts



# Obesity - Epidemiology

**Figure 2. Age-adjusted\* prevalence of overweight and obesity among U.S. adults, age 20-74 years**

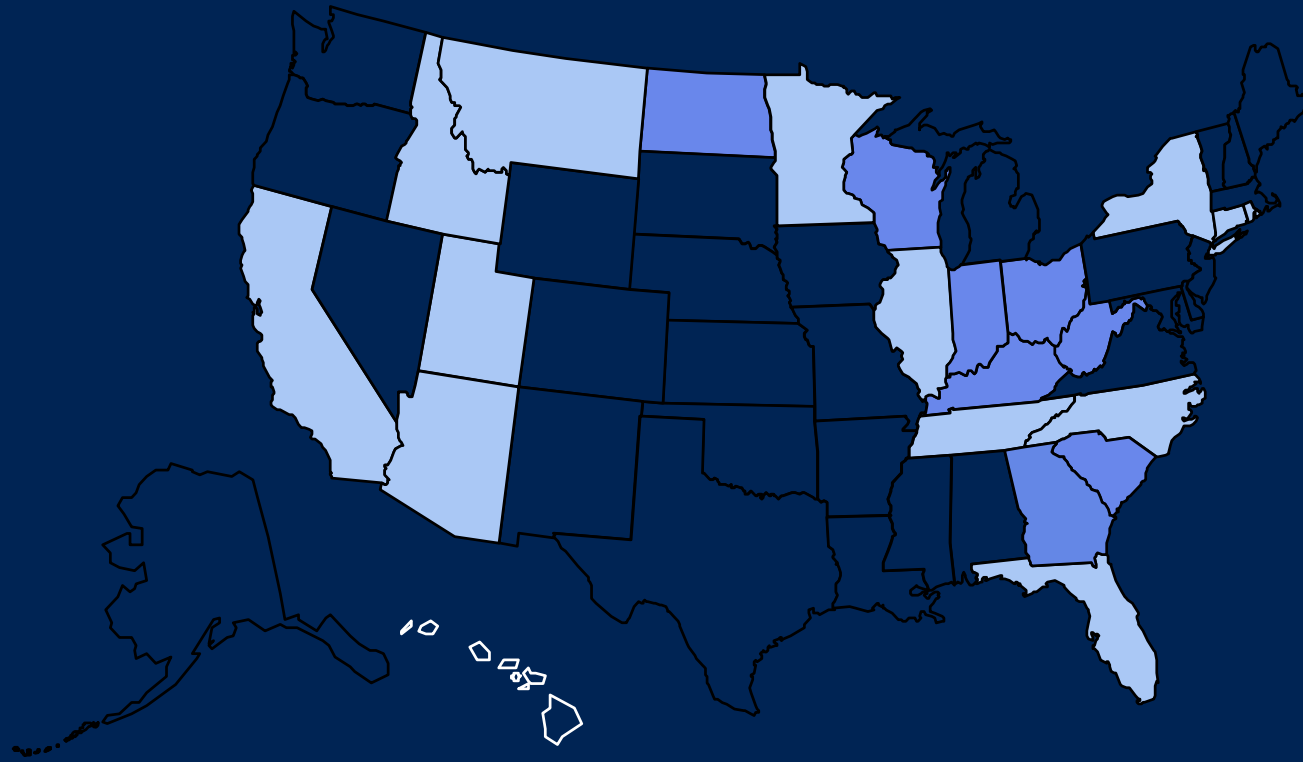


\*Age-adjusted by the direct method to the year 2000 U.S. Bureau of the Census estimates using the age groups 20-39, 40-59, and 60-74 years.

# Obesity Trends\* Among U.S. Adults

**BRFSS, 1985**

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5'4" woman)

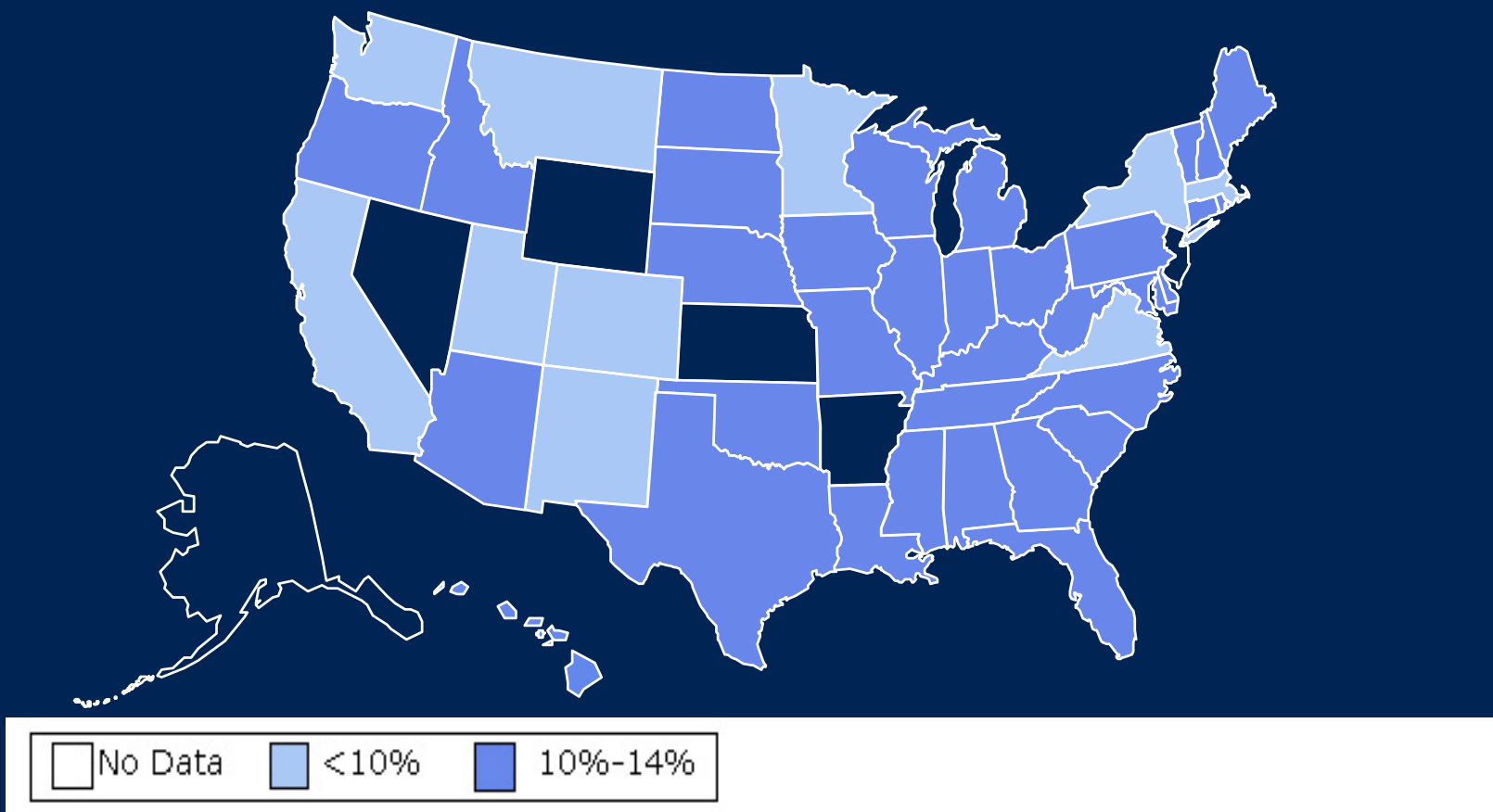


Source: Mokdad A H, et al. *J Am Med Assoc* 1999;282:16, 2001;286:10.

# Obesity Trends\* Among U.S. Adults

BRFSS, 1990

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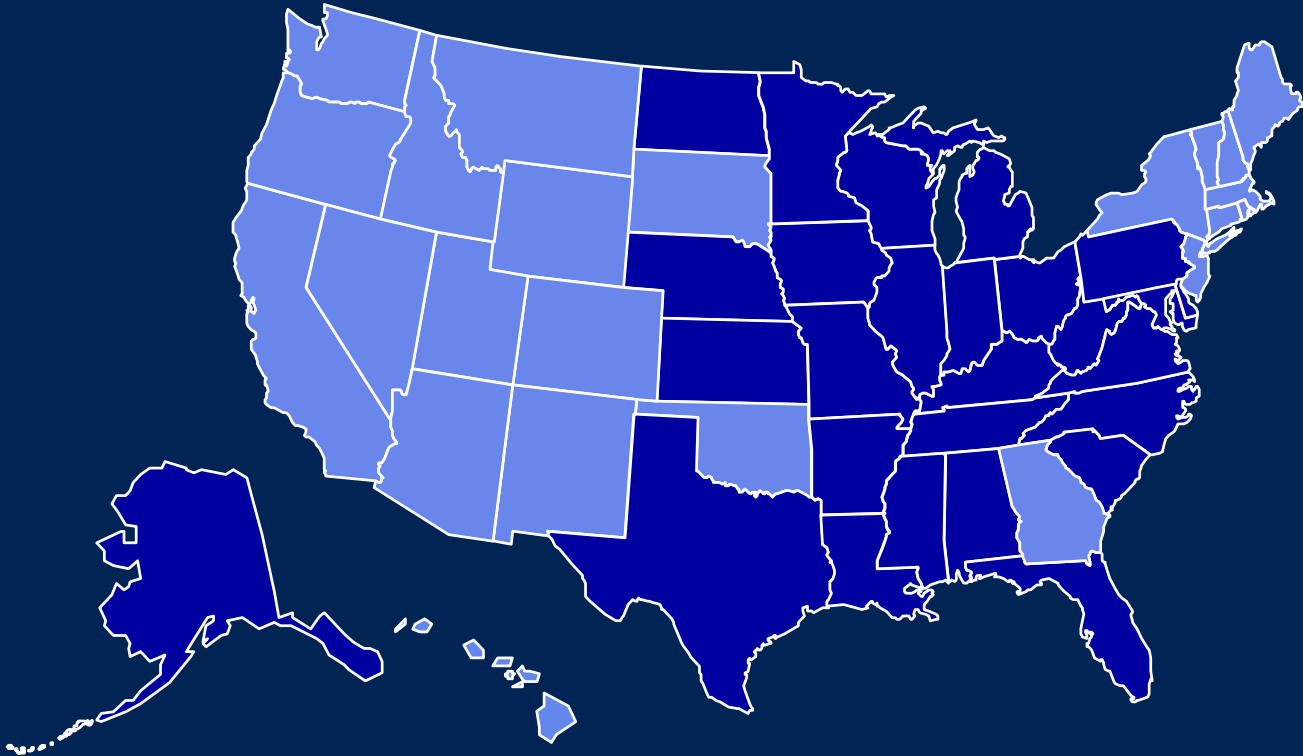


Source: Mokdad A H, et al. *J Am Med Assoc* 1999;282:16, 2001;286:10.

