



# Obesity

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- Prevalence-US
- Health risk
- Etiology
- Treatments
  - Goals
  - Drugs
  - Reduction diets
  - Behavioral modification



# Definitions of Obesity

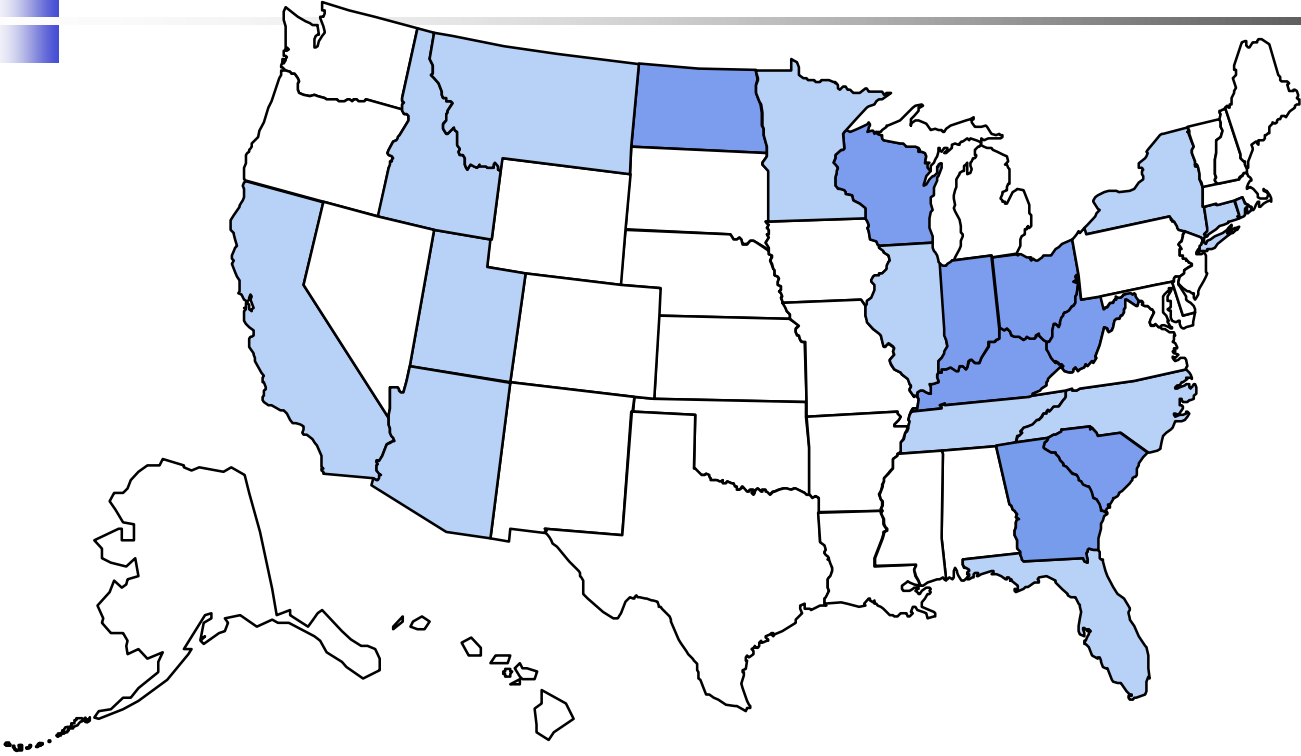
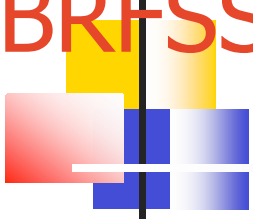
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- Body Mass Index
  - $\text{Wt (kg)}/\text{Height}^2 \text{ (m)}$
  - Overweight, 25-30
  - Obese >30
- % Body Fat
  - Males: >25%
  - Females: >30 to 35%
- Weight for Height
  - Greater than 20-30lbs (9-13kg) more than optimal weight

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1985

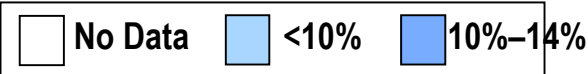
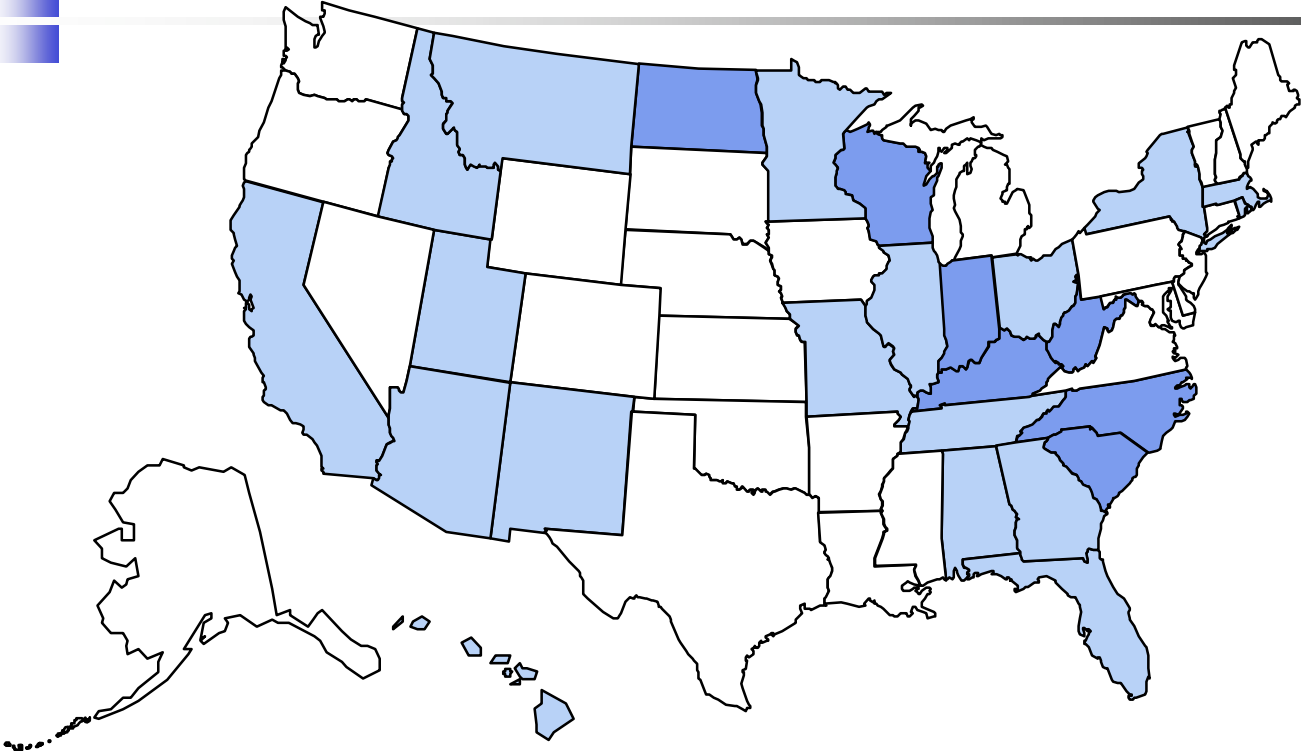
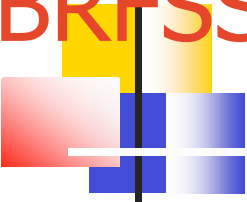
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1986

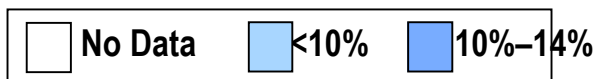
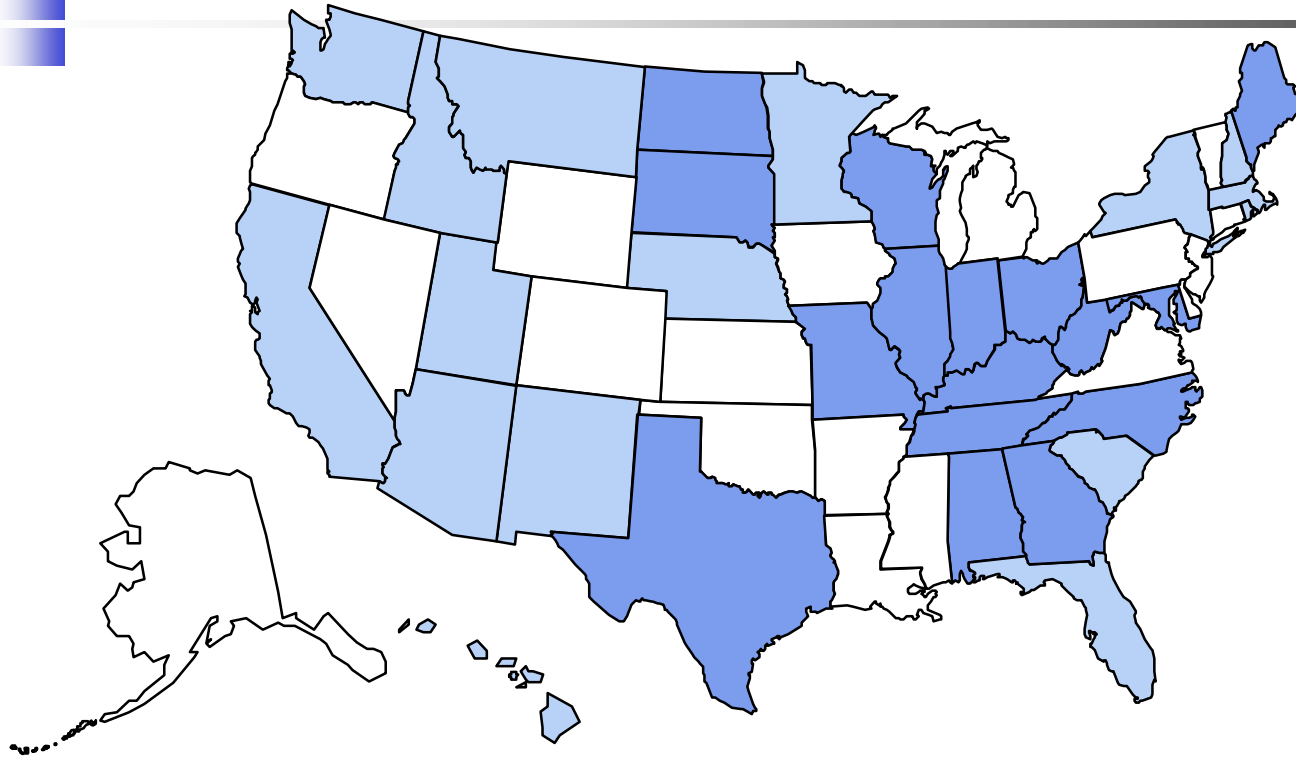
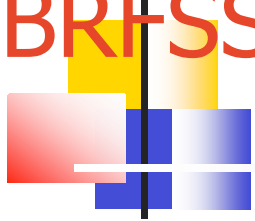
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# Obesity Trends\* Among U.S. Adults

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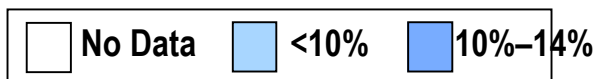
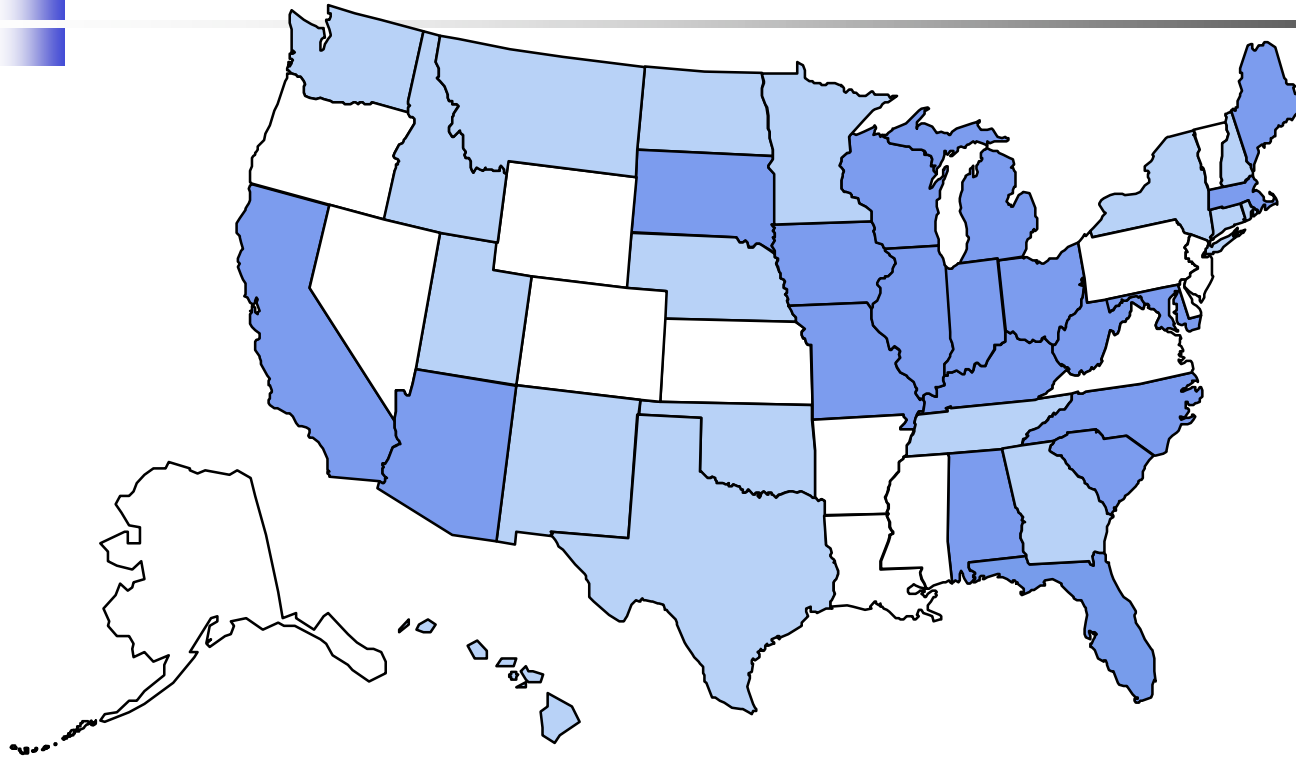
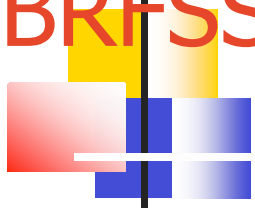
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1988

