Navigating Asia's Food Landscape

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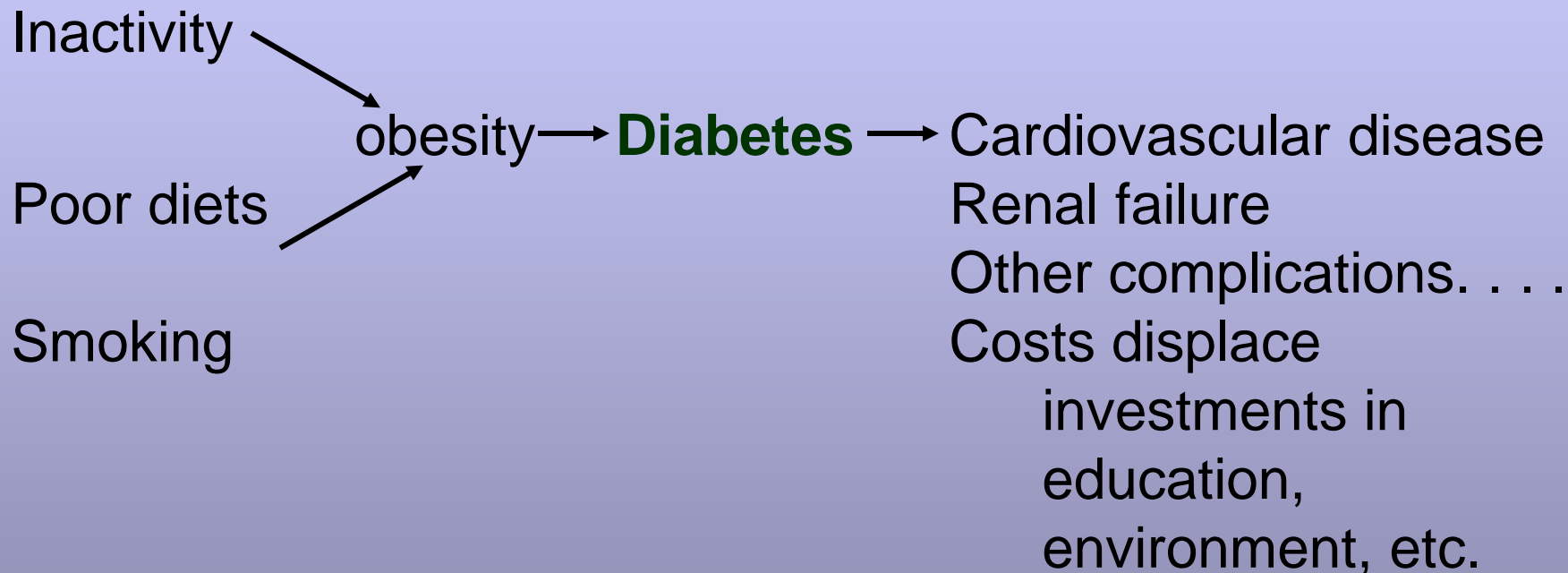
Department of Nutrition