# Obesity Trends\* Among U.S. Adults

BRFSS, 1995

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5'4" woman)

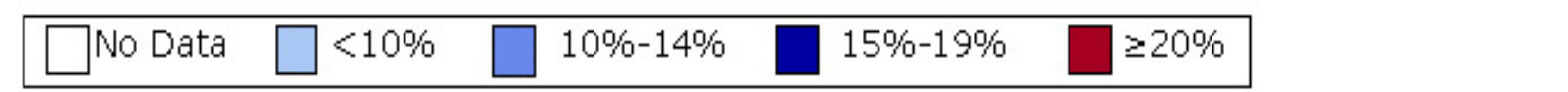
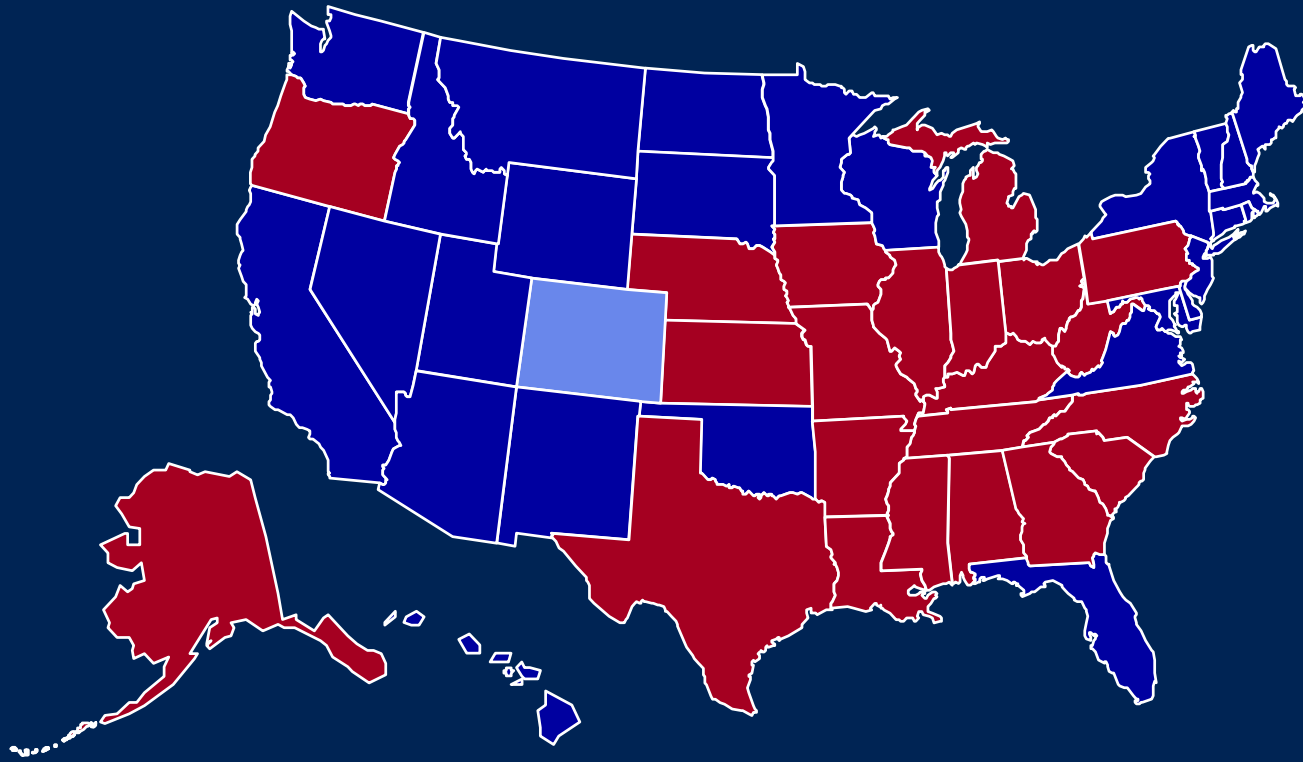


Source: Mokdad A H, et al. *J Am Med Assoc* 1999;282:16, 2001;286:10.

# Obesity Trends\* Among U.S. Adults

BRFSS, 2000

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5'4" woman)

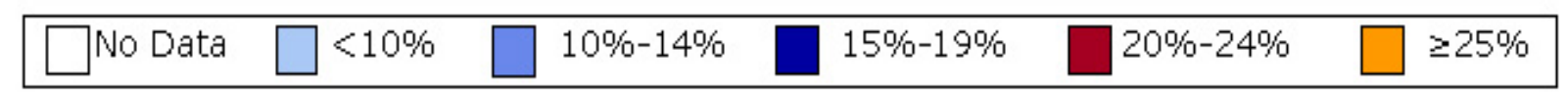
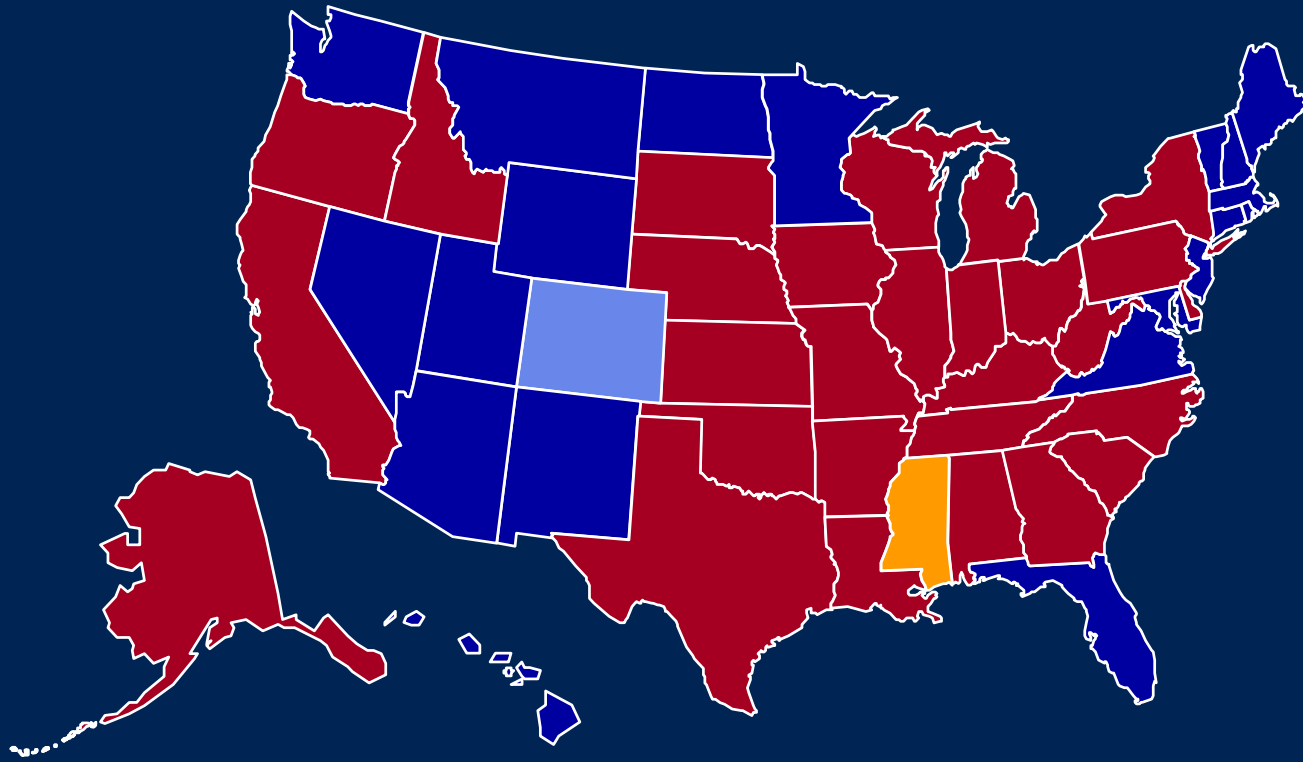


Source: Mokdad A H, et al. *J Am Med Assoc* 1999;282:16, 2001;286:10.

# Obesity Trends\* Among U.S. Adults

BRFSS, 2001

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5'4" woman)

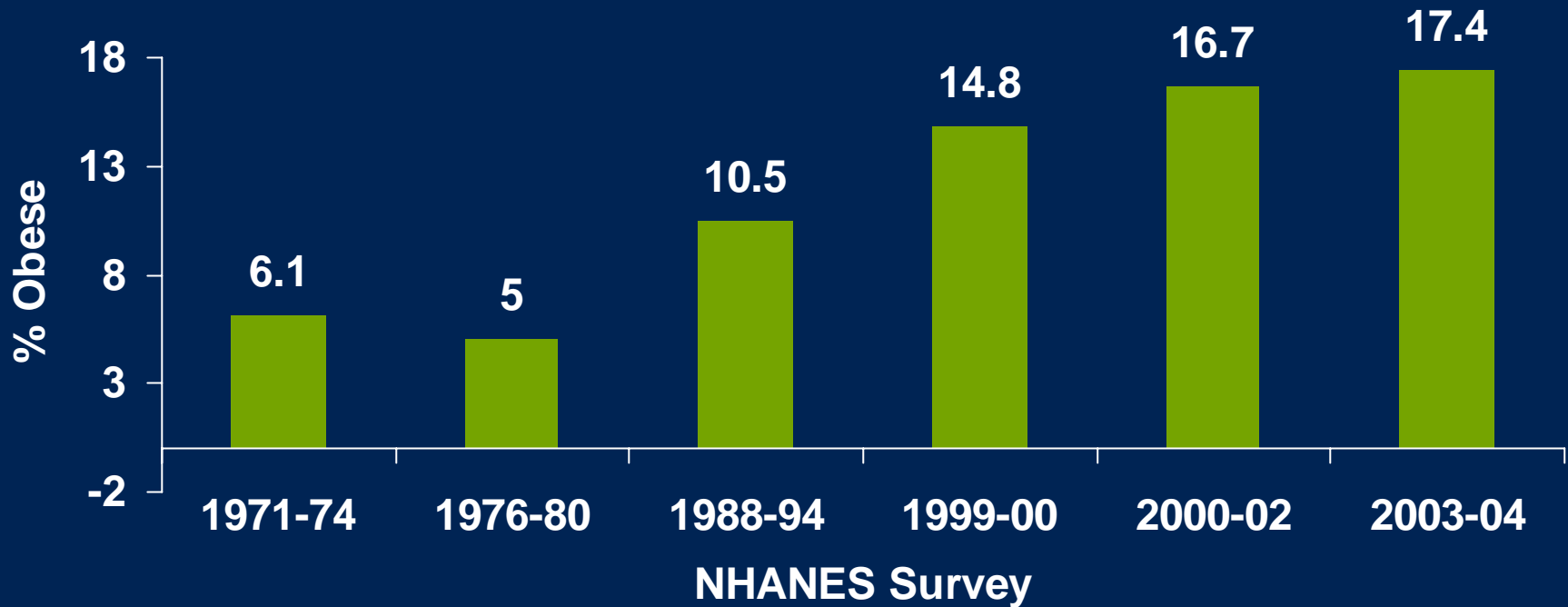


Source: Mokdad A H, et al. *J Am Med Assoc* 1999;282:16, 2001;286:10.