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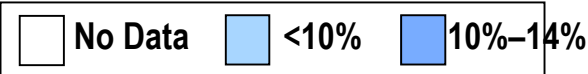
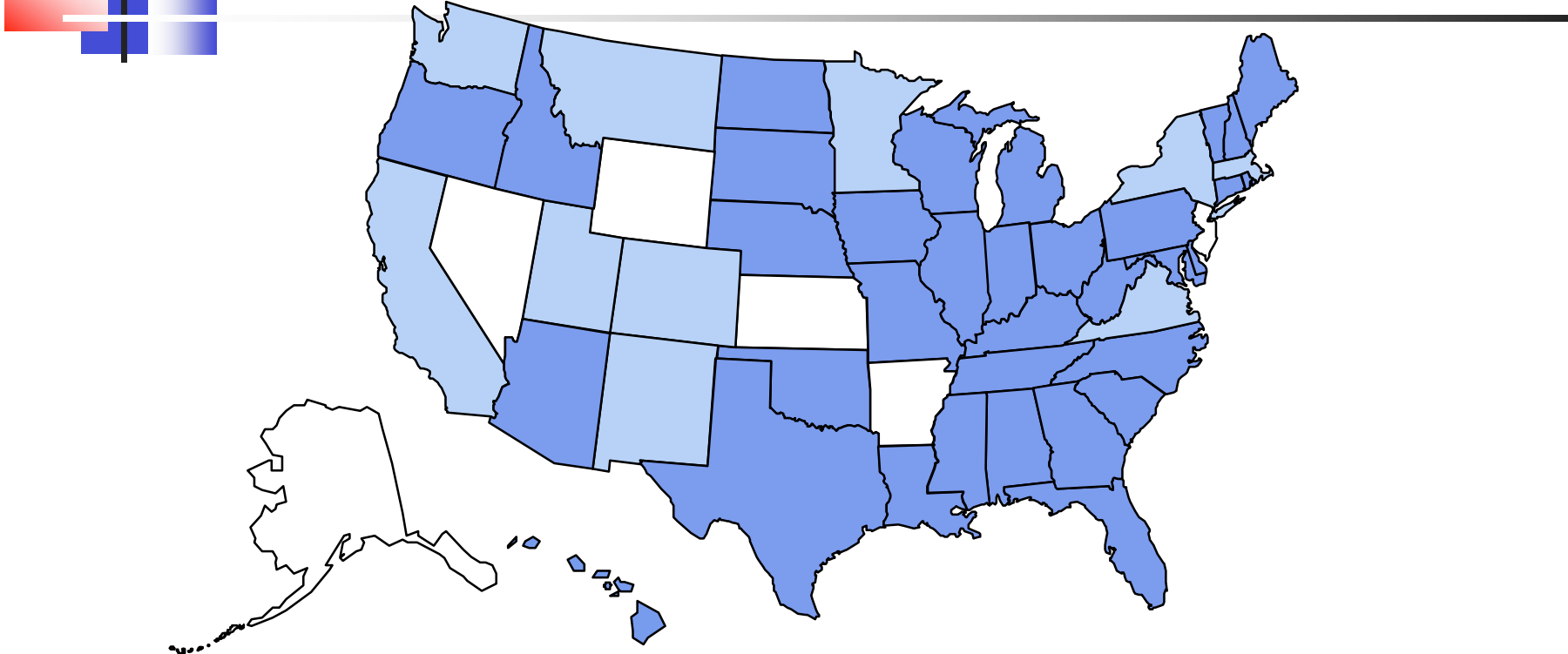




# Obesity Trends\* Among U.S. Adults

## BRFSS, 1990

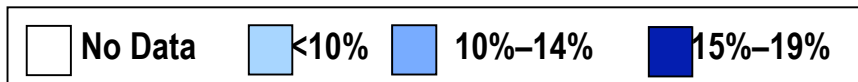
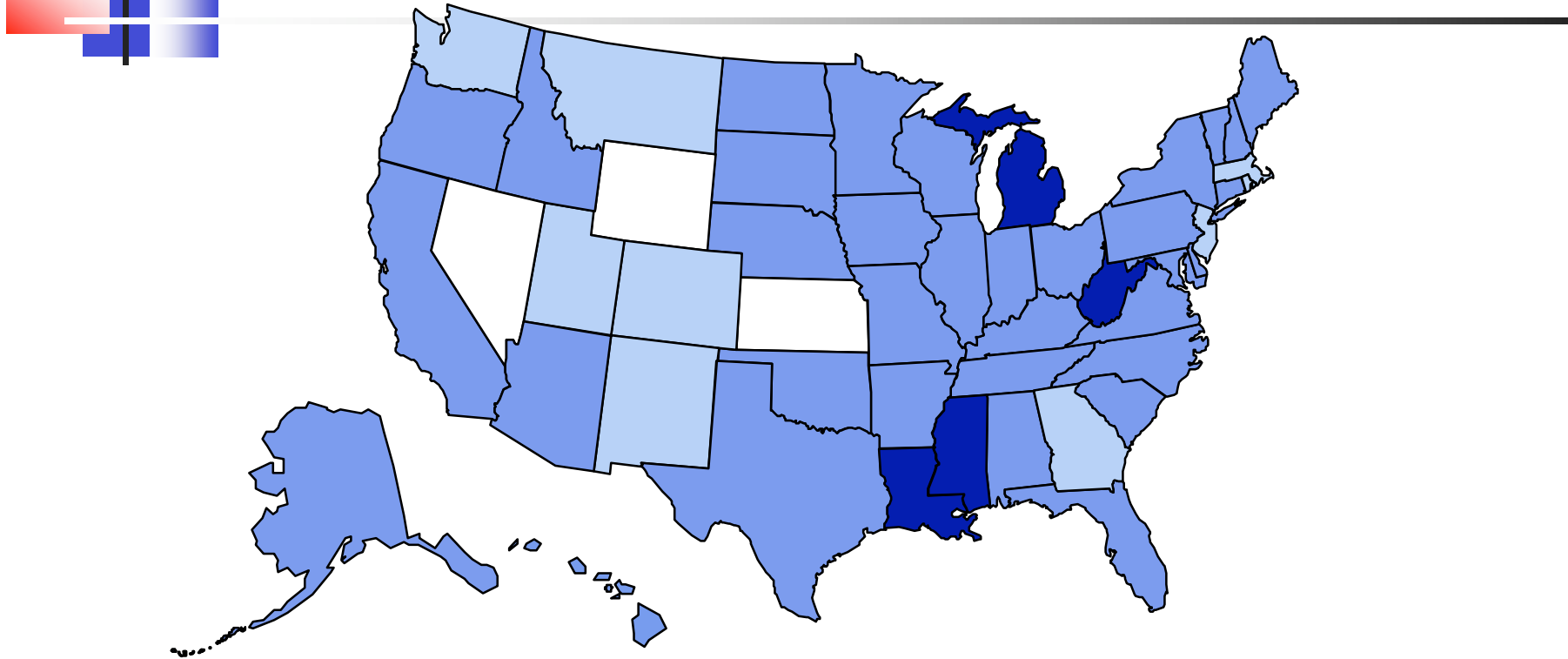
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1991

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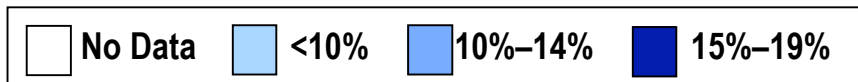
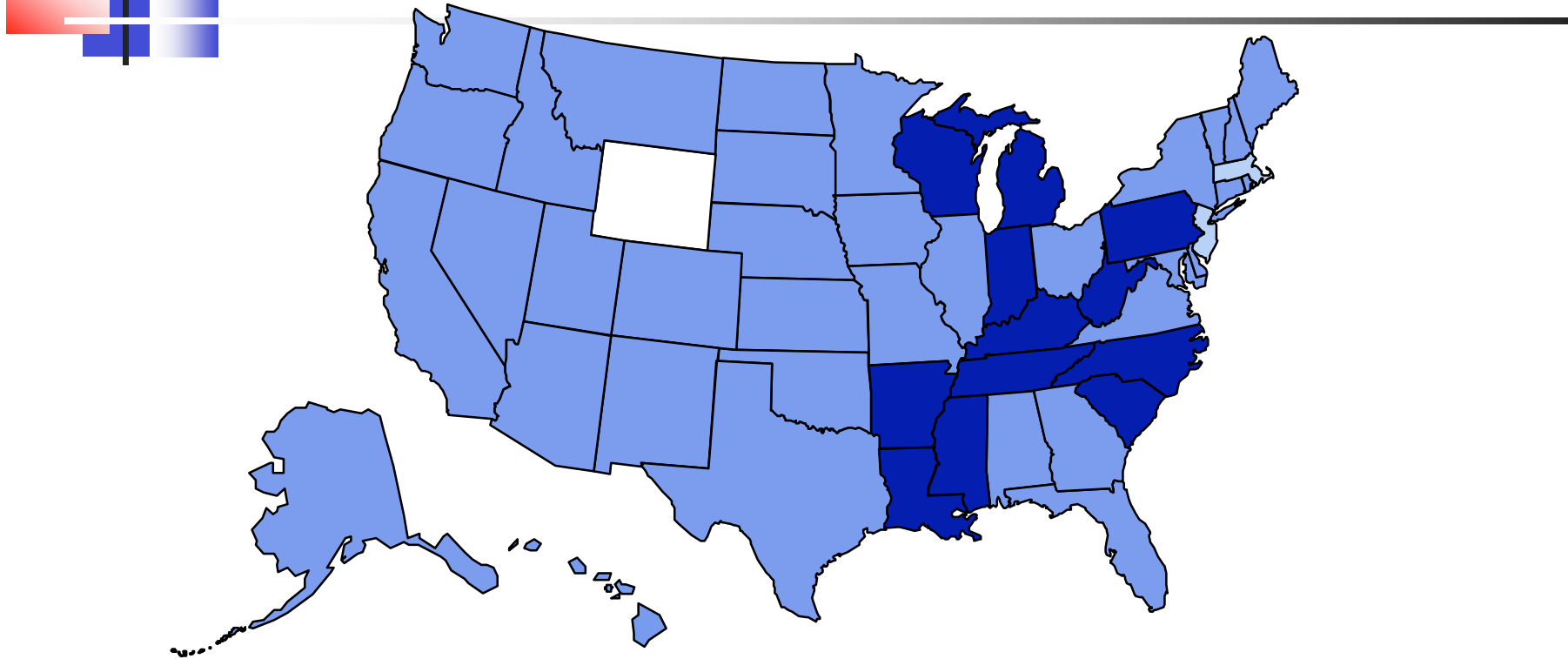




# Obesity Trends\* Among U.S. Adults

## BRFSS, 1993

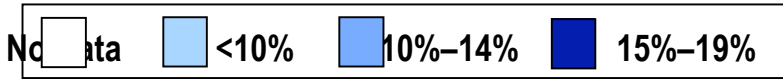
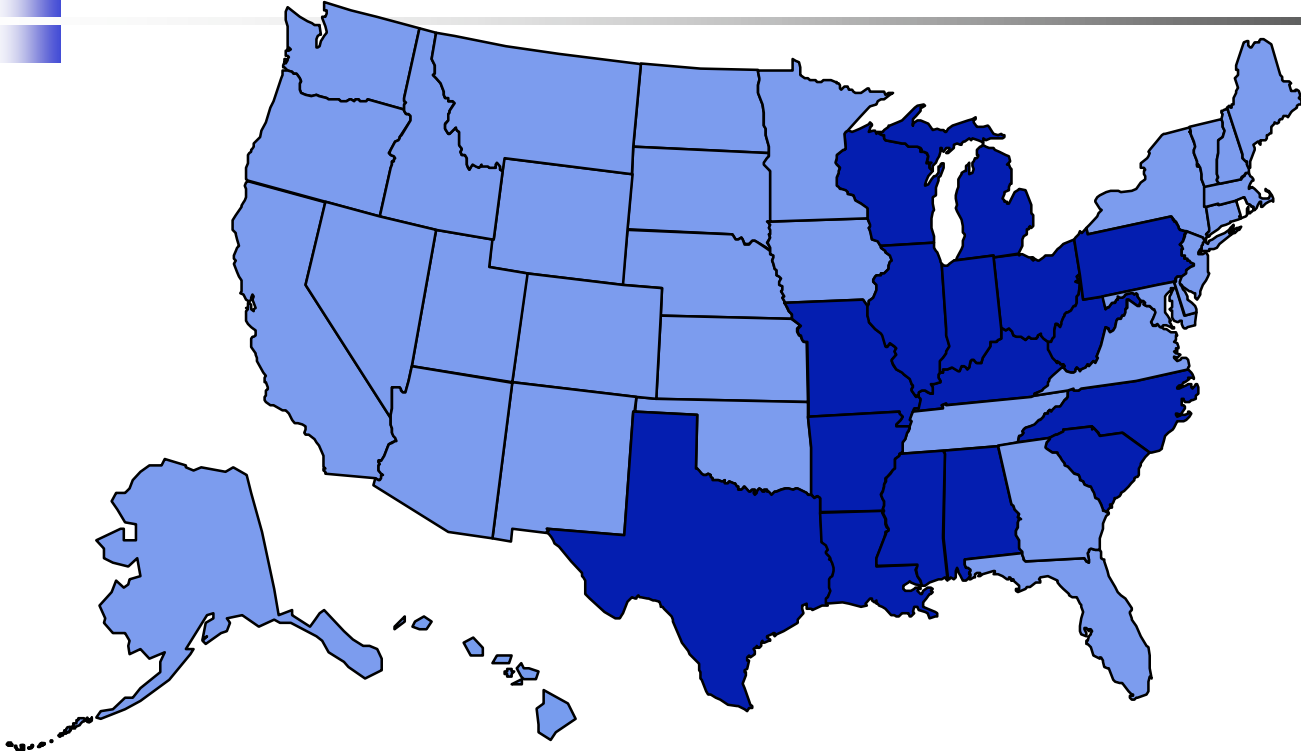
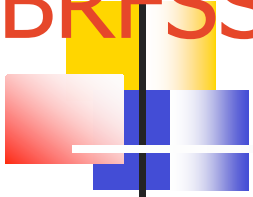
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# Obesity Trends\* Among U.S. Adults