Harvard School of Public Health

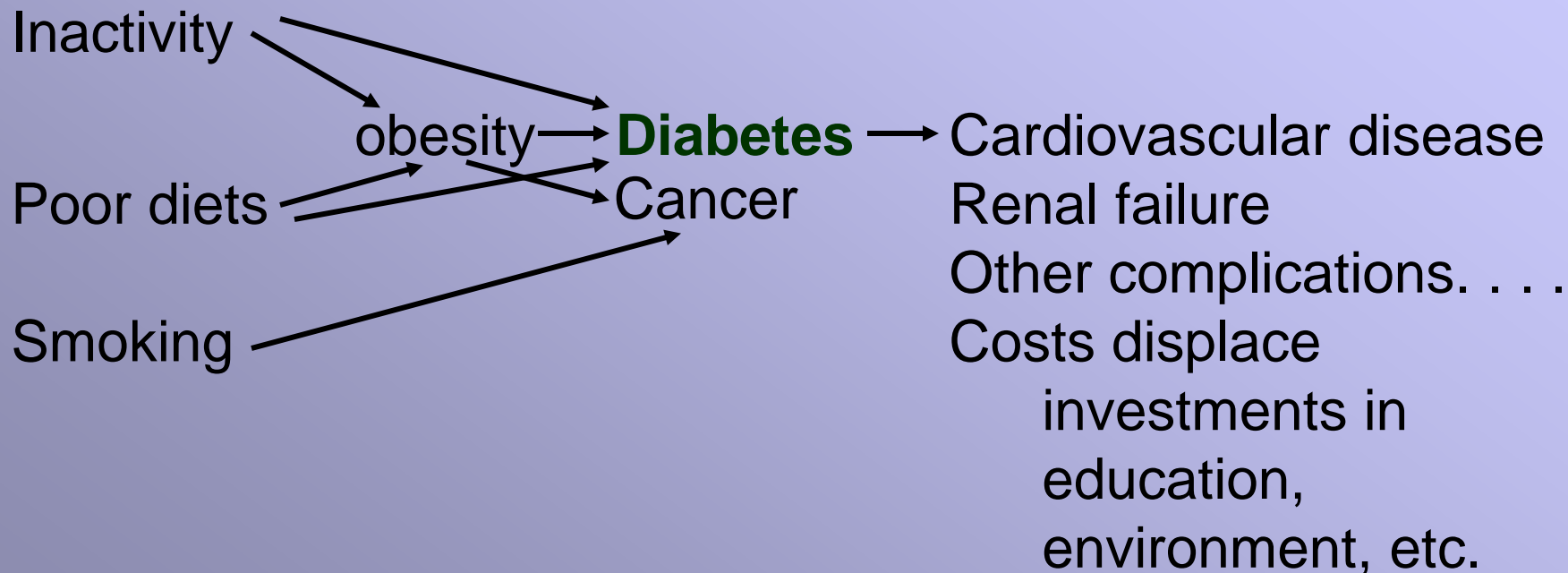October 28, 2011

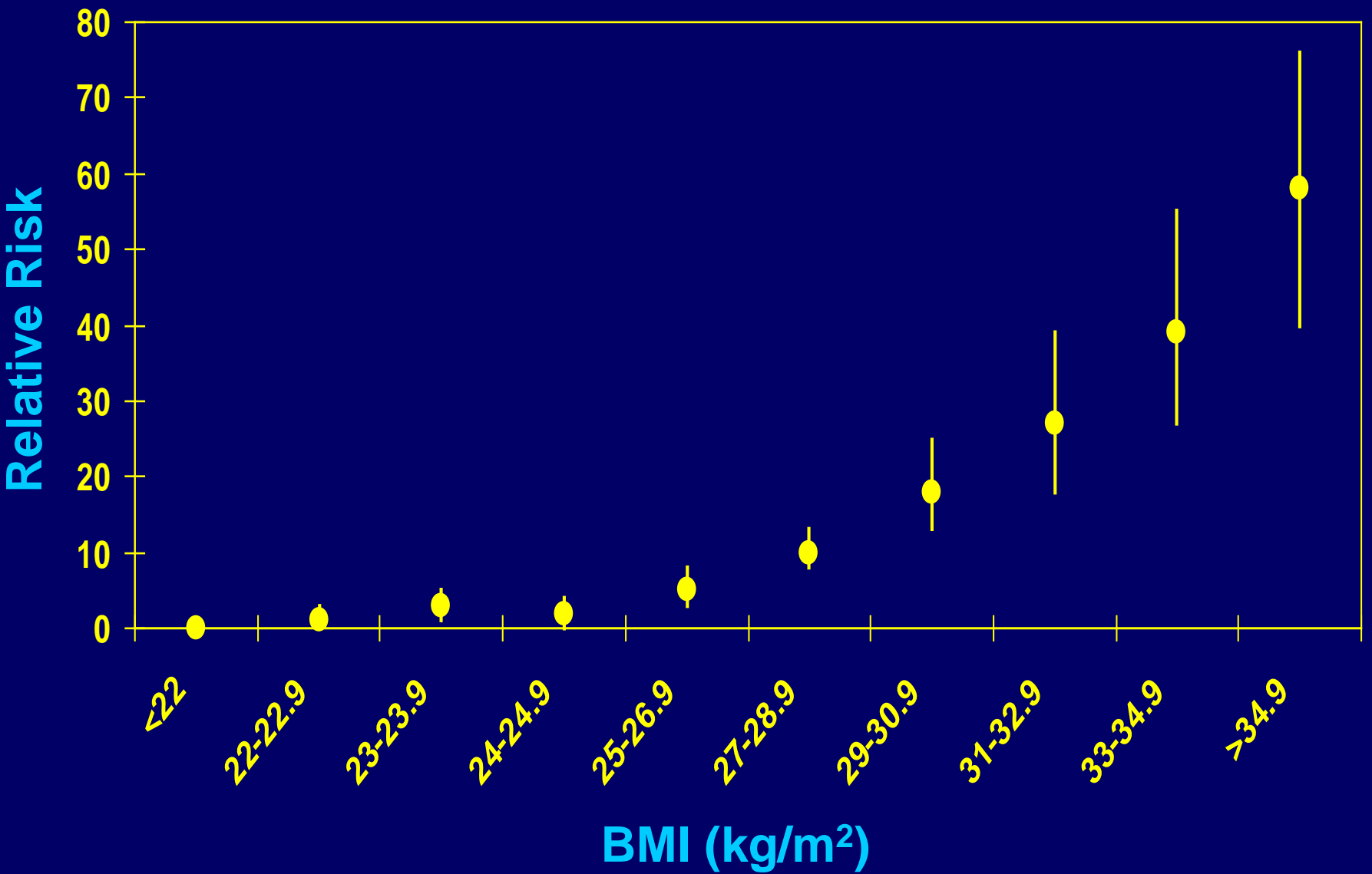# *Reason to Focus on Diabetes*

**Underlying
Causes**

Inactivity

obesity → **Diabetes** → Cardiovascular disease

Poor diets

Renal failure

Other complications. . . .

Smoking

Costs displace
    investments in
    education,
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Reason to Focus on Diabetes