# Obesity - Adolescents

## Obesity Ages 12-19



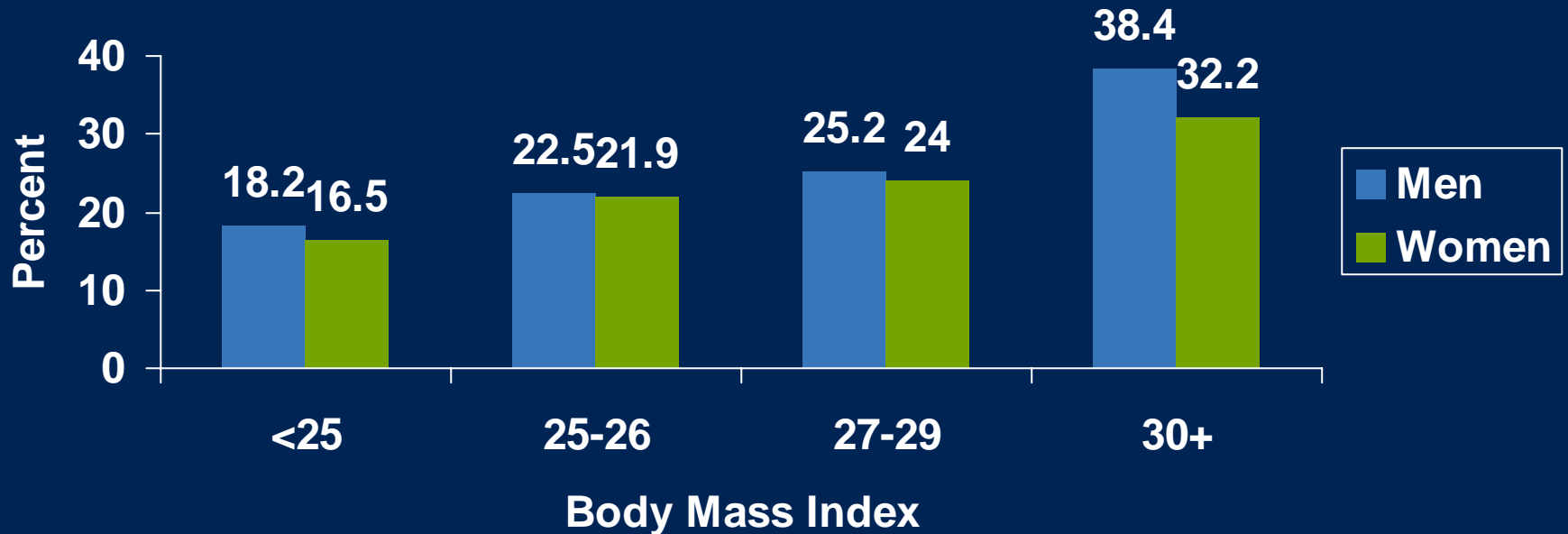
[http://www.cdc.gov/nchs/products/pubs/pubd/hestats/obese03\\_04/overwght\\_child\\_03.htm](http://www.cdc.gov/nchs/products/pubs/pubd/hestats/obese03_04/overwght_child_03.htm)

# Obesity - Health Consequences

- Hypertension
- Hyperlipidemia
- Metabolic Syndrome
- Type 2 Diabetes
- Coronary Artery Disease
- Stroke
- Osteoarthritis
- Sleep Apnea
- Gallstones
- Cancer
- Depression
- Dementia

# Obesity - Hypertension

## Prevalence of Hypertension Related to BMI (NHANES III)



# Obesity – Coronary Artery Disease

## Obesity and CAD Risk

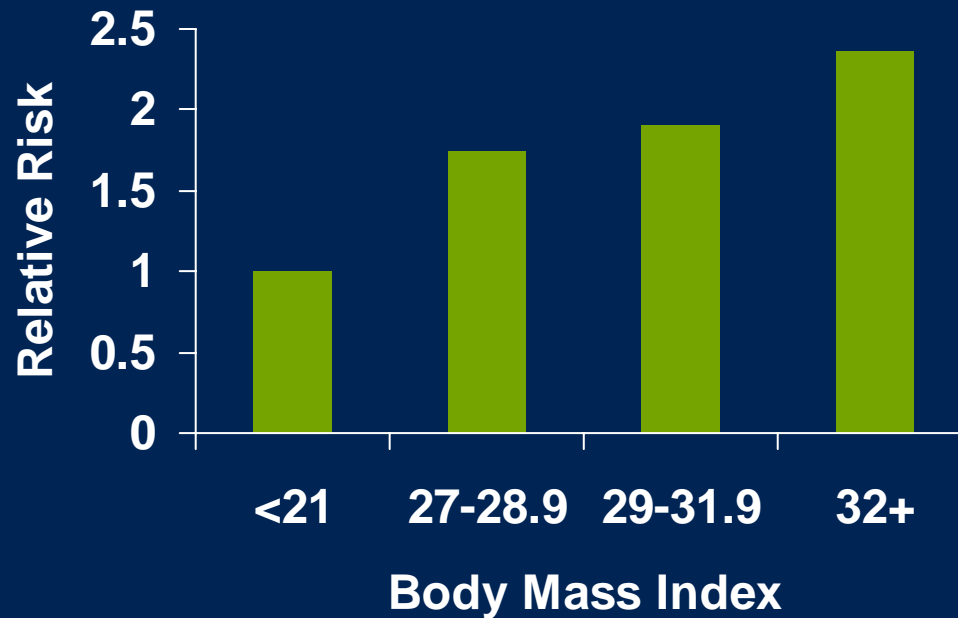


\*Control for Vit E, smoking, alcohol, age, family history

Rimm EB et al. *Am J Epidemiol.* 1995;141:1117

# Obesity - Stroke

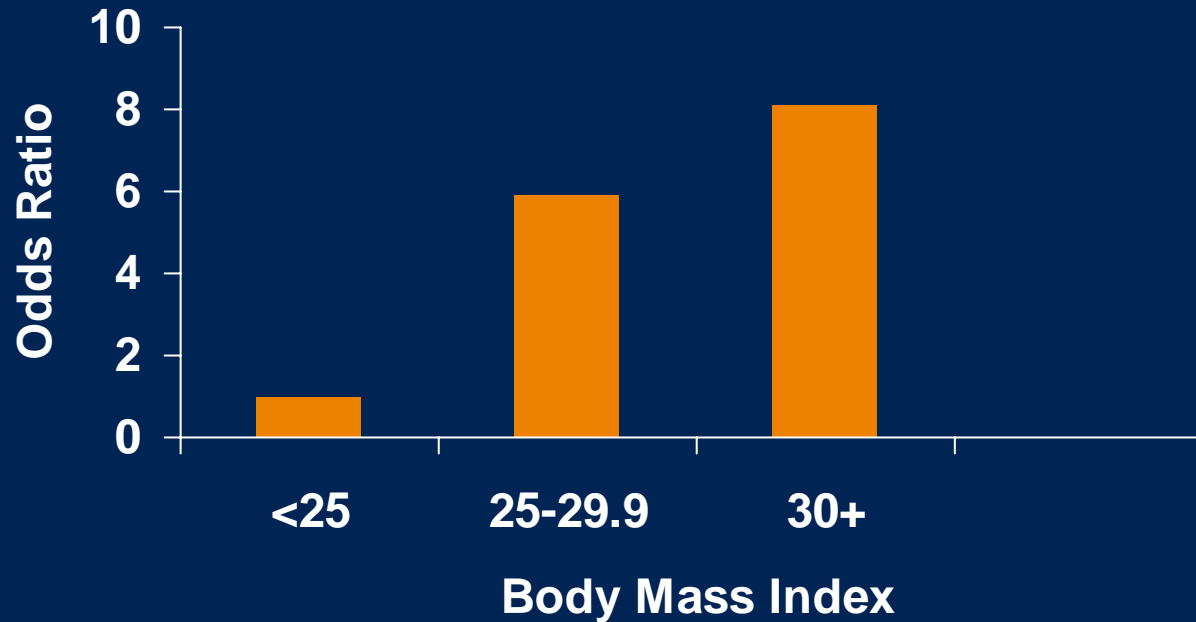
## BMI and Stroke Risk (Women)



Rexrode, KM, Hennekens, WC, et al. *A prospective study of body mass index, weight change, and risk of stroke in women.* JAMA. 1997;277:1539.

# Obesity - Arthritis

## BMI and Knee Arthritis



Sturmere, T, Klaus-Peter, G, Hermann, B. *Obesity, overweight, and patterns of osteoarthritis: the Ulm osteoarthritis study.* J Clin Epidem. 2000;53:307-313.

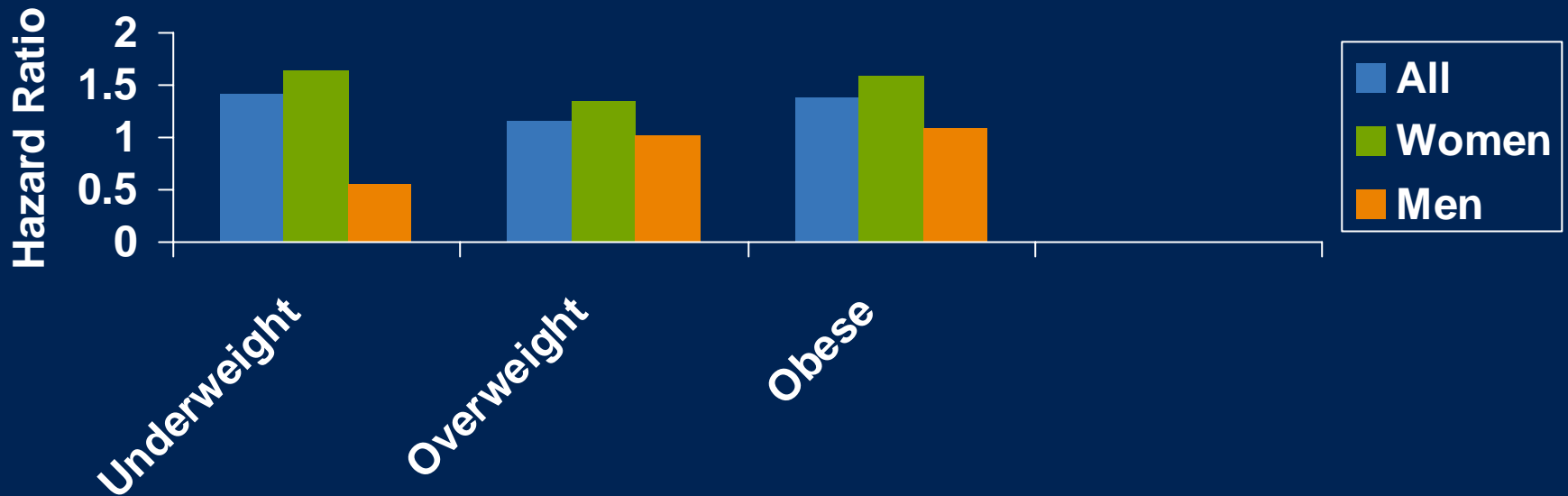
# Obesity - Cancer

Type of Cancer	Relative Risk BMI 25-30 kg/m <sup>2</sup>	Relative Risk BMI $\geq$ 30 kg/m <sup>2</sup>
Colorectal (men)	1.5	2.0
Colorectal (women)	1.2	1.5
Female Breast (postmenopausal)	1.3	1.5
Endometrial	2.0	3.5
Kidney	1.5	2.5
Esophageal	2.0	3.0