## BRFSS, 1994

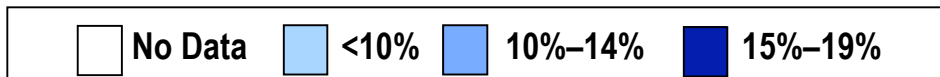
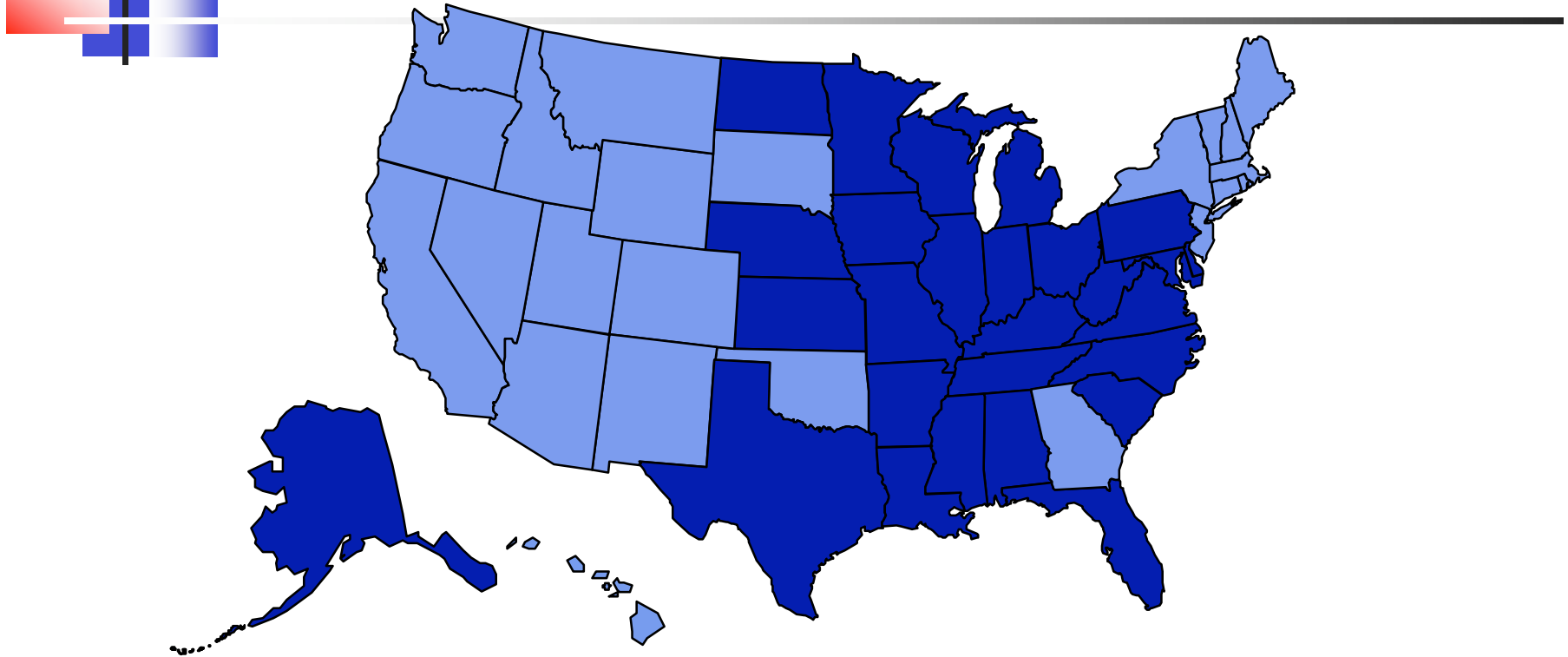
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1995

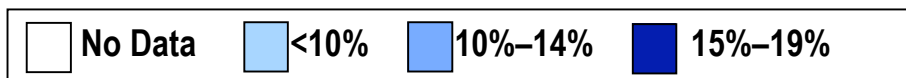
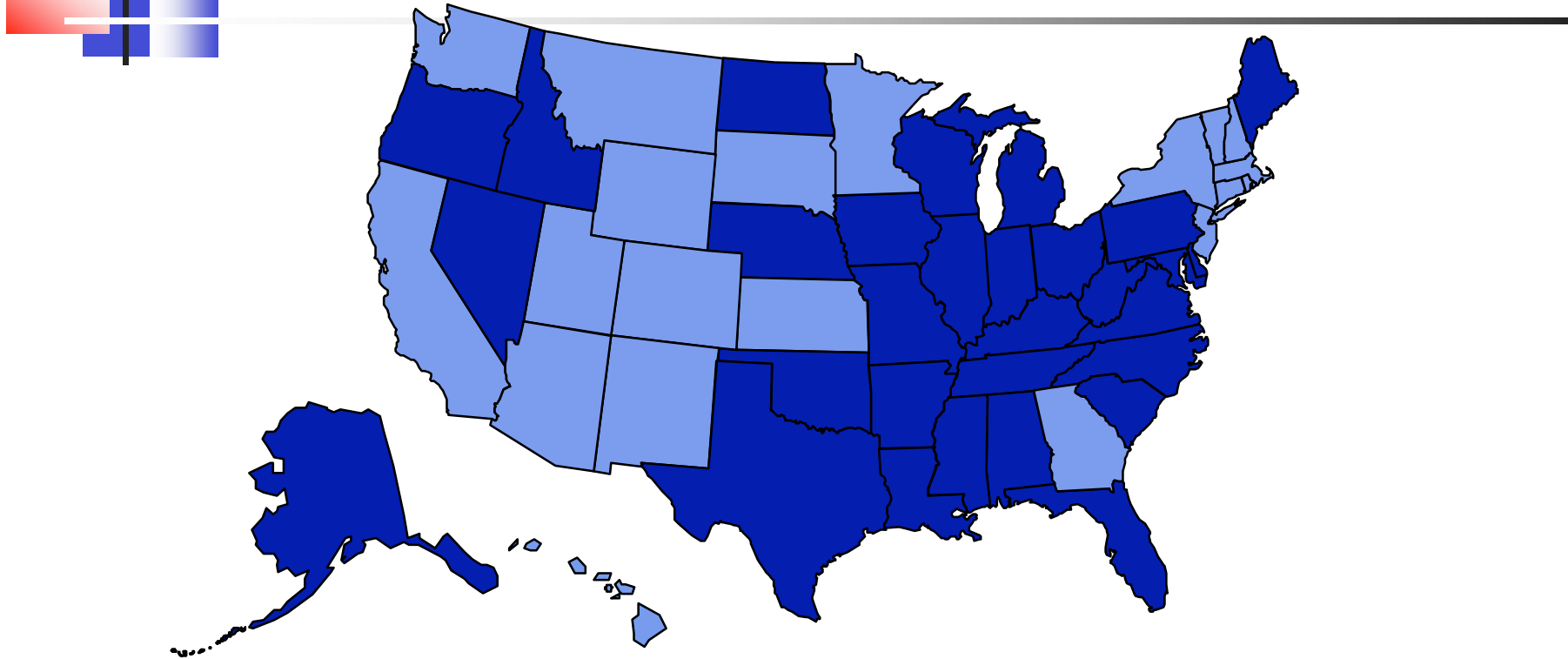
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1996

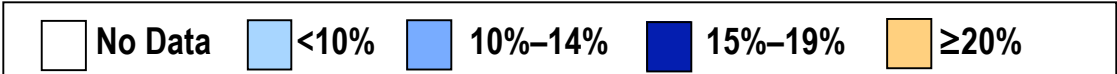
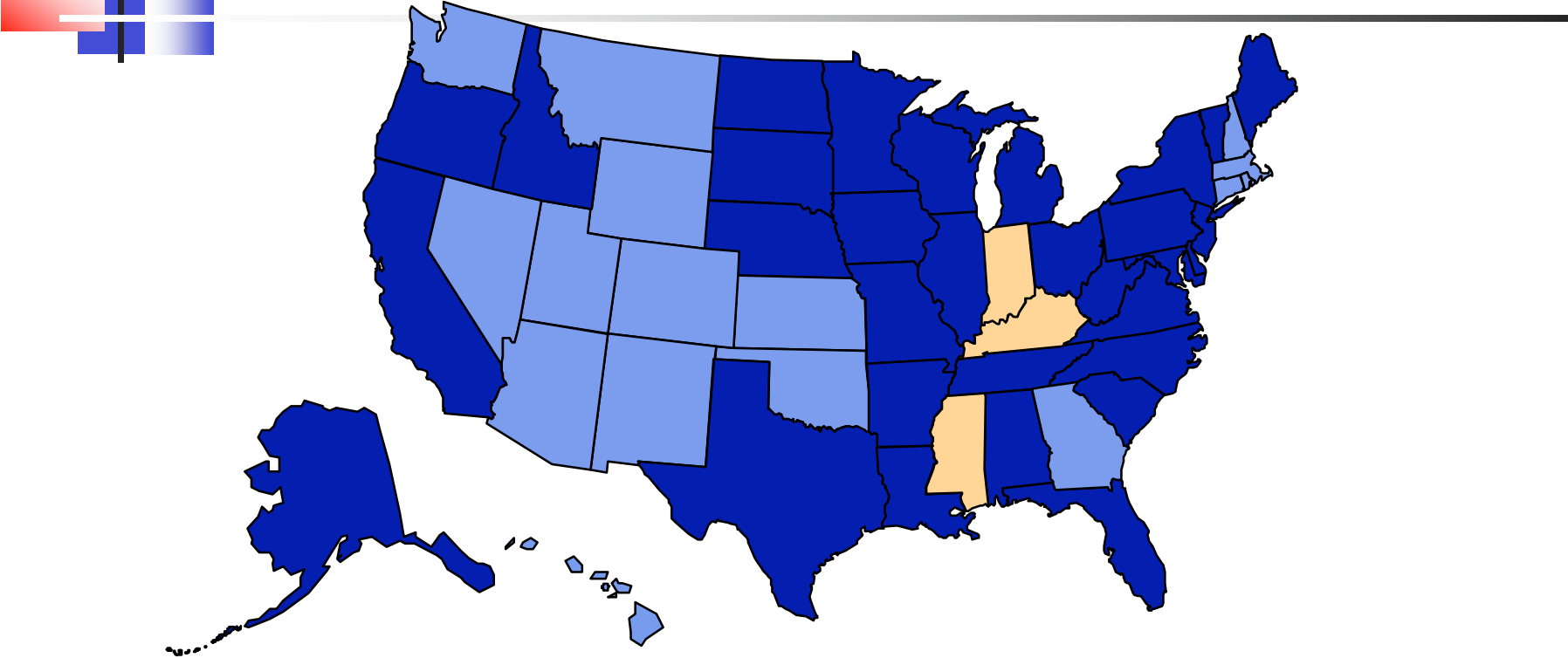
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1997

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

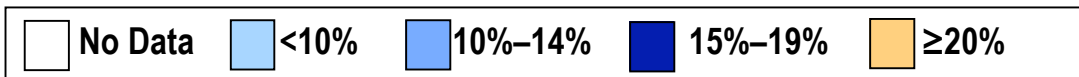
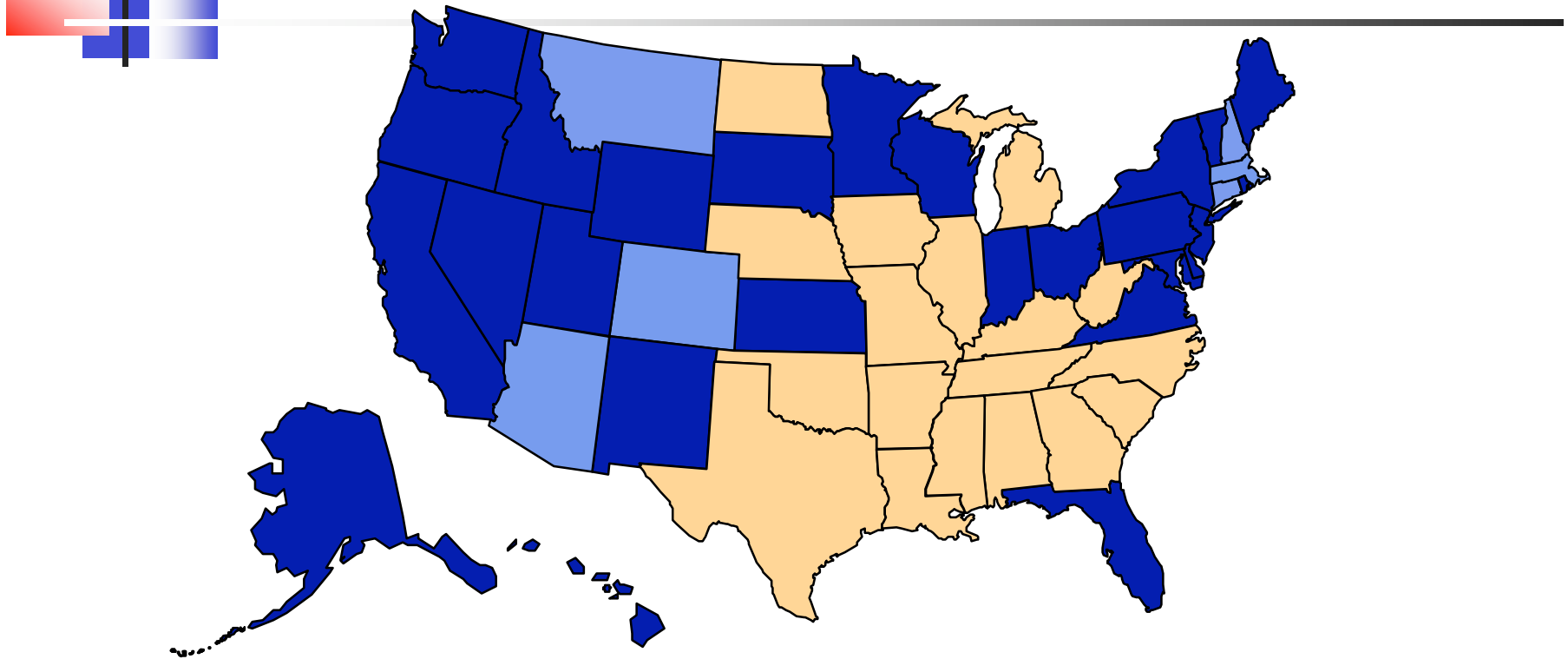