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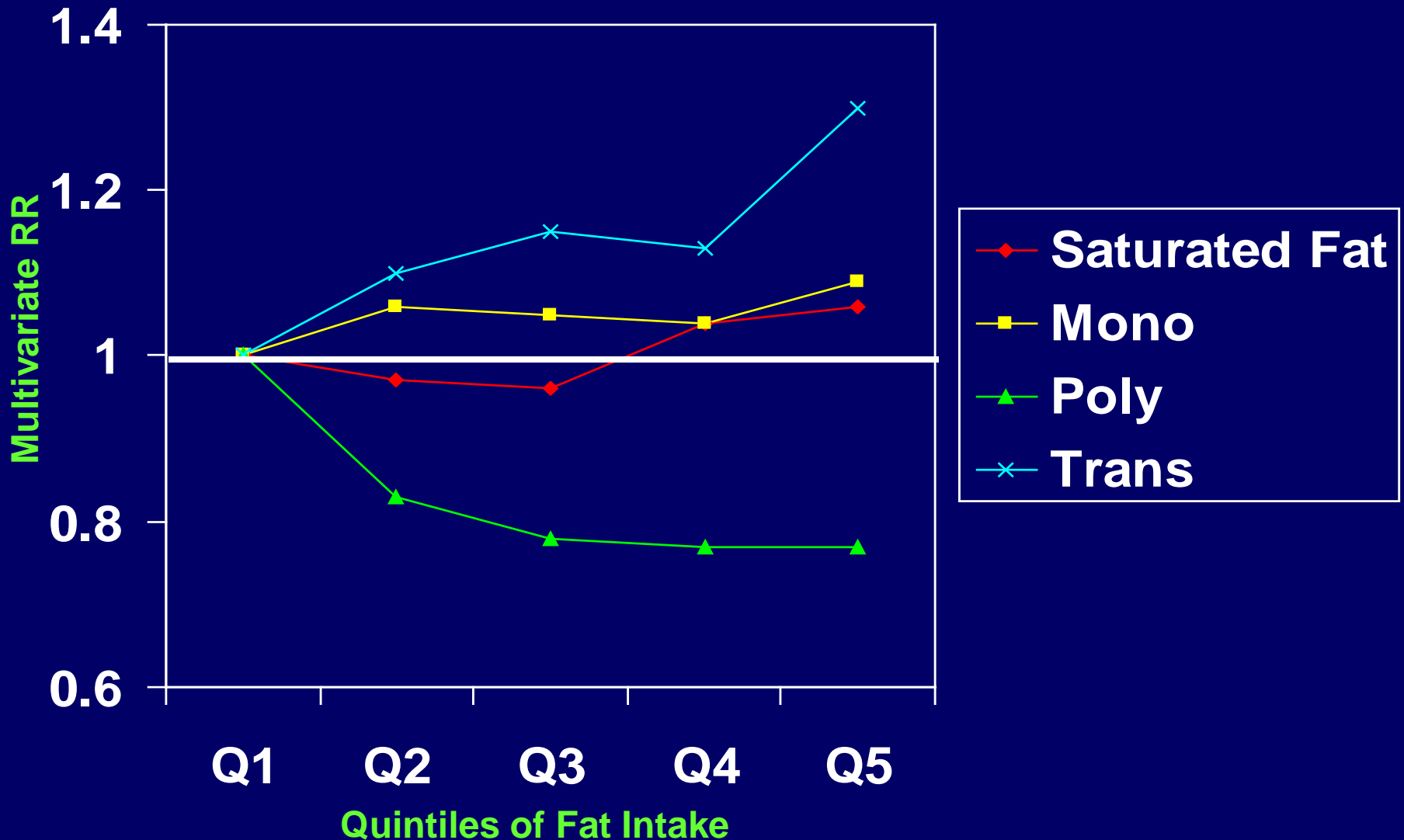Body Mass Index & Risk of Diabetes

(Colditz, 1990)

23.042

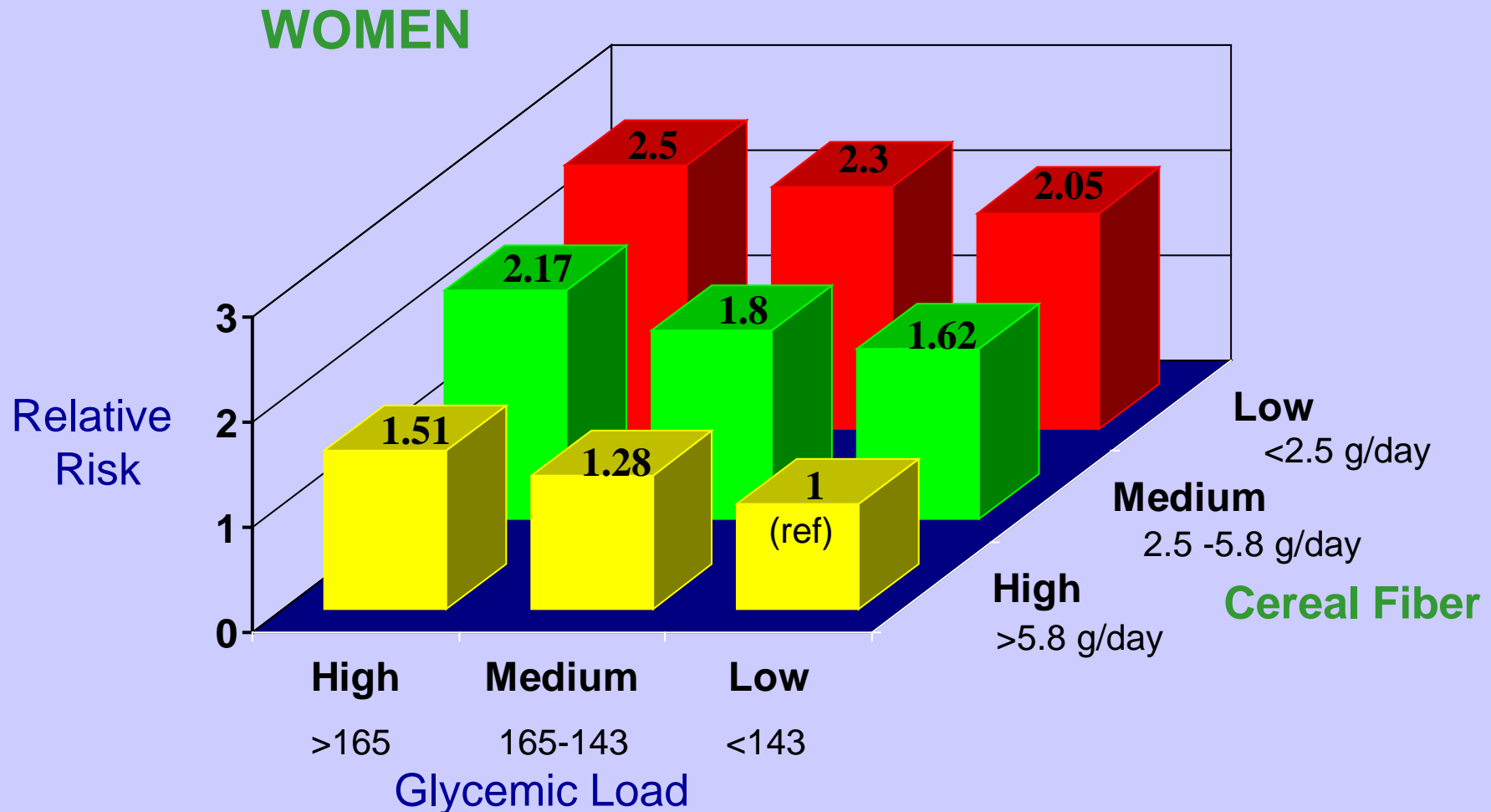# *What have we learned about diet in prevention of diabetes?*