Adapted from Calle EE, Kaaks R. Overweight, obesity, and cancer: Epidemiological evidence and proposed mechanisms. *Nat Rev Cancer* 4(8):579-91 (2004)

# Obesity - Dementia

## BMI and Dementia Risk



## Build at Mid-Life

Whitmer RA et al. *BMJ*. 2005;330:1360

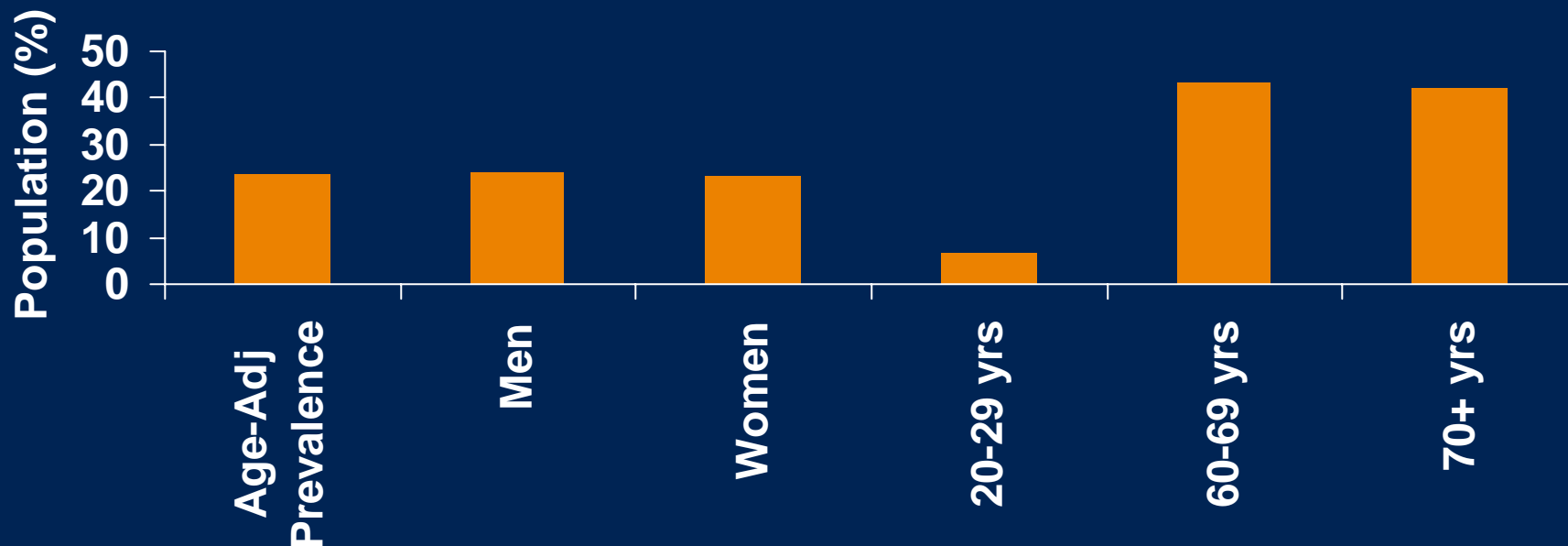


# Metabolic Syndrome

- **Obesity (waist circumference)**
  - $\geq 40$ " (102 cm) men
  - $\geq 35$ " (88 cm) women
- **Hypertriglyceridemia ( $\geq 150$  mg/dl)**
- **Low HDL**
  - $< 40$  men
  - $< 50$  women
- **Hypertension ( $\geq 130/ \geq 85$ )**
- **Insulin Resistance**
  - Abnormal glucose (fasting glucose 100-125 mg/dl)
  - Hyperinsulinemia

# Metabolic Syndrome

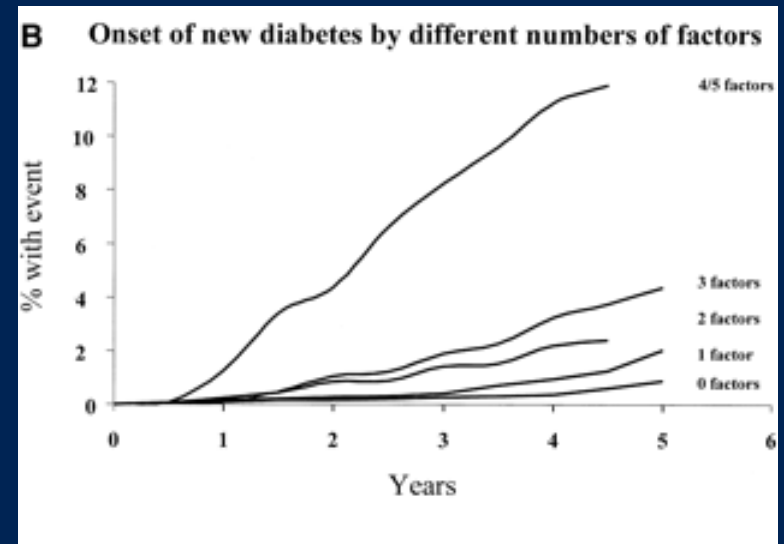
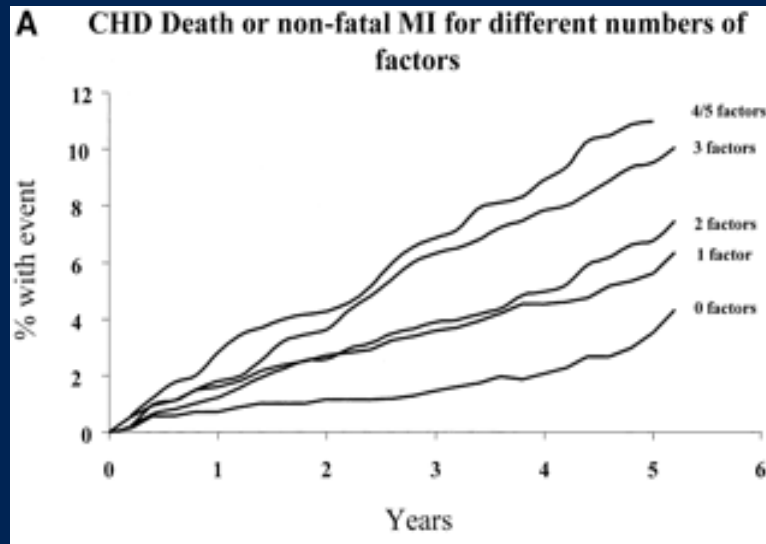
## Prevalence Metabolic Syndrome (NHANES III - 3+ Criteria)



Over 47 Million Adults Have the Metabolic Syndrome in the US

Ford ES, et al. *JAMA*. 2003;287:356

# Metabolic Syndrome – Risk of CAD and DM



Satter N et al. *Circ.* 2003;108:414

# Type 2 Diabetes

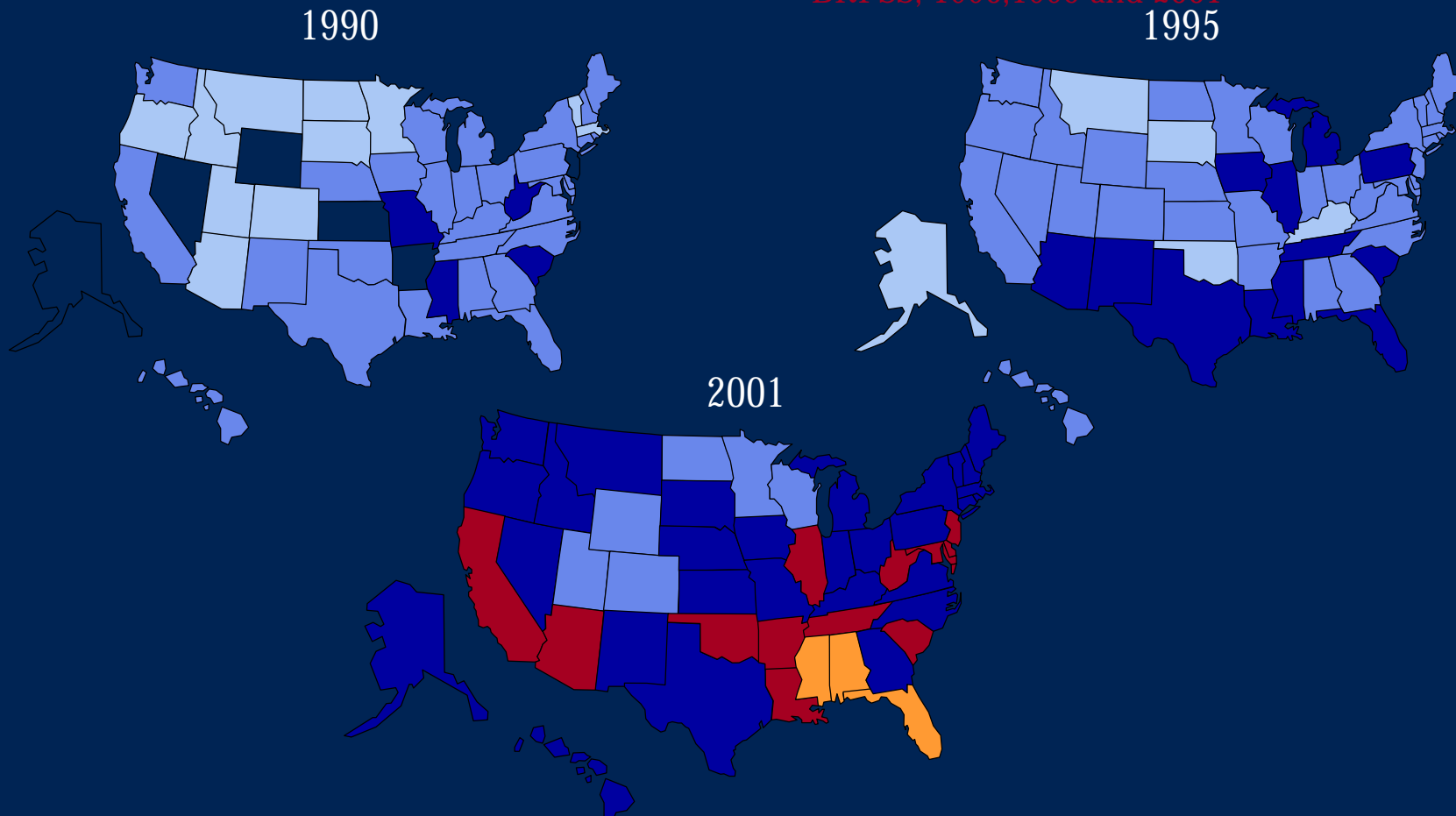
<b>BMI</b>	<b>Women (Nurses Health Study)</b>	<b>Men (Health Professionals Study)</b>
18.5-21.9	1.0	1.0
22.0-24.9	2.2	1.8
25.0-29.9	8.1	5.6
30.0-34.9	17.9	18.2
$\geq 35$	30.1	41.2