# Obesity Trends\* Among U.S. Adults

## BRFSS, 1999

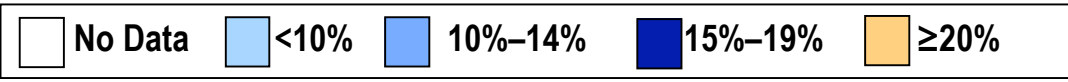
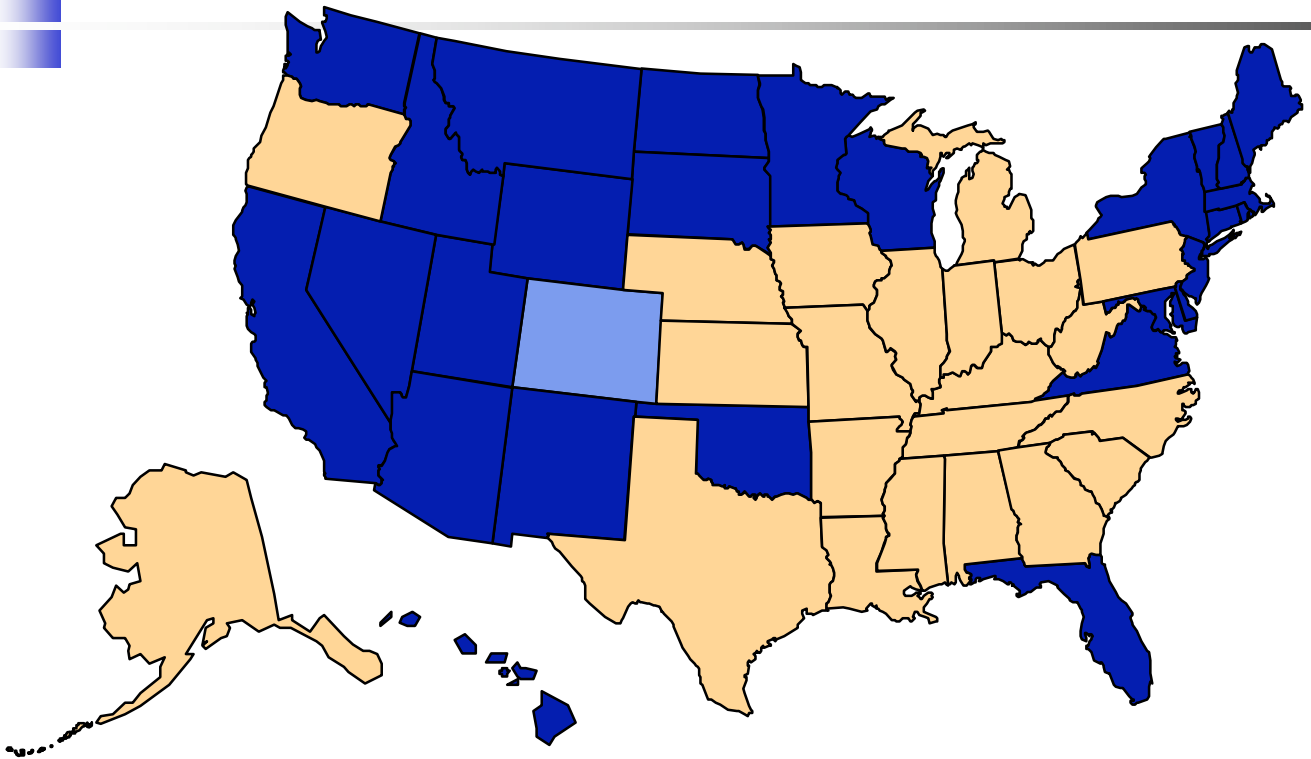
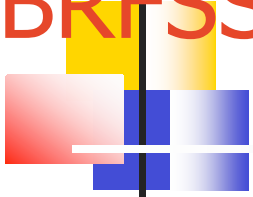
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 2000

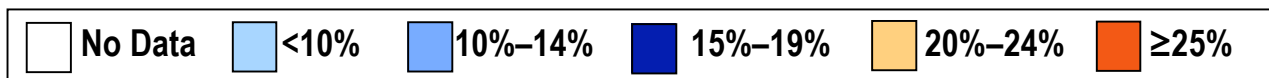
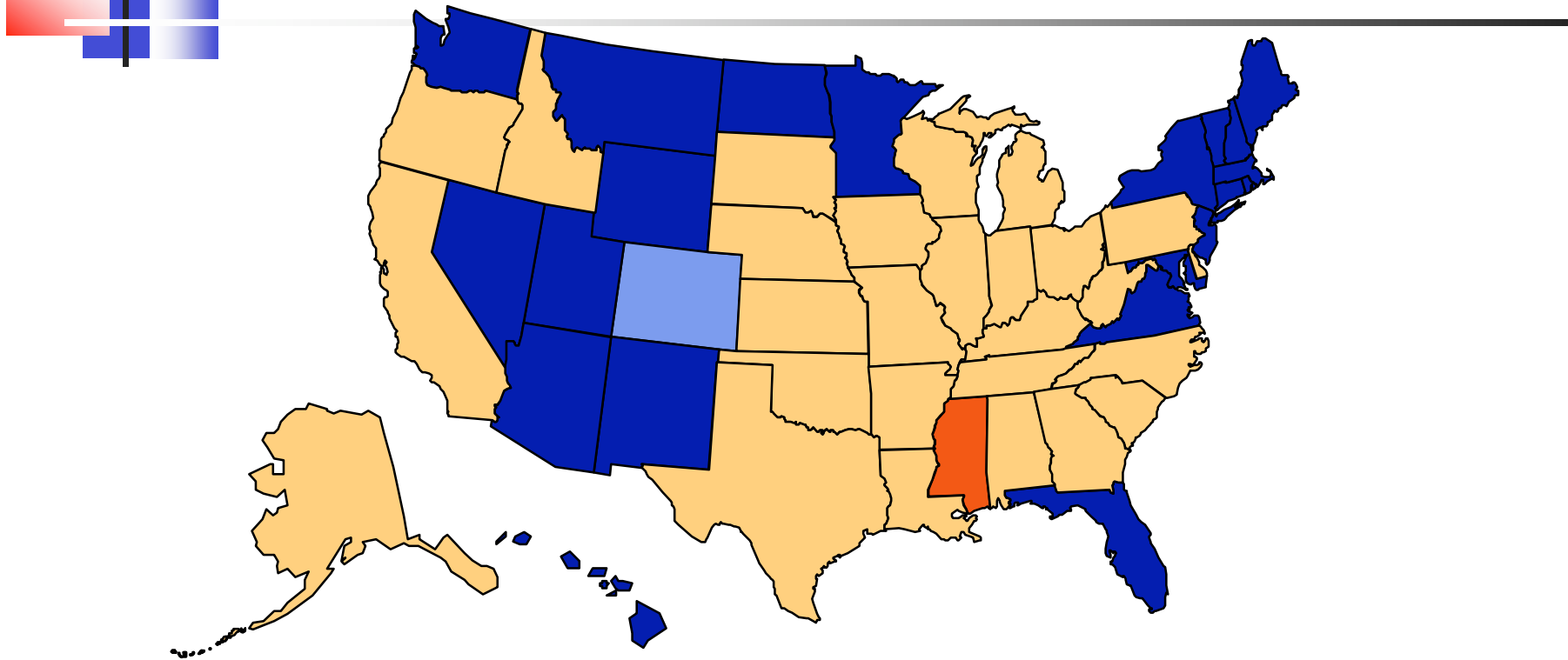
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 2001

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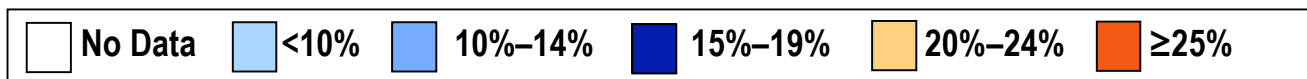
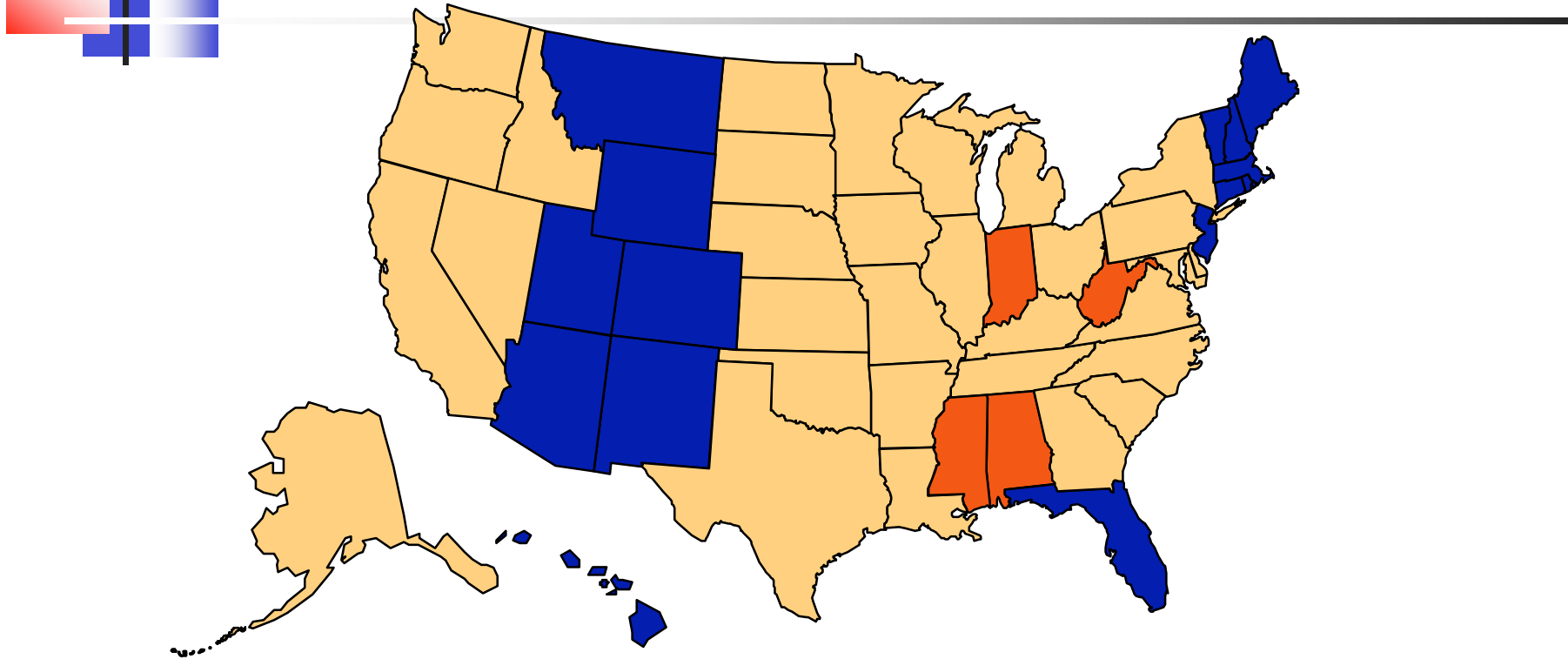




# Obesity Trends\* Among U.S. Adults

## BRFSS, 2003

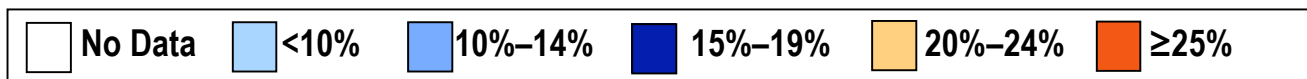
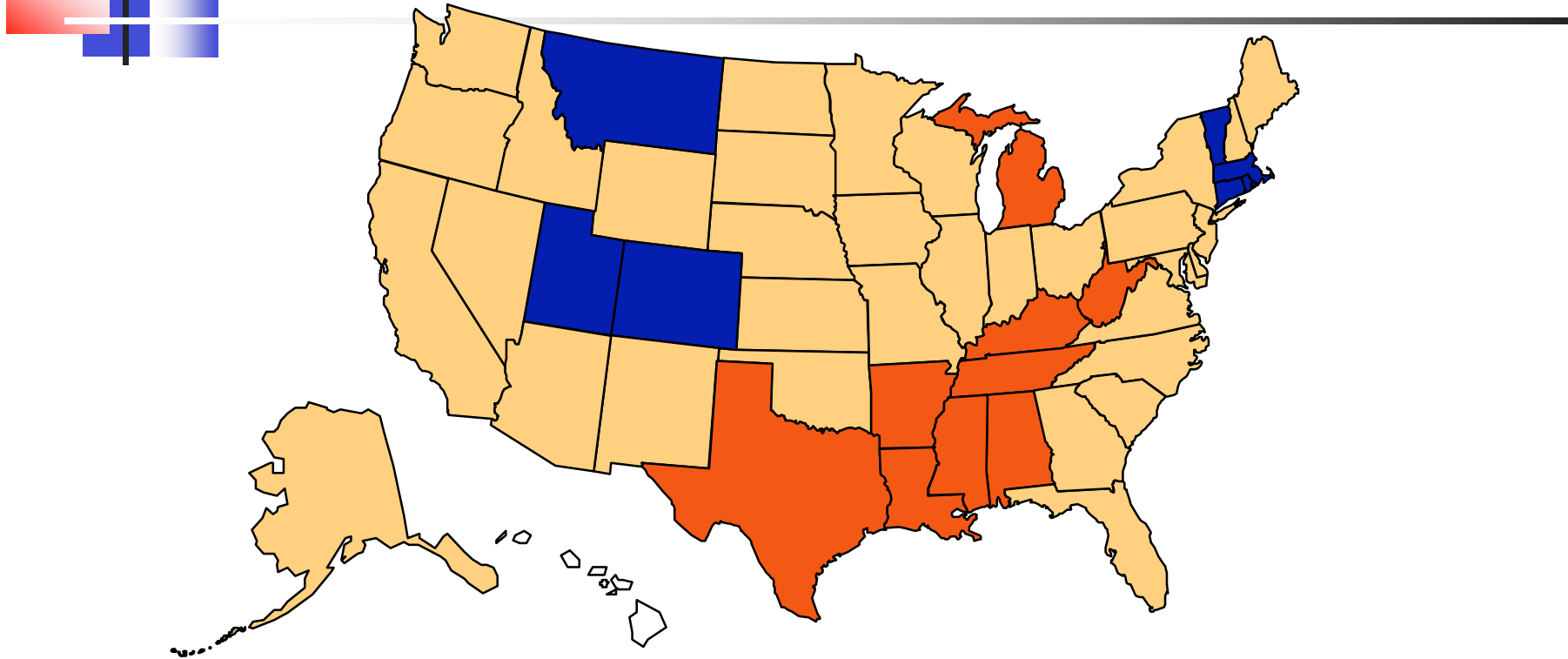
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# Obesity Trends\* Among U.S. Adults