- Carbohydrate quality
- Sugar-sweetened beverages
- Type of fat
- Red meat
- Coffee
- Moderate alcohol
- ? Vitamin D

25.157

Multivariate RRs of type 2 diabetes according to quintiles of specific types of dietary fat (mutually adjusted)
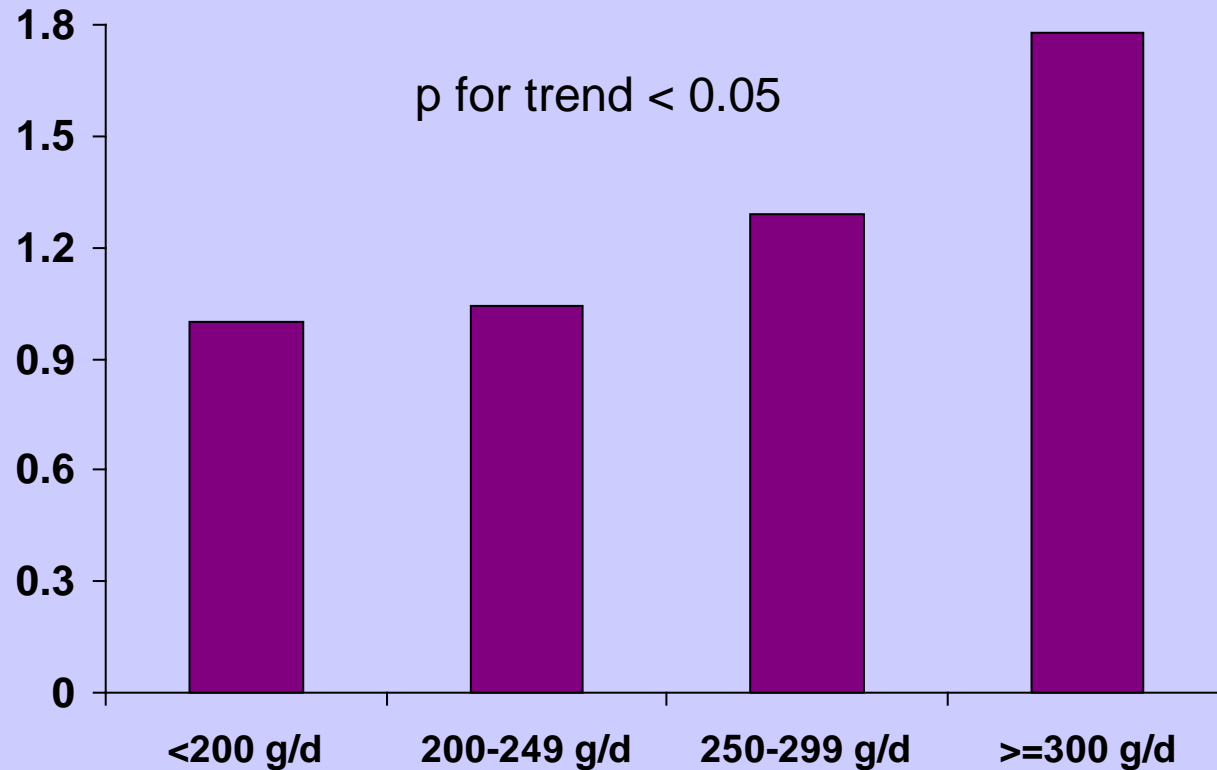
(Salmeron et al, 1999)