From Warren G. Thompson, MD presentation, 111th Annual Meeting AAIM, Orlando, October 2002

# Diabetes - Trends

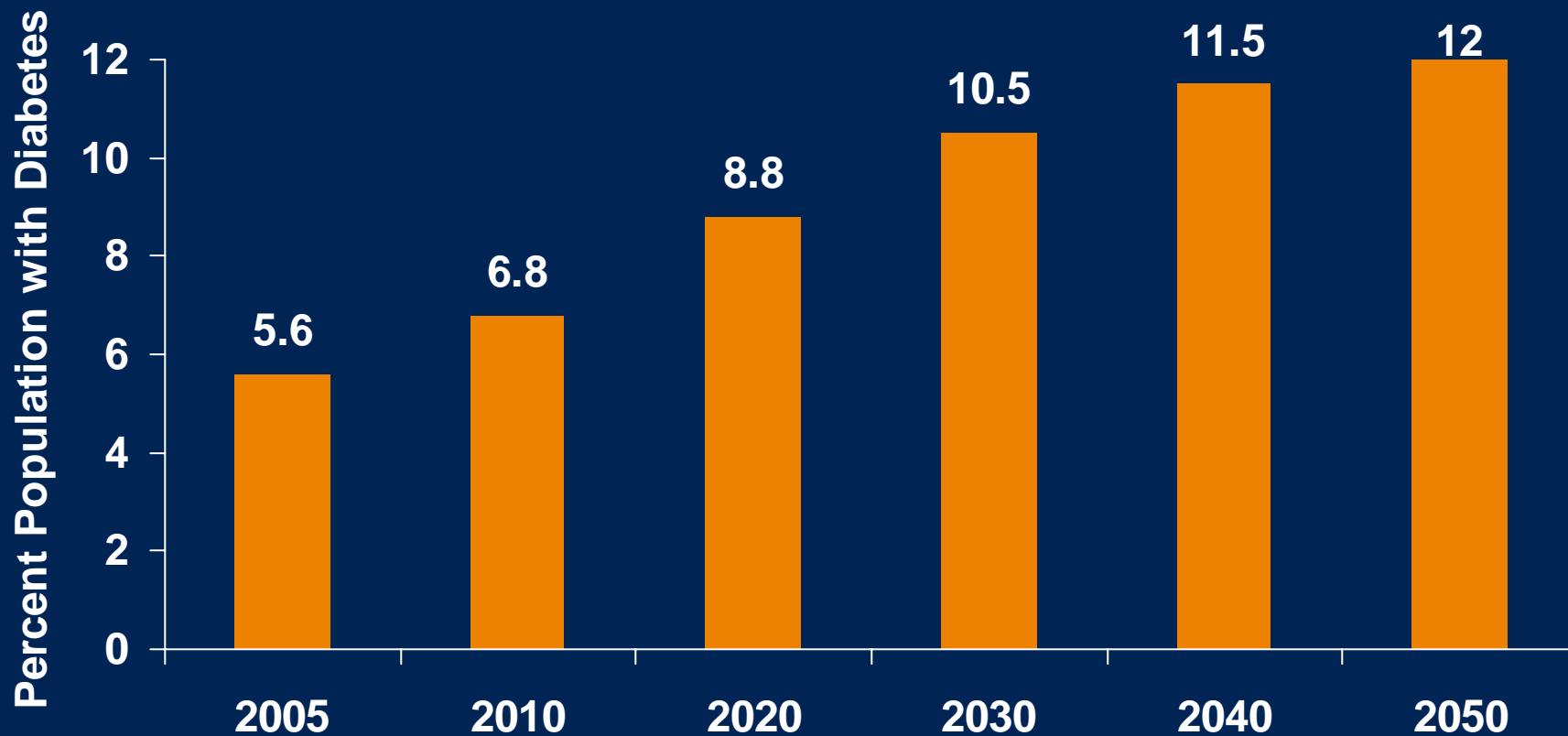
Diabetes Trends\* Among Adults in the U.S.,  
(Includes Gestational Diabetes)

BRFSS, 1990, 1995 and 2001



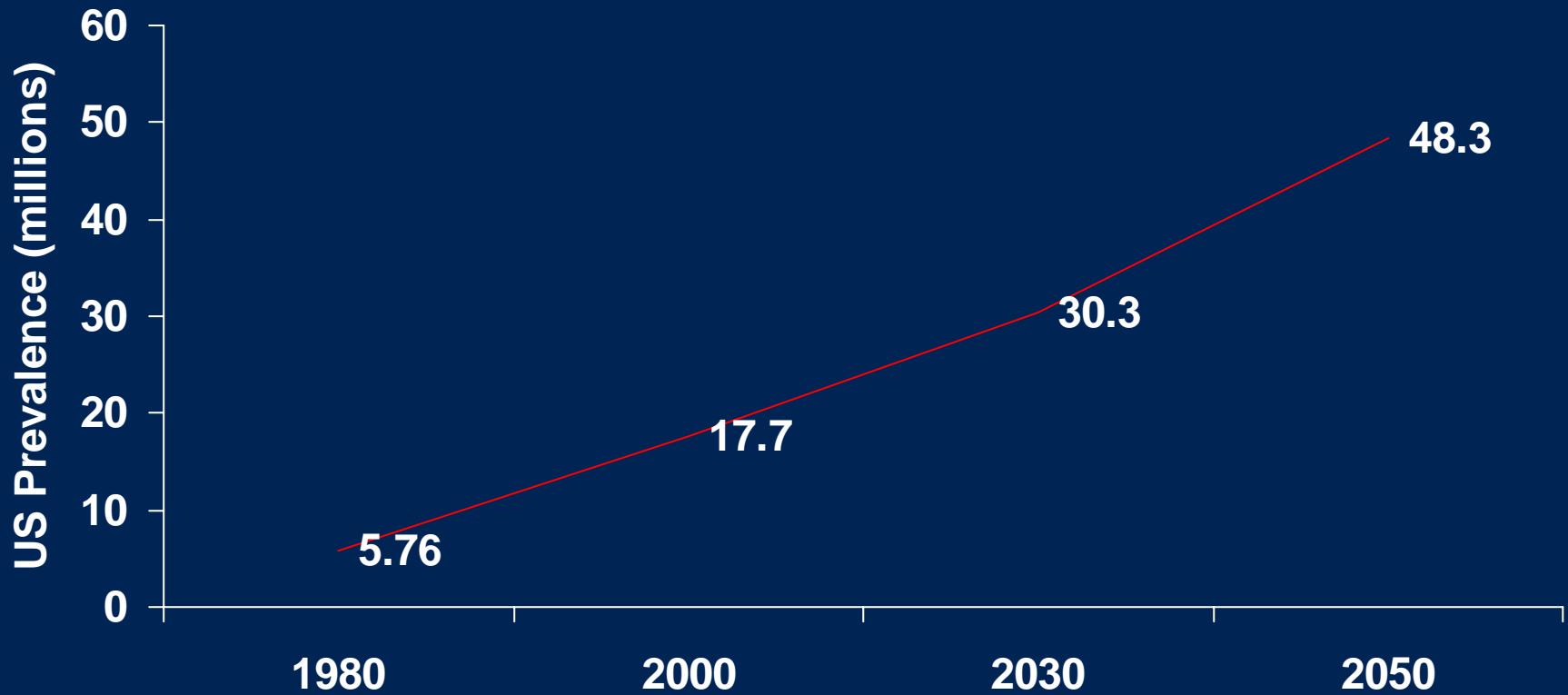
Source: Mokdad et al., *Diabetes Care* 2000;23:1278-83; *J Am Med Assoc* 2001;286:10.