## BRFSS, 2004

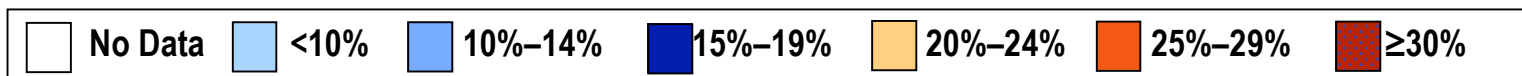
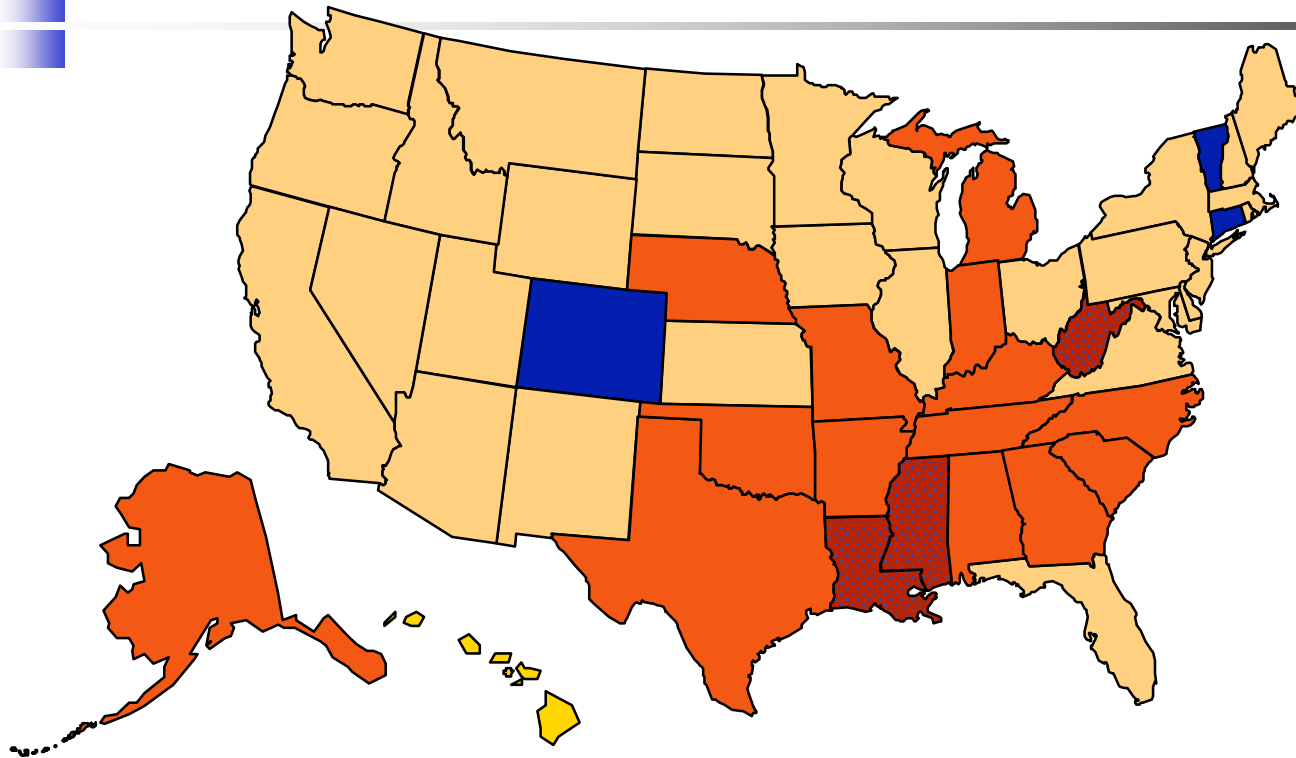
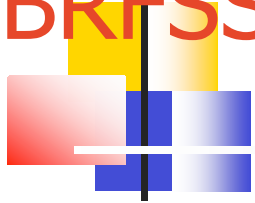
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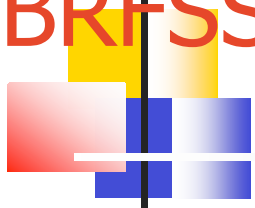
## BRFSS, 2005

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

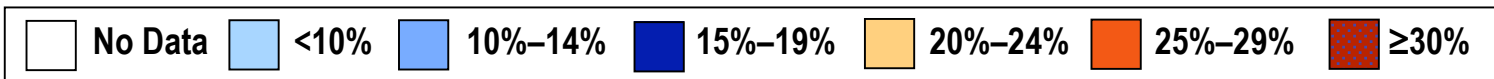
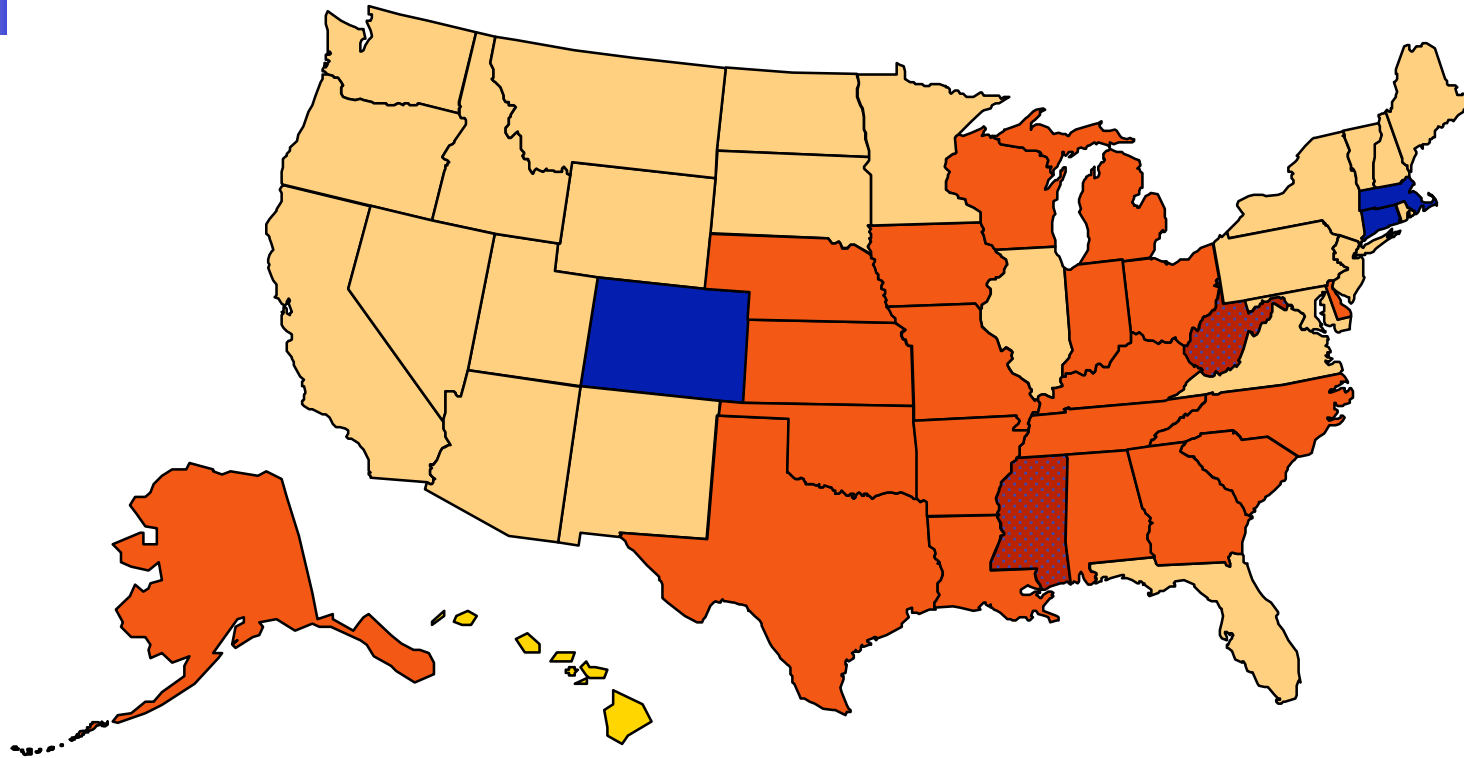


# Obesity Trends\* Among U.S. Adults

## BRFSS, 2006



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

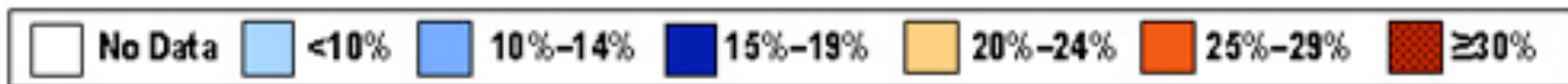
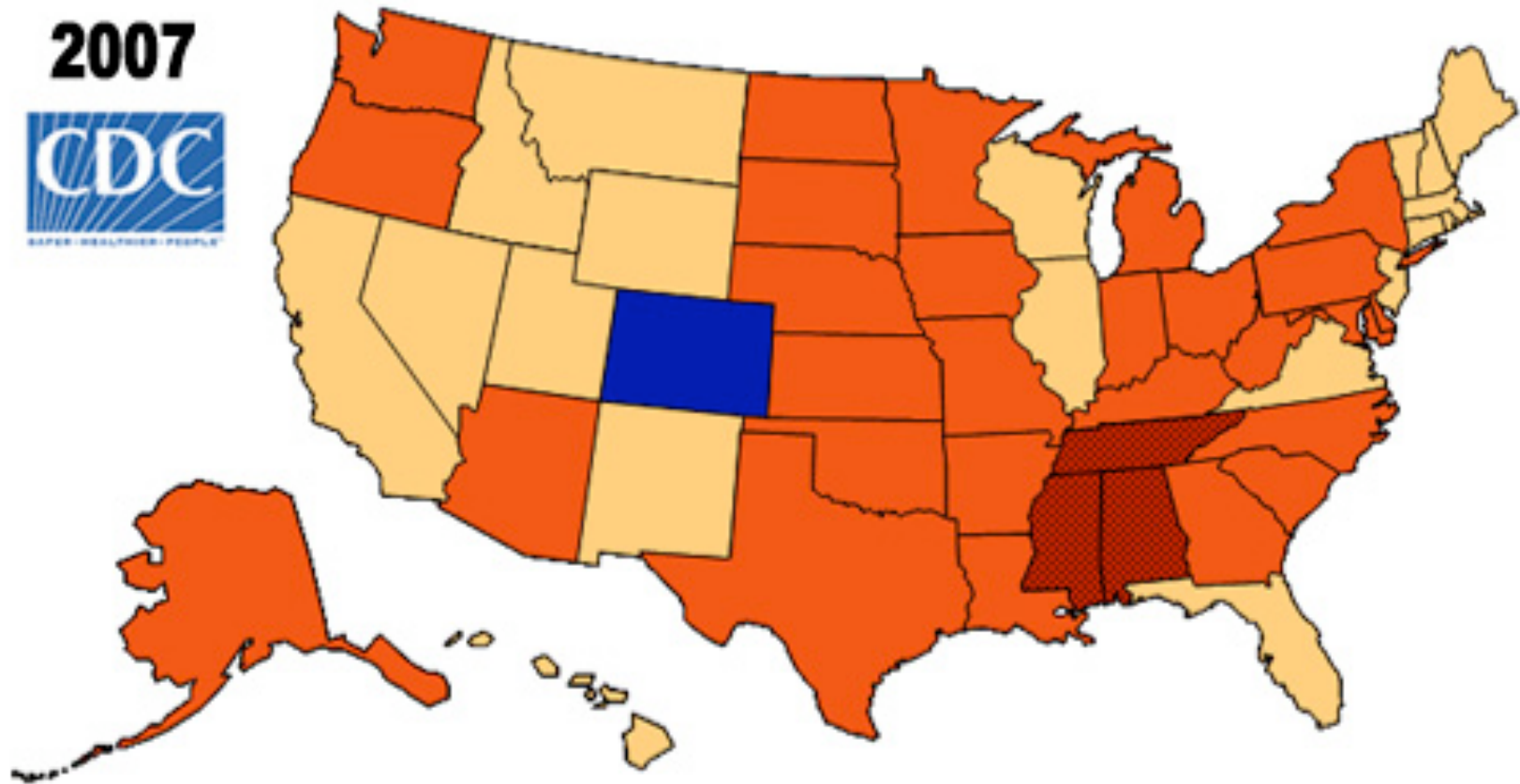