25.004

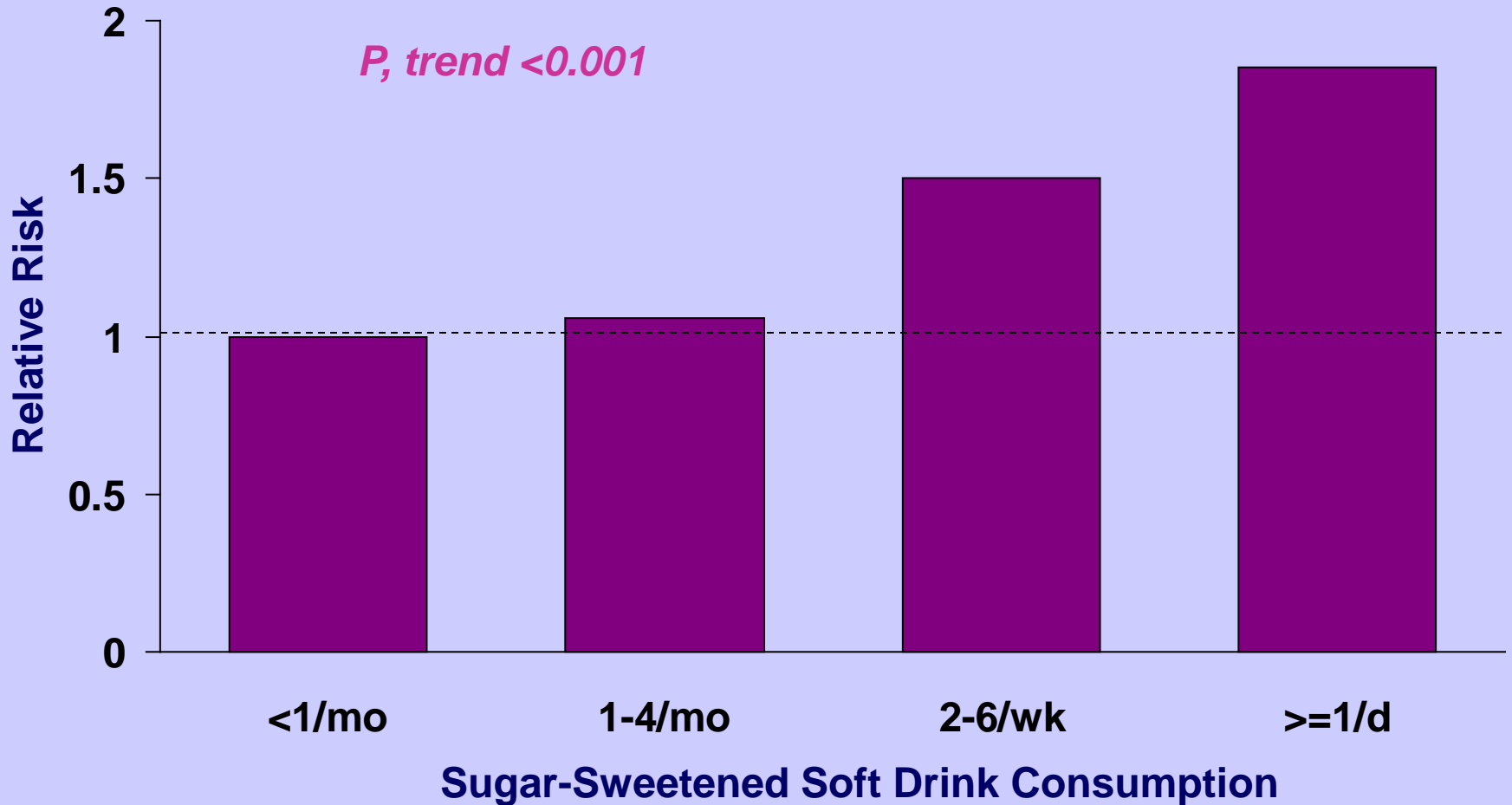# Relative Risk of Type 2 Diabetes by Different Levels of Cereal Fiber and Glycemic Load

WOMEN

Relative Risk

3

2

1

0

2.5 2.3 2.05

2.17 1.8 1.62

1.51 1.28 1 (ref)

Low <2.5 g/day

Medium 2.5 -5.8 g/day

High >5.8 g/day

Cereal Fiber

High >165

Medium 165-143

Low <143

Glycemic Load

(Salmeron et al,1997)

9.038

White Rice Intake and Risk of Diabetes in Shanghai Women
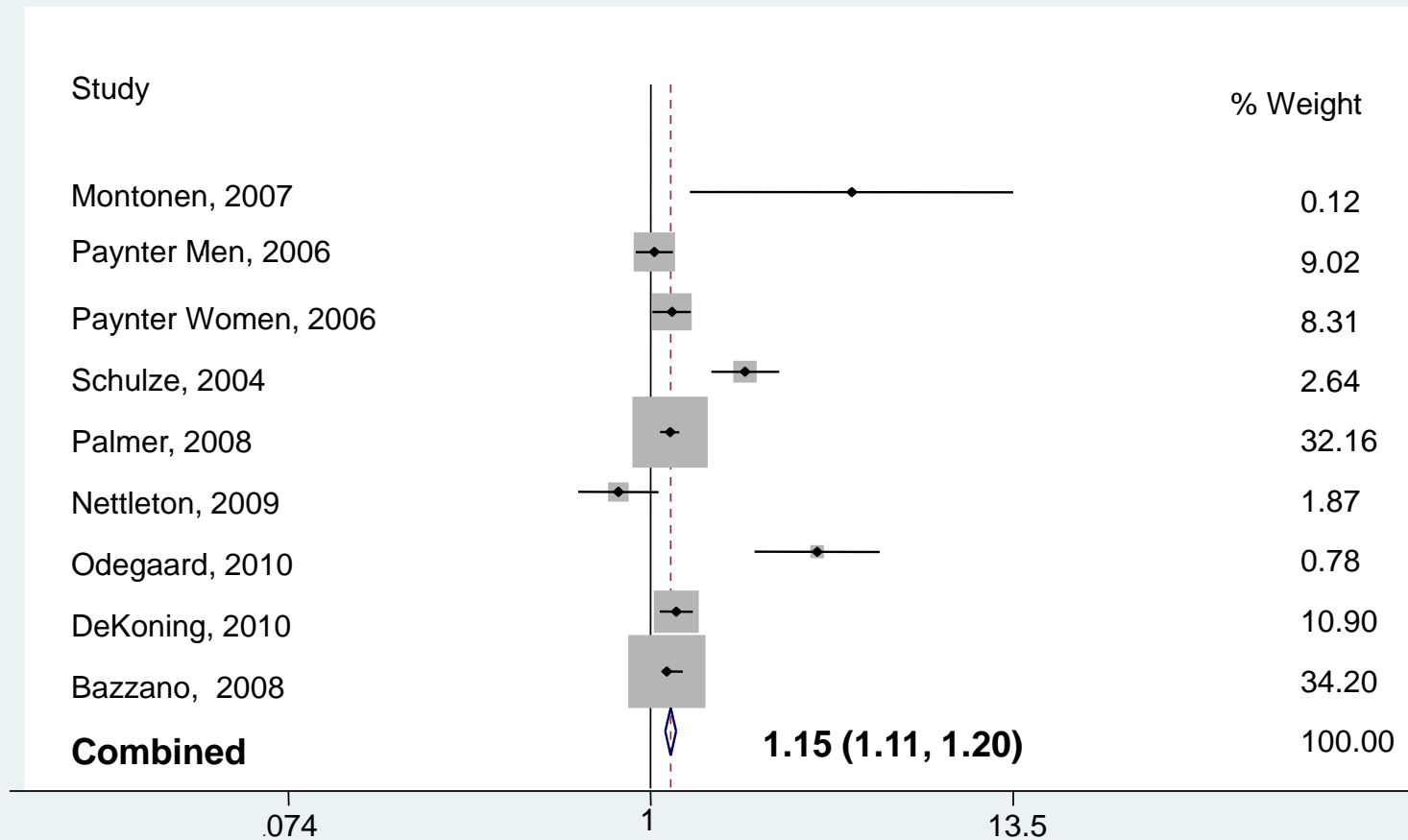