# Diabetes - Incidence



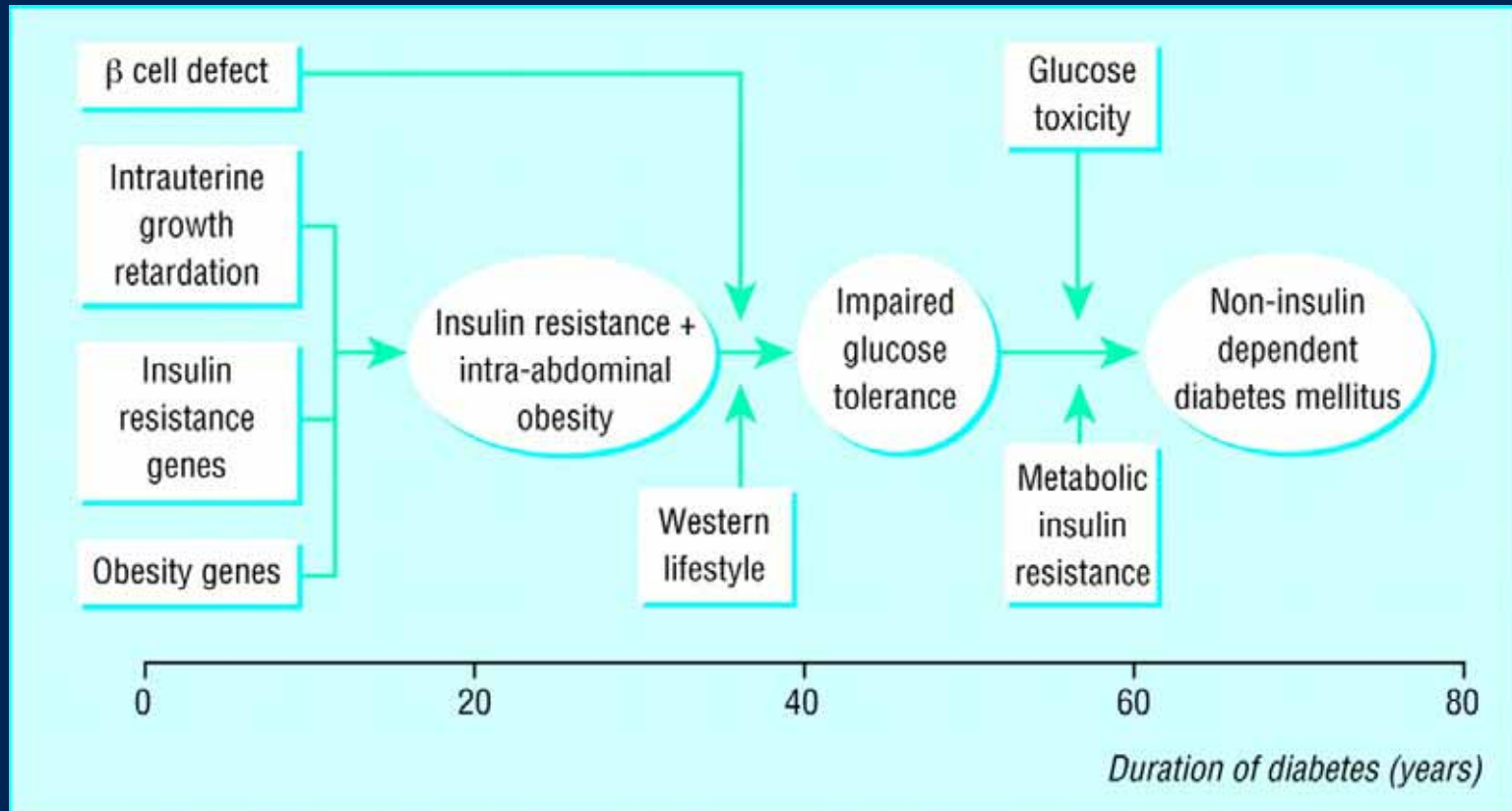
Adapted from Narayan KM et al. *Diabetes Care*. 2006;29:2114

# Diabetes - Prevalence



From: Wild et al; CDC and Narayan KM et al. *Diabetes Care*. 2006;29:2114

# Diabetes - Pathogenesis



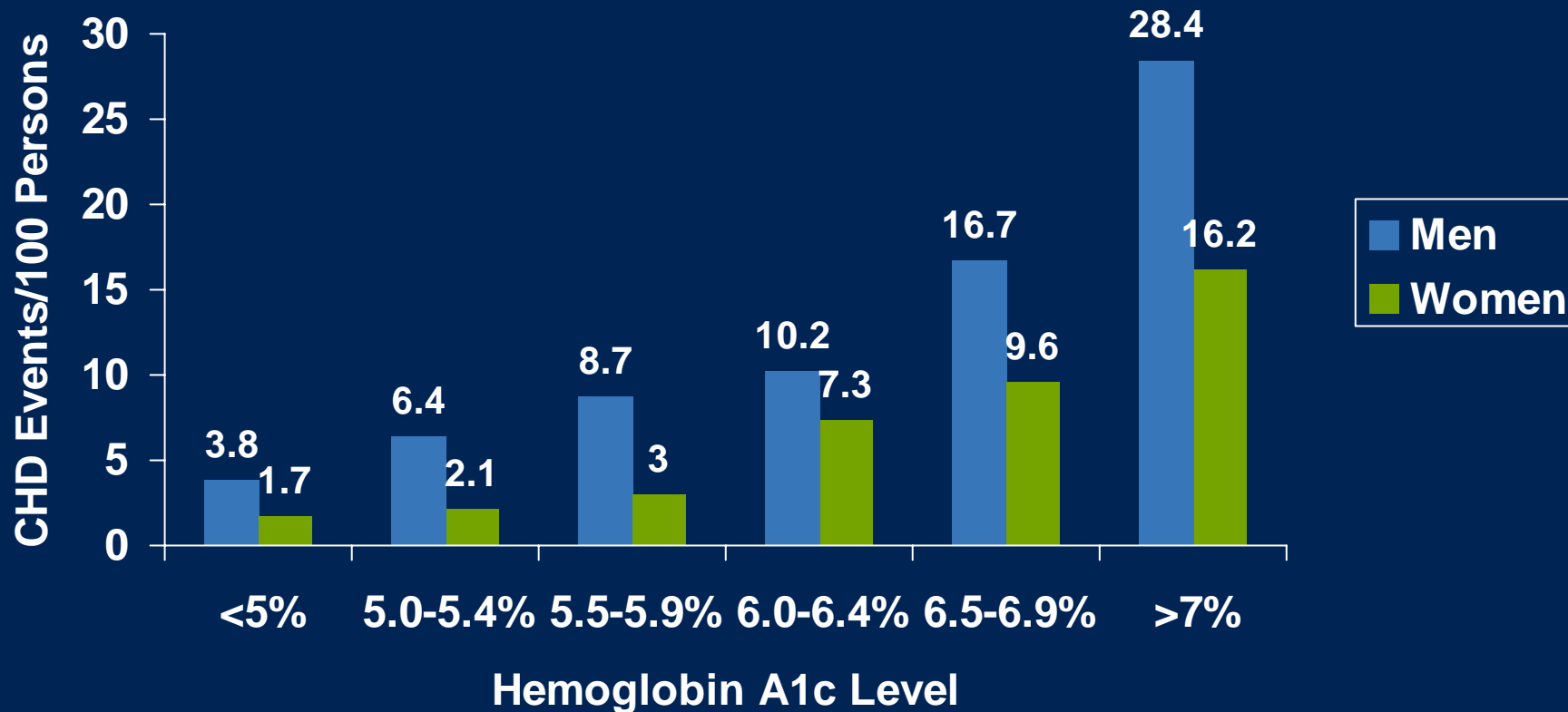
Mandrup-Poulsen, T. BMJ 1998;316:1221-1225



# Diabetes - Morbidity

- **Neuropathy**
  - 60-70% of Diabetics Have Neuropathy
- **Blindness**
  - Leading Cause New Blindness Ages 20-74
- **Vascular Disease**
  - Coronary Artery Disease
  - Peripheral Vascular Disease
  - Cerebrovascular Disease and Stroke (2-4 X Risk)
- **Limb Loss**
  - Diabetes Major Contributing Cause
- **Renal Failure**
  - 44% of New Cases of End-Stage Renal Failure

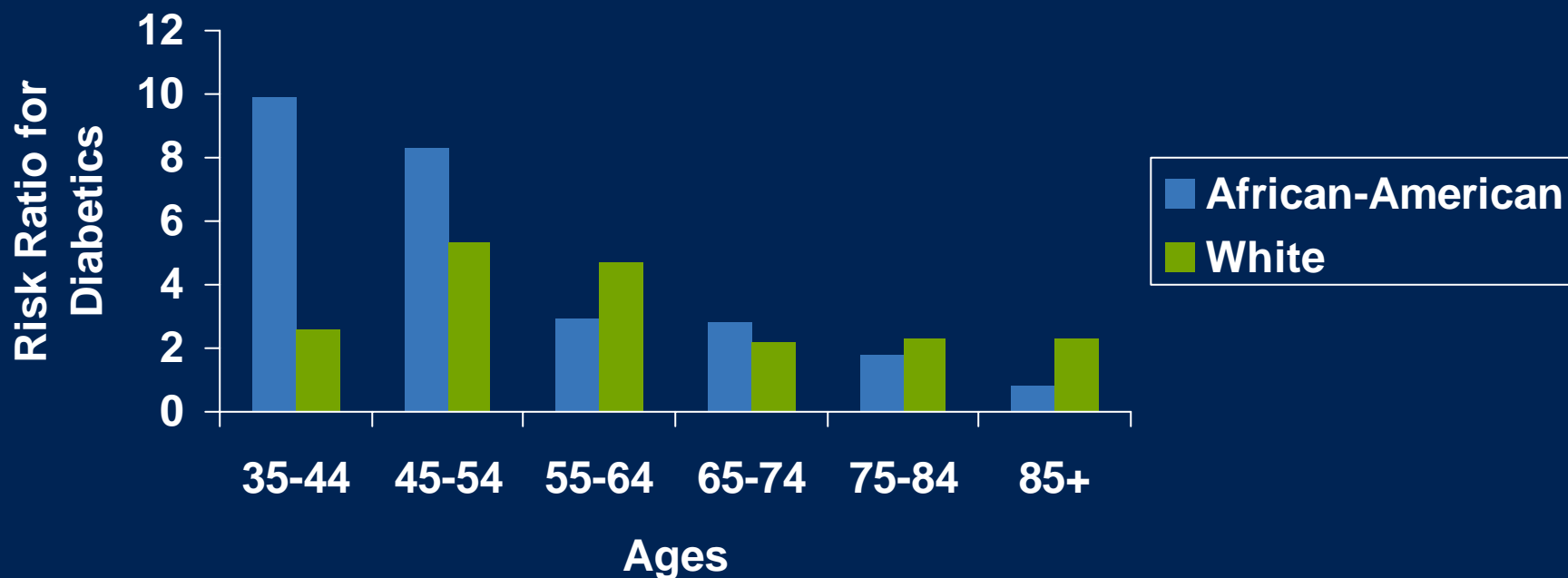
# Diabetes – Coronary Heart Disease



Kturw KT et al. *Ann Intern Med.* 2004;141:413

# Diabetes - Stroke

## Risk Ratio for Ischemic Stroke in Diabetics



Kissela BM, et al. *Diabetes Care*. 2005;28:355

# Obesity - Therapy

- Diets
- Behavior modification
- Exercise
- Medications
  - OTC
  - Rx
    - orlistat
    - sibutramine
- Surgery
  - Banding procedures
  - Bypass procedures