# Obesity Trends\* Among U.S. Adults

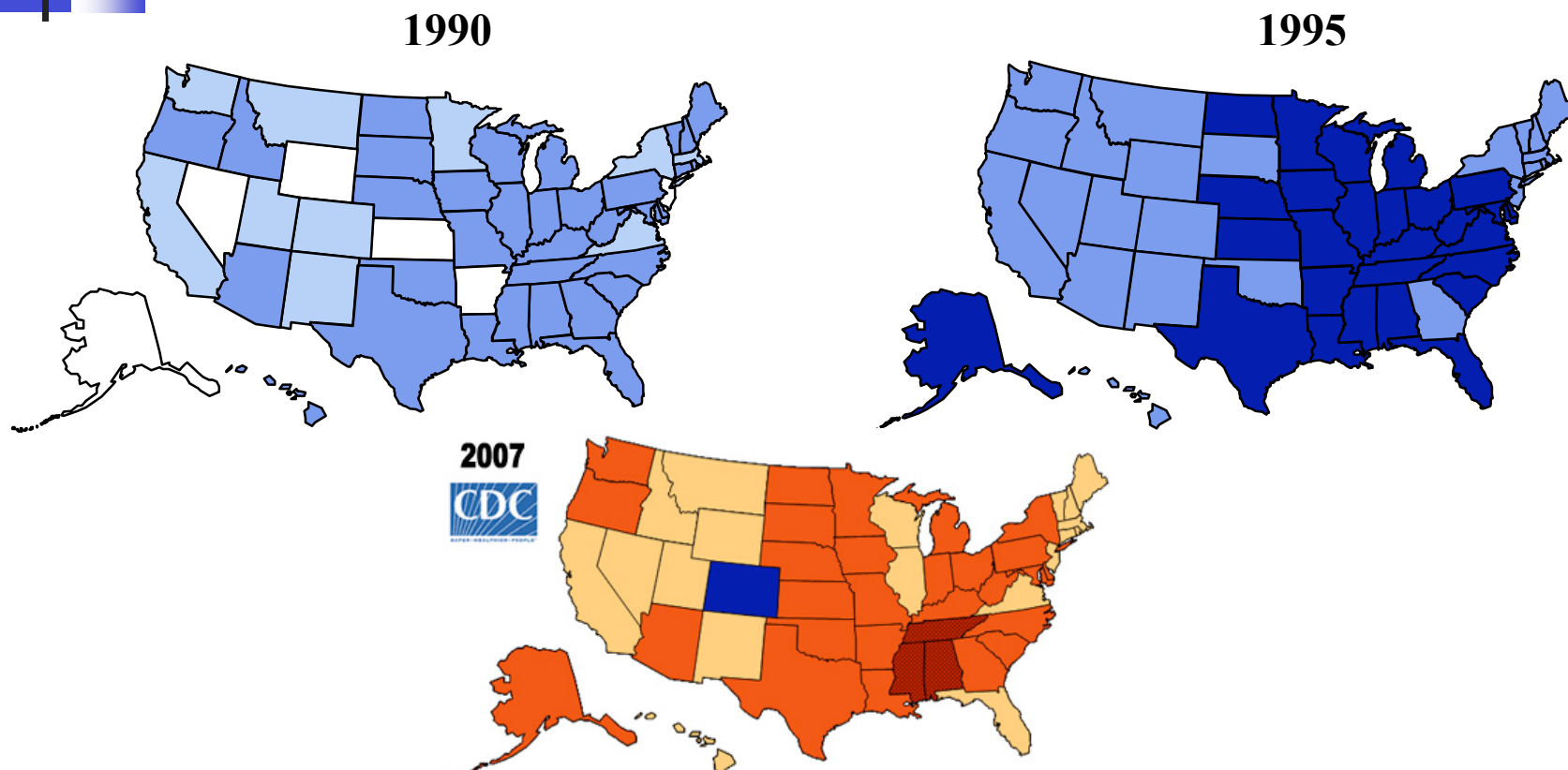
## BRFSS, 2007

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

**2007**

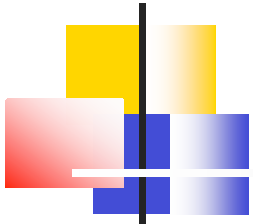


# Obesity Trends\* Among U.S. Adults BRFSS, 1990, 1995, 2005

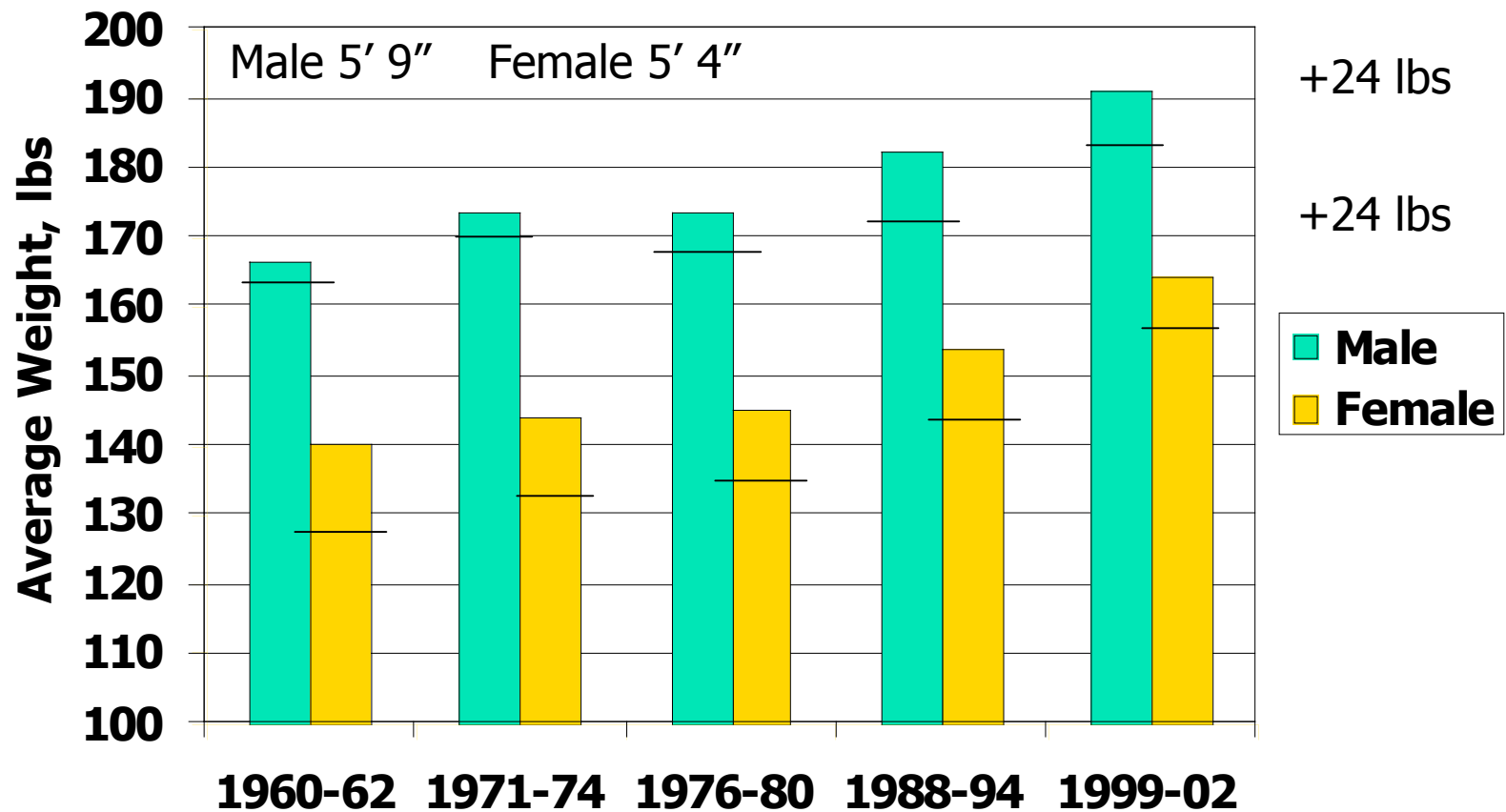


Legend for obesity prevalence among U.S. adults:

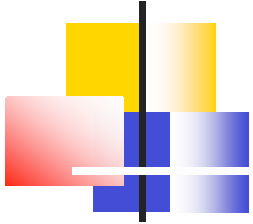
- No Data
- <10%
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥30%



# Increase in average body weight of US adults 20-74 y/o

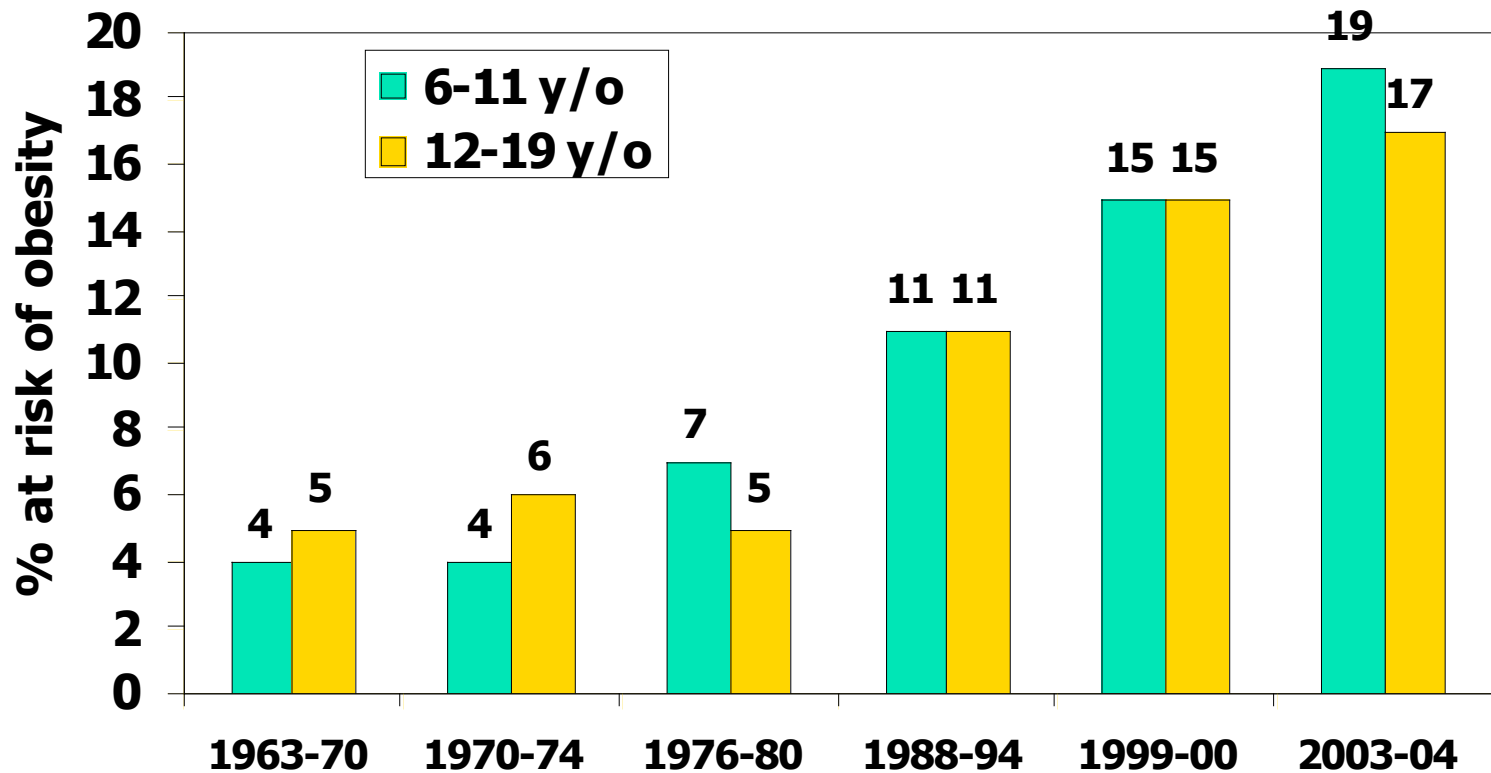


Ogden et al. Advanced Data. Number 347:Oct 27, 2004

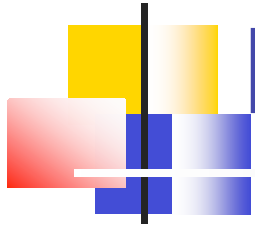


# Pediatric Obesity

## Greater than 95%ile from 1963

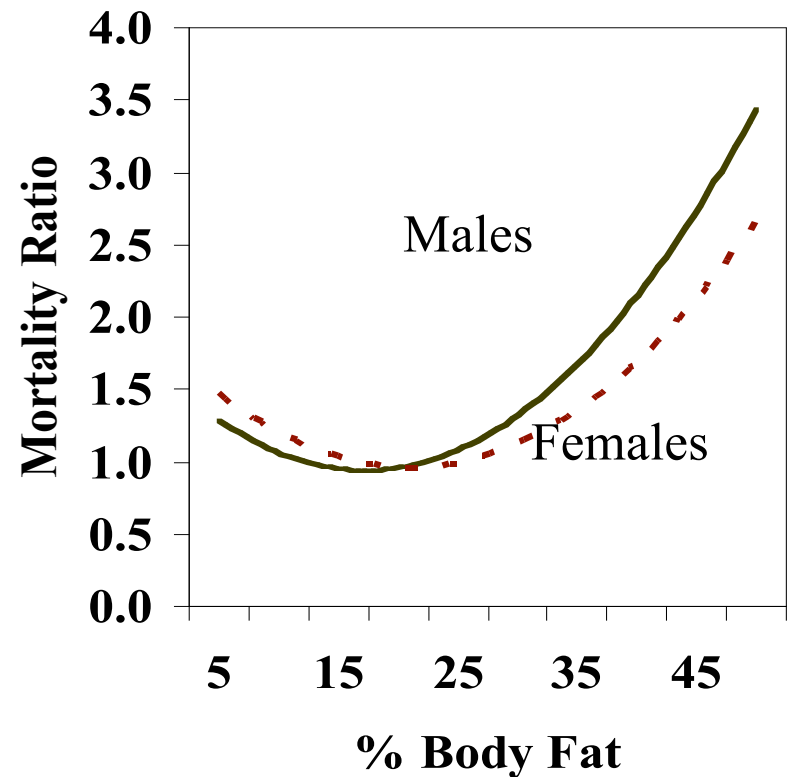


CDC Vital Statistics – National Surveys



# Health Risk of Body Fat

- Mortality increases with increasing fatness above 20-25%.
- Gender effect women about 5%pts greater.
- Age effect optimal shifts right