p for trend < 0.05
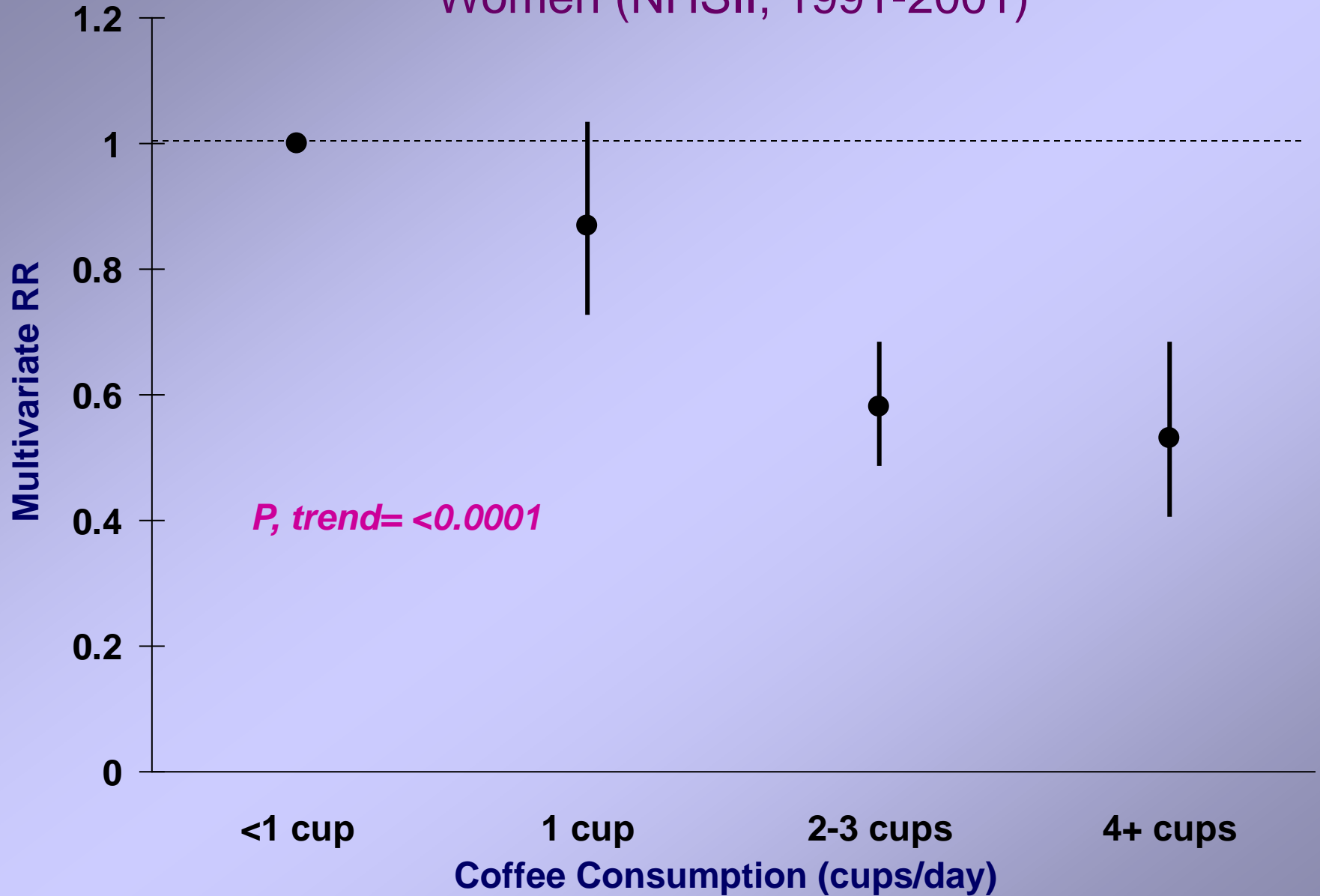
(Villegas et al. Arch Intern Med 2007)

25.119

Sugar-Sweetened Soft Drinks & Type 2 Diabetes, NHSII 1991-1998

25.079b

Sugar-sweetened beverage consumption and risk of T2DM, per increase in one 12 oz serving of SSB per day (fixed-effects estimate)

Study		% Weight
Montonen, 2007		0.12
Paynter Men, 2006		9.02
Paynter Women, 2006		8.31
Schulze, 2004		2.64
Palmer, 2008		32.16
Nettleton, 2009		1.87
Odegaard, 2010		0.78
DeKoning, 2010		10.90
Bazzano, 2008		34.20
Combined	**1.15 (1.11, 1.20)**	100.00

.074   1   13.5

37.015

(Malik et al. Diabetes Care 2010)

Coffee Consumption and Risk of Type 2 Diabetes in Women (NHSII, 1991-2001)

P, trend= <0.0001

(van Dam R, Diabetes Care, 2006)