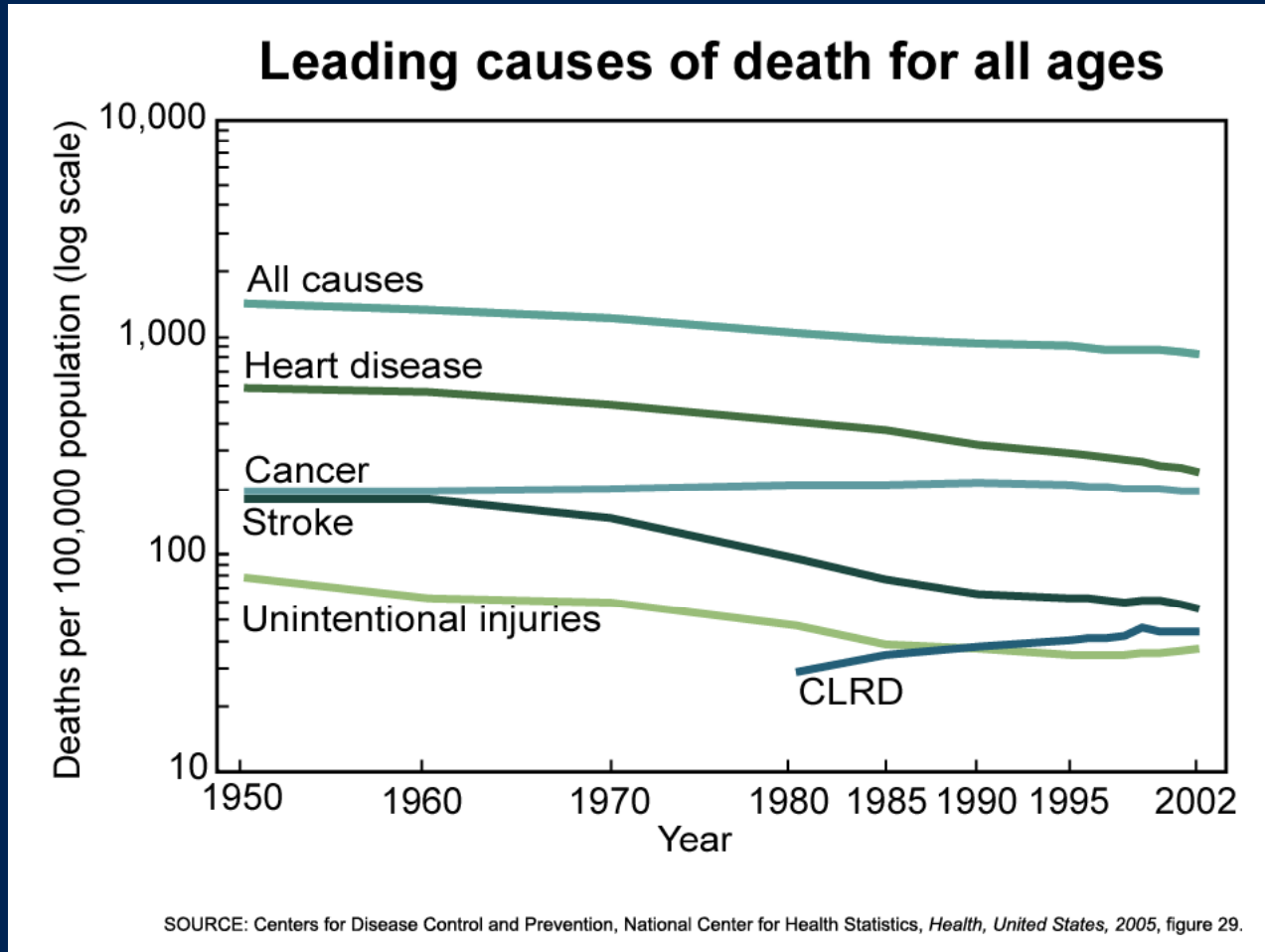
# Obesity – Treatment Trials

- **Metformin**
  - Suppresses glucose production
  - May be useful in metabolic syndrome
- **Zonisamide (Zonegran®)**
  - Anti-seizure medication
  - Side effect weight loss
- **Exenatide (Byetta®)**
  - Enhances glucose-dependent insulin release
  - Slows gastric emptying
- **PYY**
  - Appetite suppressant
  - Nasal spray

# Diabetes – Treatment Advances

- **Exenatide (Byetta®)**
- **Exubera® - inhaled insulin**
- **Ongoing Research**
  - Islet neogenesis associated peptide
    - Stimulates formation of new islet cells
  - Islet cell transplants
    - Key is finding right immunosuppressive combination
- **Prevention of Diabetes?**
  - Metformin
  - Rosiglitazone (Avandia®)
  - Angiotensin-converting enzyme inhibitors

# Cardiovascular Disease

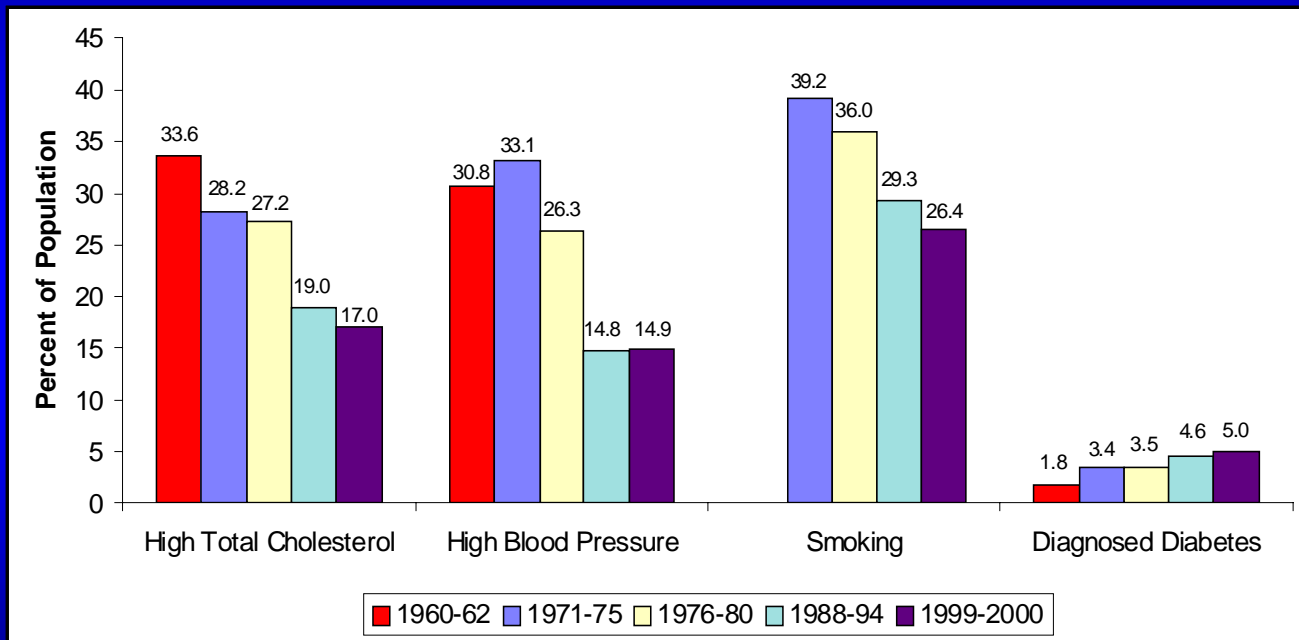


# Cardiovascular Disease

## Trends in Cardiovascular Risk Factors in the U.S. Population Aged 20-74



NHES: 1960-62, NHANES: 1971-75 to 1999-2000



Source: JAMA 2005. 293: 1868-74.



# Coronary Artery Disease Treatment - Today

- **Medical**
  - Beta-blockers
  - Angiotensin-converting enzyme inhibitors (ACEI)
  - Nitrates
  - Antiplatelet therapy
- **Surgical**
  - PTCA
  - Stenting
  - Bypass
- **Mechanical**
  - Implantable defibrillators (ICD)
  - Left ventricular assist devices (LVAD)

# Coronary Artery Disease Treatment - Tomorrow

- **Anti-angiogenesis**
  - Endostatin
  - TNP-470
- **Angiogenesis**
  - Stimulate growth of blood vessels
    - Vascular endothelial growth factor (VEGF)
    - Basic fibroblast growth factor (bFGF)
    - Gene therapy
- **Stem Cell Transplant**
  - Autologous BMT
    - Intra-coronary

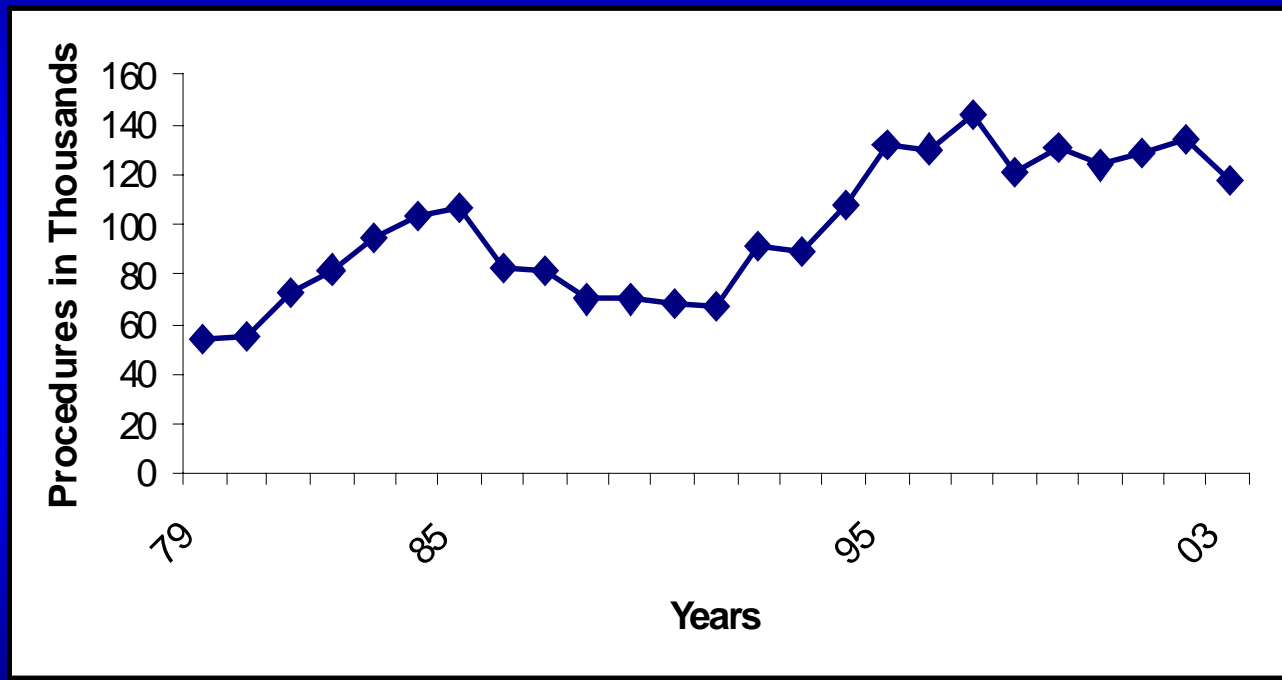
# Stroke – Treatment Today

- **Treatment**
  - Thrombolytics (limited use)
- **Prevention**
  - Antithrombotics (aspirin, clopidogrel)
  - Surgery
    - Endarterectomy
    - Stenting
      - Drug eluting stents
    - Bypass