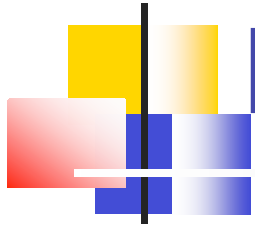




# Metabolic Syndrome

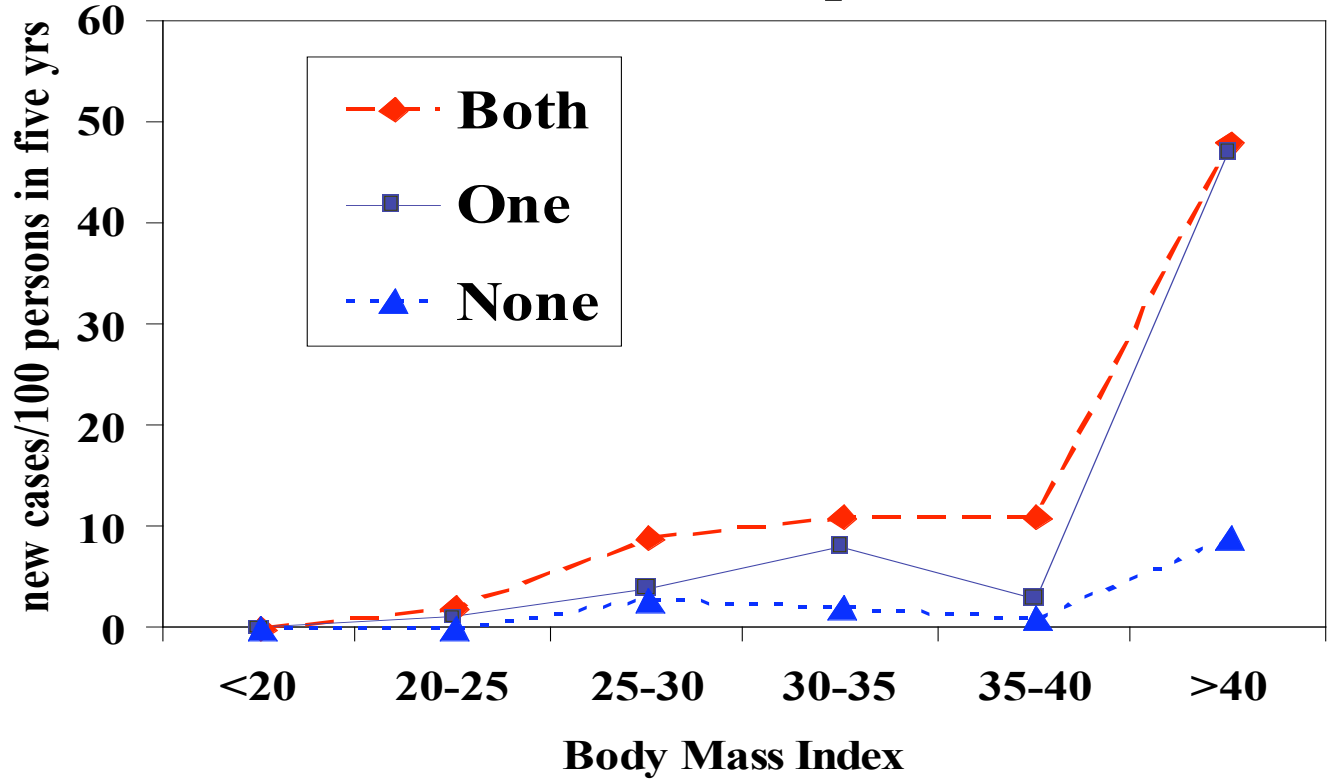
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- Obesity
  - Particularly abdominal obesity
- Insulin resistance/Type 2 diabetes
- Dyslipidemia
  - Inc. VLDL
  - Dec. HDL
- Hypertension

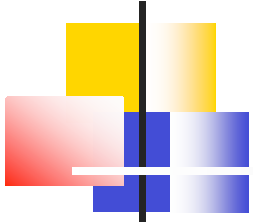


# Family History Increases Risk

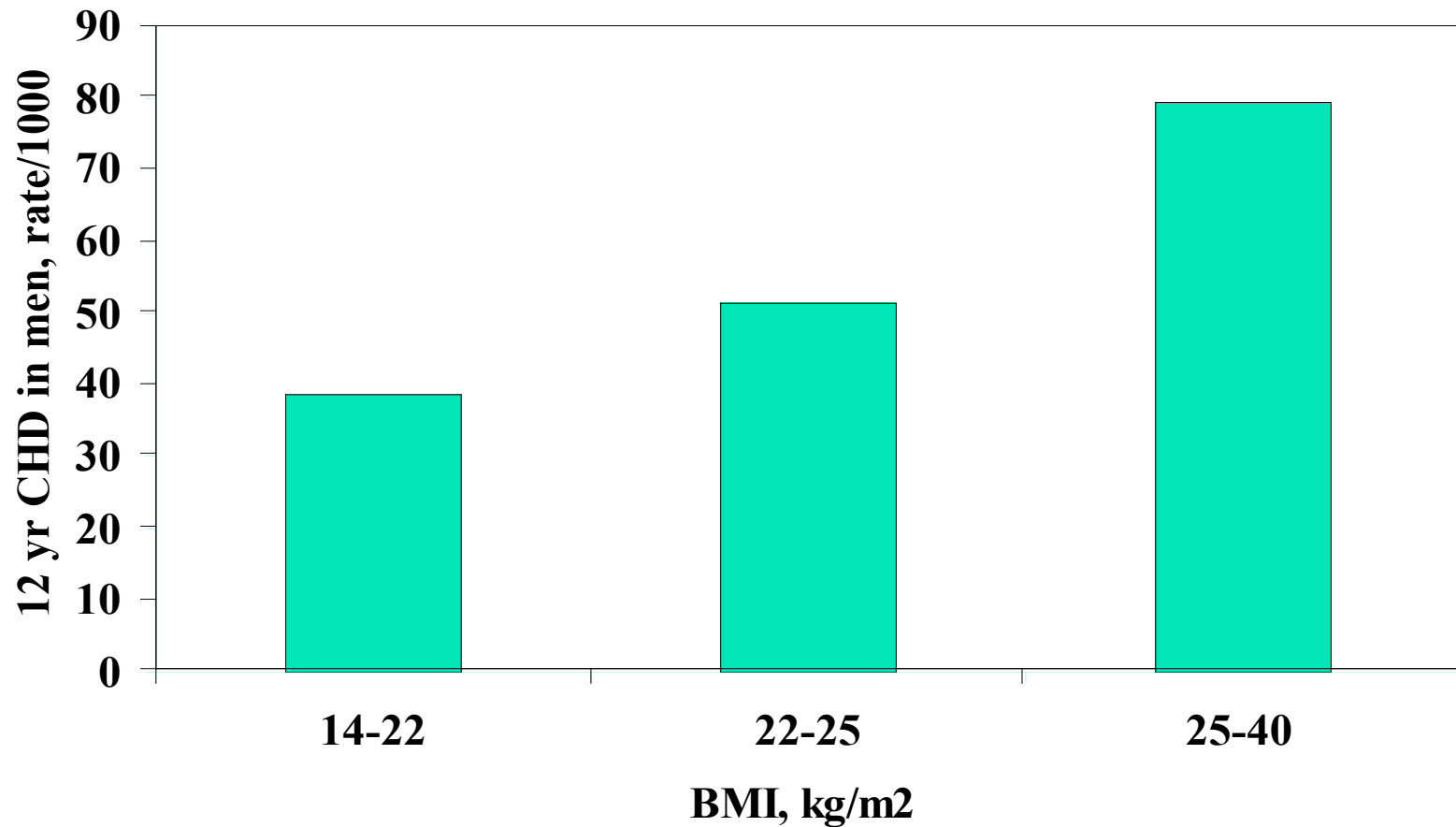
**Pima Indians- Number of parents with diabetes**



# BMI is a CHD Risk

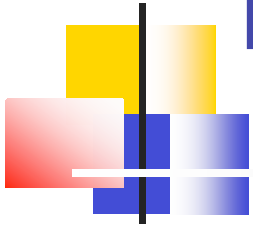


German males, 54→66 y/o

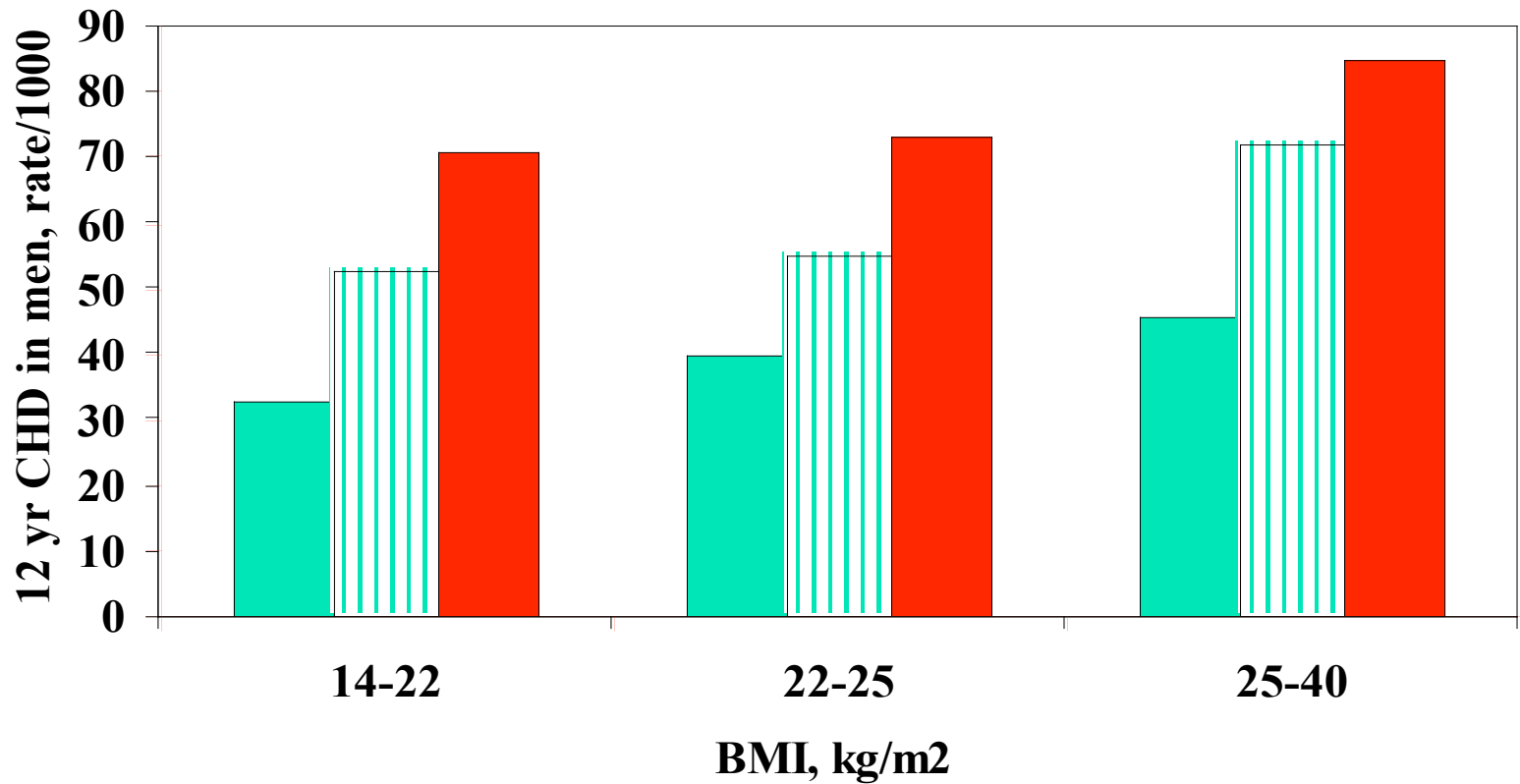


# Upper Body Fat is a Greater Risk

German males, 54→66 y/o



■ upper lean    ▨ intermediate    ■ upper fat



# Upper Body Fat is a Greater Risk

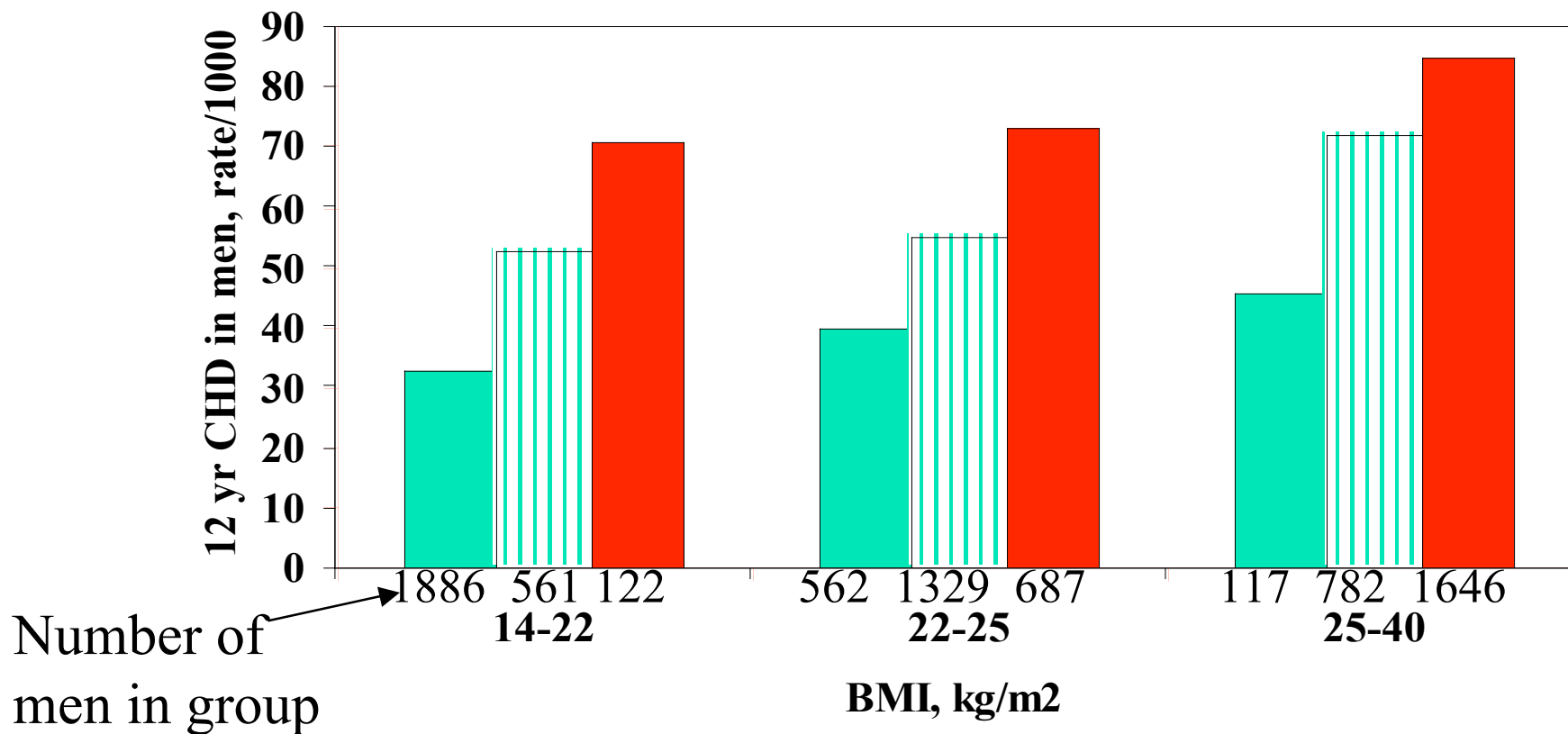
German males, 54→66 y/o



■ upper lean

▨ intermediate

■ upper fat





# Theoretical Causes of Obesity

## Something to all of them, but...

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- Genetic
  - Deficient thermogenesis
  - Deficient intake regulation
- Environmental
  - Sedentary lifestyle
  - High fat diet
  - Disordered eating
  - Palatable diet/over serving
- Genetic–environment interaction