25.162

Relative Risk of type 2 diabetes for replacing 1 serving/day of total red meat with other foods. Data from NHS, NHSII, HPFS, including 13,759 cases of diabetes *(Pan A et al. AJCN, 2011)*
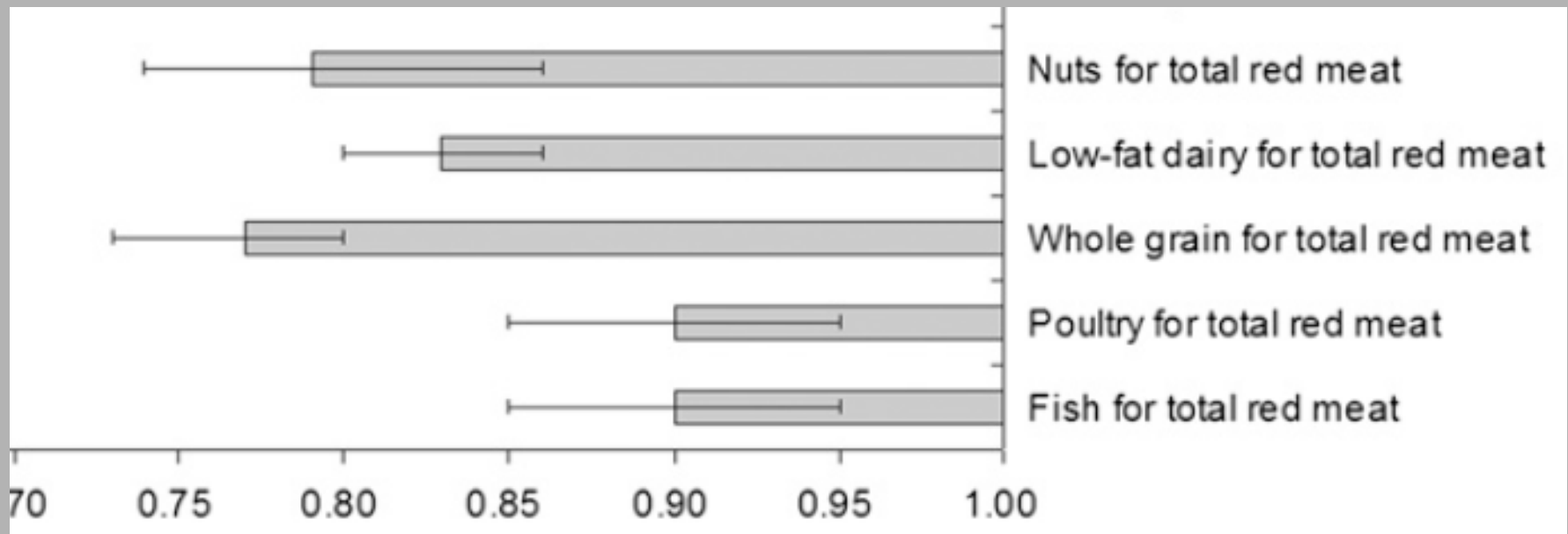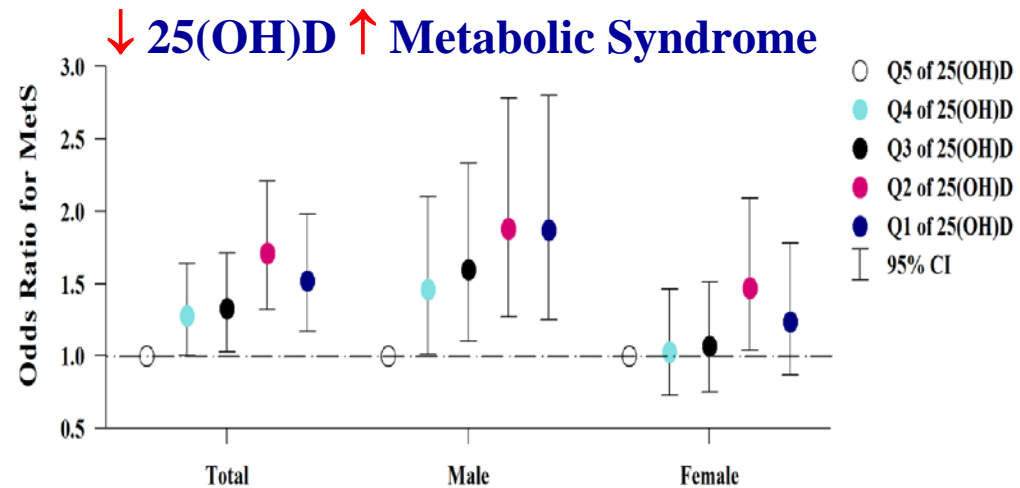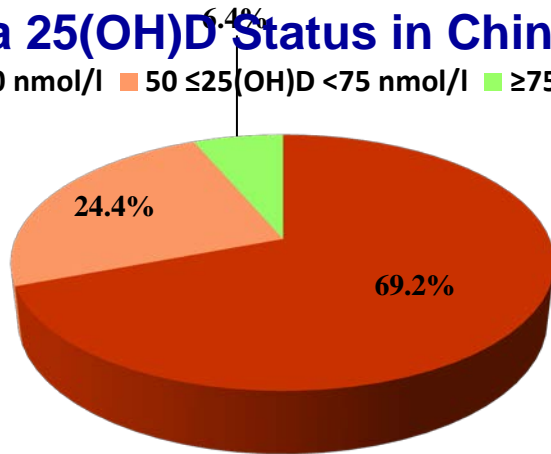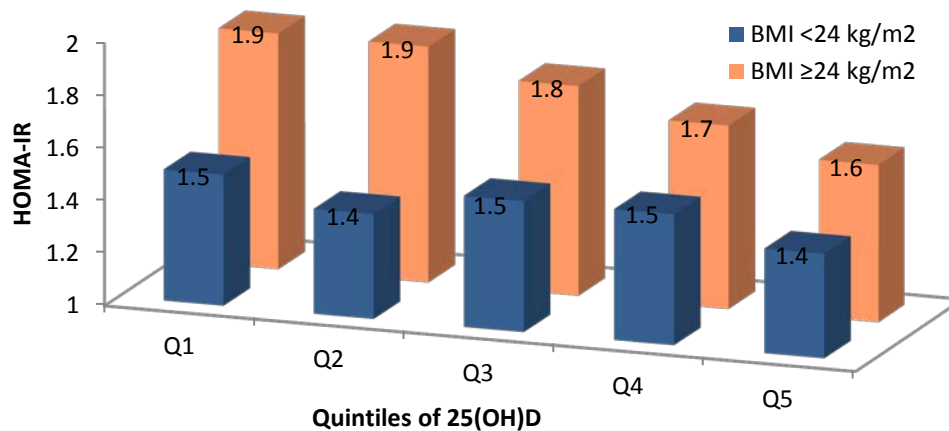
Vitamin D and Metabolic Disorders