# Stroke – Treatment

## Trends in Carotid Endarterectomy Procedures

United States: 1979-2003

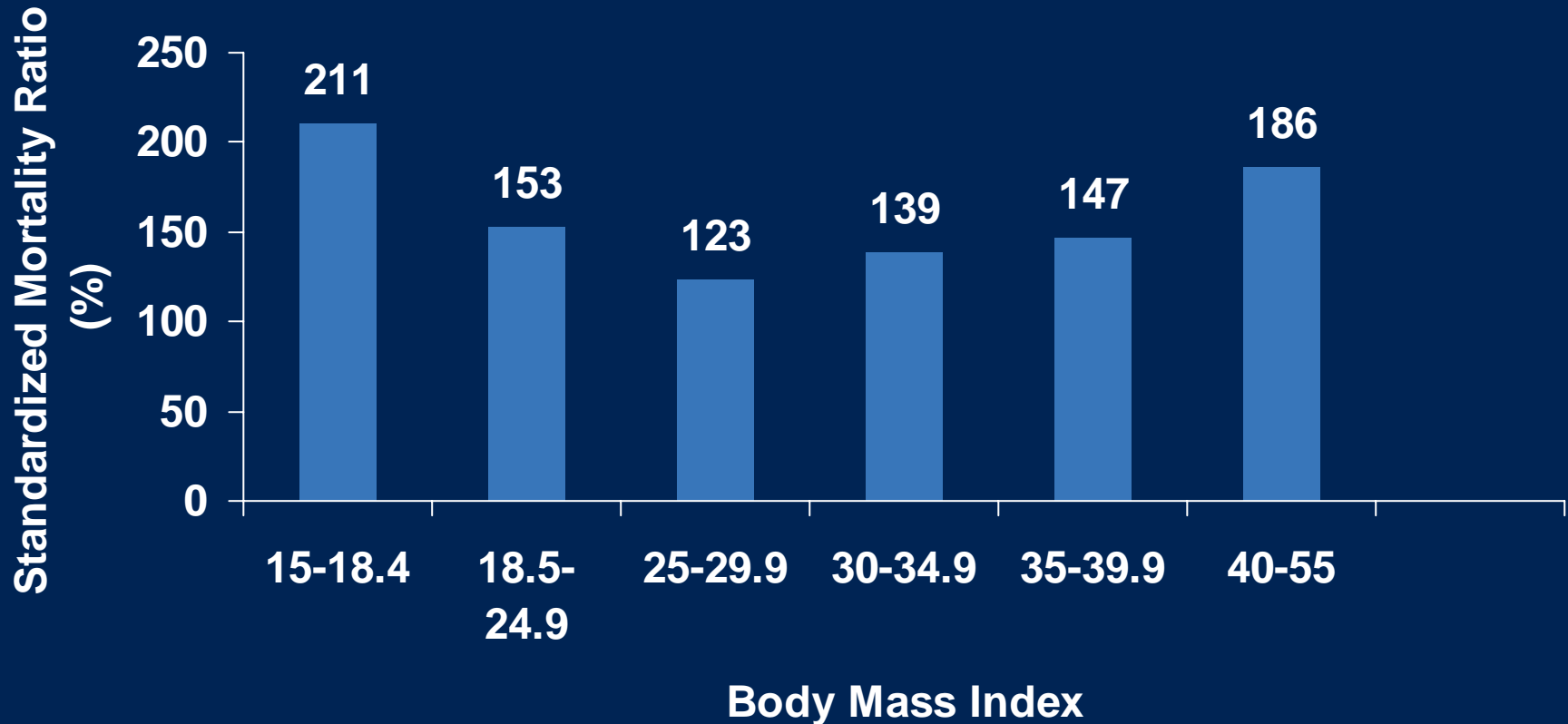


Source: CDC/NCHS and NHLBI.

# Stroke Treatment - Tomorrow

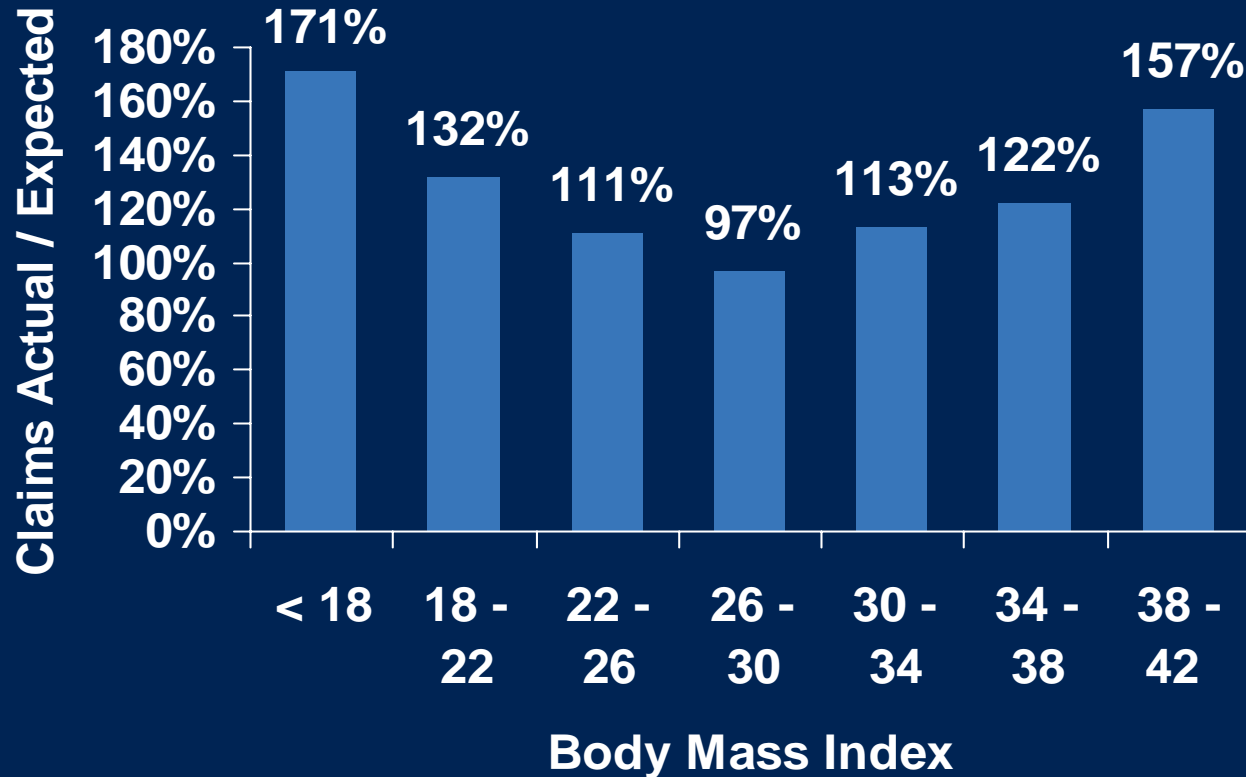
- **Drugs that minimize cell death**
  - NXY-059
    - Free-radical trapping agent
    - Trial 858 patients (reported NEJM, 2/9/06)
    - Improved primary outcome (disability at 90 days)
    - Did not improve secondary outcome (neurologic functioning)
- **Stem cell transplant**
  - Autologous BMT
    - Intravenous

# Obesity – Mortality Experience



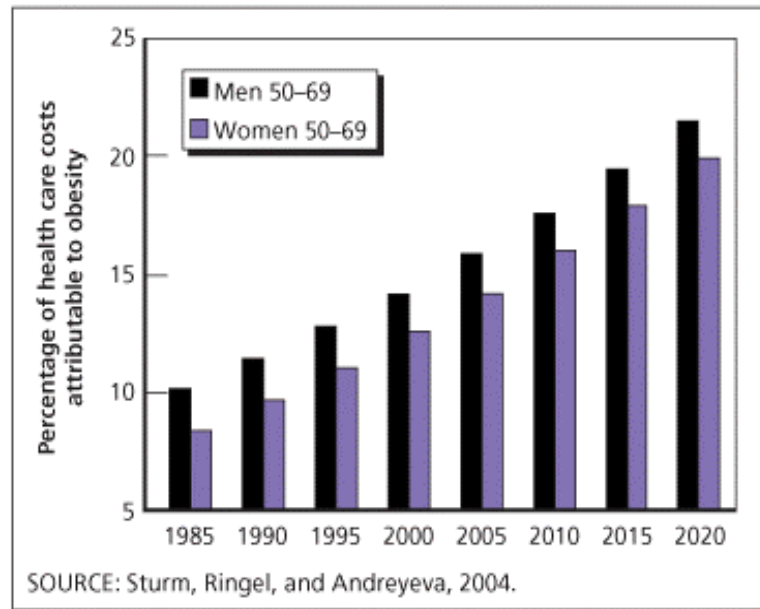
Roudebush B, et al. *J Ins Med.* 2006;38:167

# Obesity – Morbidity Experience

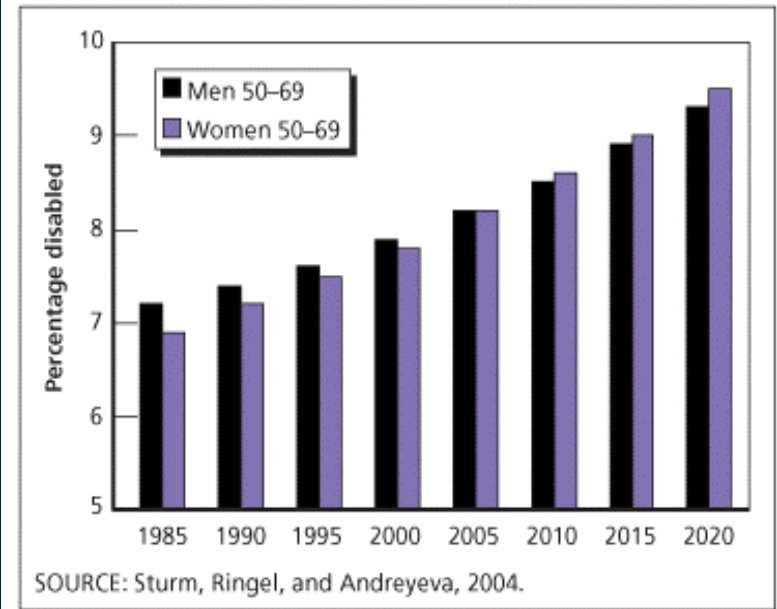


# Obesity – Disability Trends and Costs

**Figure 5**  
**One-Fifth of Health Care Expenditures Would Be Devoted to Treating the Consequences of Obesity**



**Figure 6**  
**Rising Disability Rates Would Offset Past Reductions in Disability**



Rand Health Research Highlights. 2004



# Balance or Not?

**Medical  
Advances**

**Morbidity  
Compression?**



**Obesity  
Effects**

**Diabetes  
Complications**

**“The Fastest Growing Causes [Of Disability] are Diabetes and Musculoskeletal Problems, Conditions That are Associated with Obesity.”**

*Rand Health Research Highlights. 2004*