# Genetics

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- Familial pattern of excess weight
- Similarity of twins raised apart
- Does not explain obesity epidemic
- Explains 40-60% of excess weight

# Deficient Thermogenesis

("It's my metabolism")

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- Small rodents (rats and mice)
  - Obese rodents generally have low resting energy expenditure
- Humans
  - Obese humans generally have high resting energy expenditure
  - Appropriate after adjusting for body composition



# Deficient Intake Regulation

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- Signal error
  - from periphery to brain
  - within brain
  - regulation worse for liquid calories
- Result
  - Consumption of more energy than expended
  - Small error compounded over many days



# Sedentary Lifestyle

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- Active individuals gain less weight
- Adding exercise decreases fatness by a few percent
- Recommendations
  - Cardiovascular health – 20m vigorous 3x/wk
  - Reduce chronic disease – 30m moderate 5-7x/wk
  - Control weight – 300kcal 7x/wk



# High Fat Diet

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- Fat balance not regulated as well as other macronutrients
  - Less compensation after excess intake
- Fat increases energy density of foods
  - Decreases fullness
- Recommendations
  - Fat < 30% of energy
  - Saturated fat < 10% of energy



# Disordered Eating

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- Eating for reasons other than hunger
- Recommendations
  - Let children eat for hunger
  - Reduce energy dense snacks
  - Eat slowly



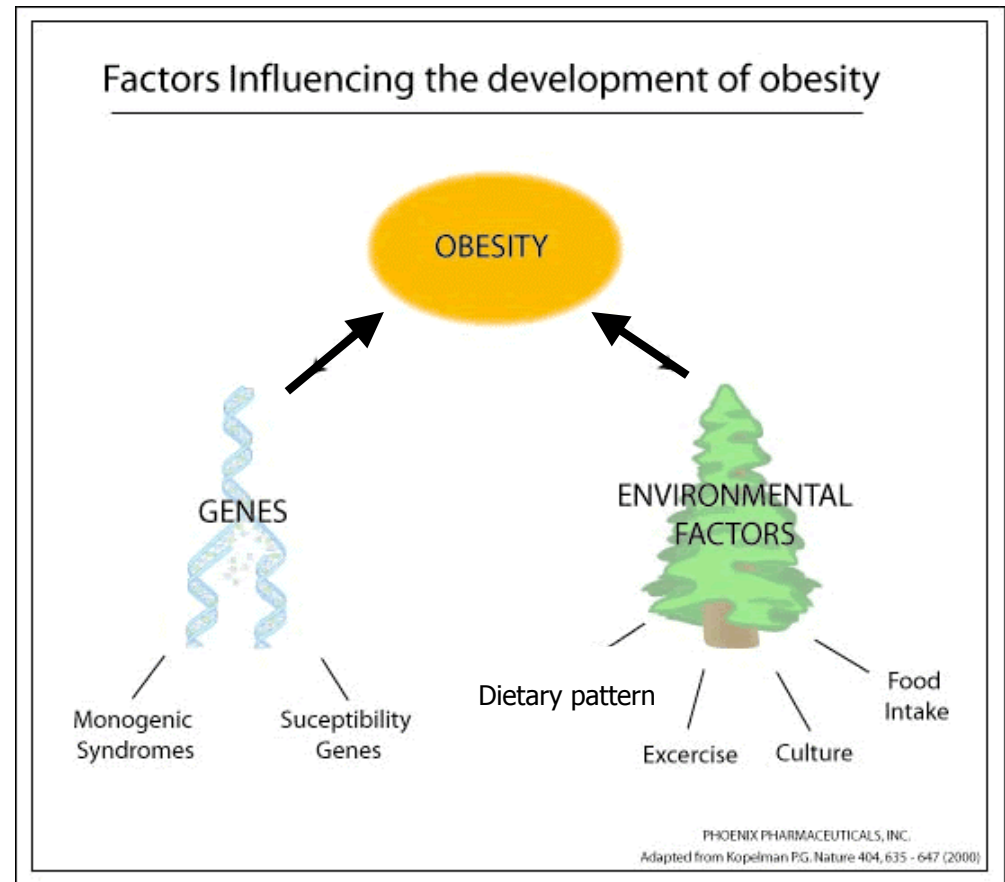
# Palatability & Over-service

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- Intake correlates with serving size
- Frequency of restaurant use correlates with BMI
- Pediatric weight gain correlates with sweetened drink intake
- Recommendation
  - Ask for that doggie bag when the food is served
  - Avoid sweetened/caloric drinks

# Gene-Environment Interaction

- Genetic predisposition to obesity
- Expressed in certain environments



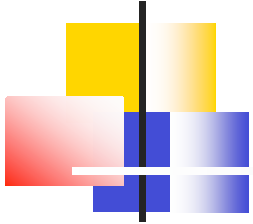
# TREATMENT OF OBESITY

## Step I - Beware of

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- Unintended weight loss
- Psychological disorders
  - Inappropriate weight loss
  - Clinical depression
  - Eating disorders

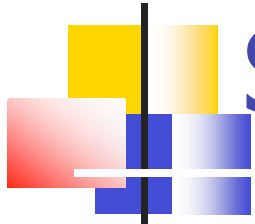
# Drug therapy



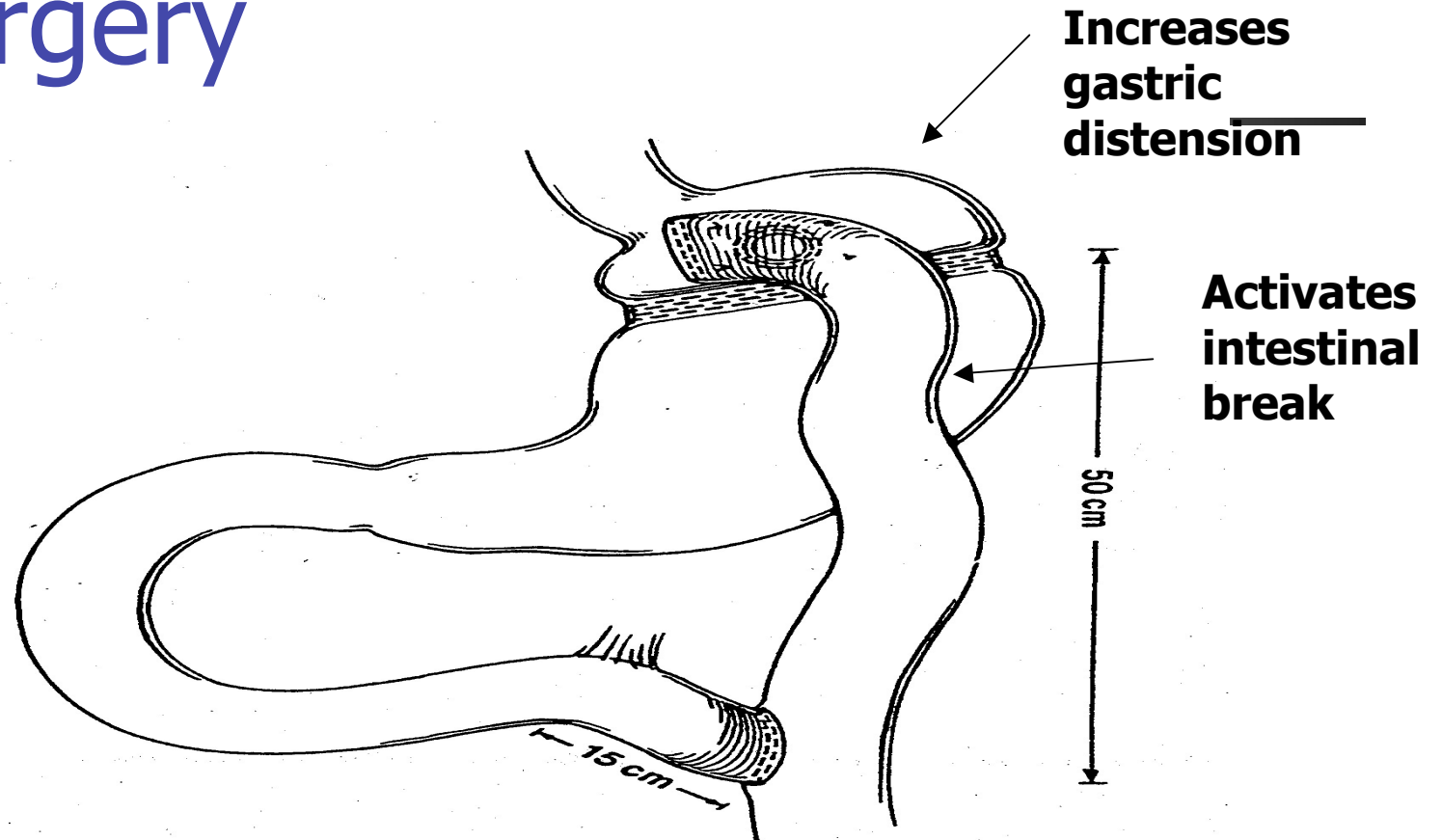
## ■ Problems

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- Limited understanding
- Side effects
- Appetite suppressants
  - Approved: sibutramine (Meridia)
  - Under development
- Thermogenic agents
  - ~~Ephedrine~~
  - Caffeine or capsaicin
  - Under development
- Absorption blockers
  - Approved: fat digestion inhibitor (Xenical, Alli)
  - Under development



# Surgery



**Roux-en-Y Gastric Bypass (RYGB)**



# Surgery

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- Large weight loss
  - 50 lbs or more
  - Generally sustained after 5 years
- Risk of death – 1 to 2%
  - Worse with older operations
- Reserved for
  - BMI  $>40$  kg/m<sup>2</sup>
  - Lower BMI with serious co-morbidities



# Diet and exercise

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- 1200-1800 kcal/d
- Balanced diet
  - Protein
  - Mineral (esp. Zn & Ca)
- Increasing physical activity
  - Gradual increase
  - Several thousand kcal/wk
- Relapse frequent



# Behavior modification

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- Goal:
  - Develop a healthy lifestyle
  - modest but long-term changes
  - 1.5 – 2 lbs/wk (possibly higher in first month)
- Diet
  - Eat for hunger
  - Decrease energy intake
  - Develop monitoring and coping strategies
- Incorporate physical activity into lifestyle
  - >2000 kcal/wk
    - 90 min walking/d or 45 min of aerobics/d



# Behavior Tools \*

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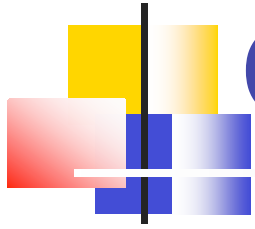
- Identify negative behaviors
- Identify the negative behavior triggers
- Break the cycle between trigger & behavior
- Contingency management



# Behavior Tools \*

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- Identify the negative behaviors
  - I snack on energy dense foods in the evening
- Identify factors that trigger the behavior
  - Keep a diary –maybe find:
    - Snack when watching TV
    - Snack when skip a hot dinner
    - Snack when bored
- Identify another negative behavior
  - Eat large portions when eating out



# Changing behaviors

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- Break links to behavior
  - I eat high fat foods in front of TV
    - Reduce TV viewing
    - Substitute fruit and a hot drink
- Remove stimuli to behavior
  - I eat too much ice cream
    - Don't buy ice cream
    - Or purchase small units (snack cup)
- Cognitive restructuring
  - I overeat after a bad day
    - Substitute another reward
    - Take a walk or go shopping



# Contingency Management

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- Problem situations
  - Parties
    - I eat too much at parties
    - Move away from the snack bowl
  - Restaurants
    - They serve too much food
    - Fill the doggie bag first
    - Don't clean the plate, maybe destroy the plate
- Responses to situations
  - I over-ate at lunch
  - Have a low calorie dinner



# Behavior Tools

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- Identify why start/stop eating (or exercising)
- Identify the negative behaviors
- Reduce those behaviors
- Contingency management
- **Self-monitoring and recognizing backsliding**



# Self-monitoring

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- Weekly weights
  - Set healthy limits
  - Return to restriction diet
- Periodic dietary records
- Exercise calendars, pedometers, buddy system



# Helpful hints

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- Eat for hunger
- Savor your food and enjoy eating
- Use small plates and serve from the kitchen
- Use a variety of energy dilute foods
  - Provide moisture with water not fat
  - Flavor with spices
- If it's a problem, why buy it?



# For that small weight loss

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- Need to lose 5 lbs before your high school reunion?
  - Eat only from a plate
  - Write down everything you eat



# Fad Diets

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- High \_\_\_\_\_(carb, fat or protein)
- Food grouping or time of day restrictions
- At best, these are methods of restricting choice and thus reducing kcal and may be weight loss aids if reasonably balanced.
  - Vitamin & mineral suppl important
  - Limit to short term use
- At worst, these are recipes for nutritionally deficient diets.



# I can't lose weight...

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- Last winter, I lost 15 lbs on the Atkins diet, but gained it back.
- Last year, I joined a Weight Loss Group and lost 15 lbs, but regained it all.
- I joined the health club, but lost no weight.
- I replaced desserts with low fat versions, but lost no weight.