Plasma 25(OH)D Status in Chinese

- <50 nmol/l
- 50 ≤25(OH)D <75 nmol/l
- ≥75 nmol/l

6.4%
24.4%
69.2%

↓ 25(OH)D ↑ Metabolic Syndrome

- ○ Q5 of 25(OH)D
- ● Q4 of 25(OH)D
- ● Q3 of 25(OH)D
- ● Q2 of 25(OH)D
- ● Q1 of 25(OH)D
- I 95% CI

Odds Ratio for MetS

Total   Male   Female

↓ 25(OH)D ↑ Insulin Resistance

- BMI <24 kg/m2
- BMI ≥24 kg/m2

HOMA-IR

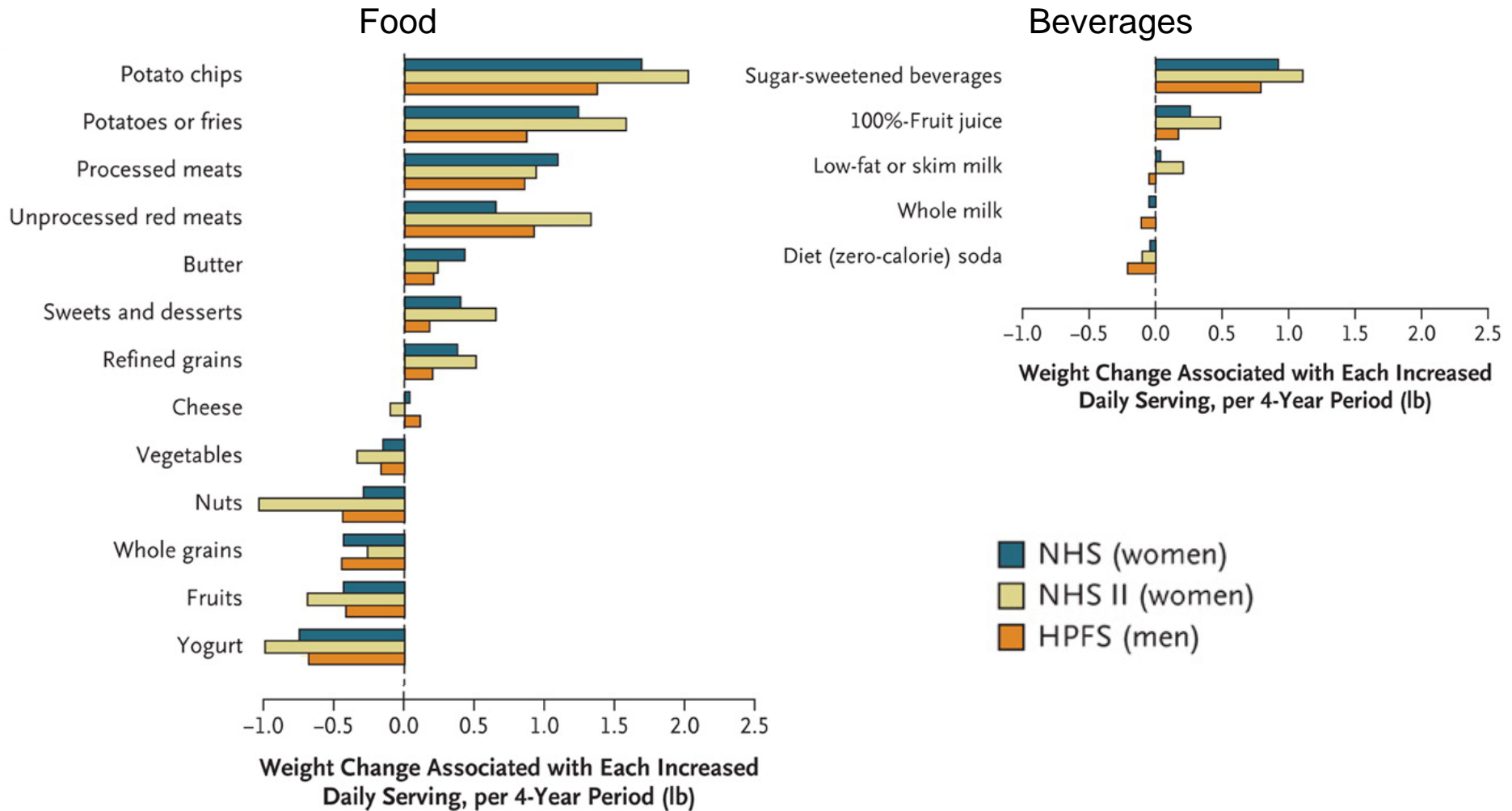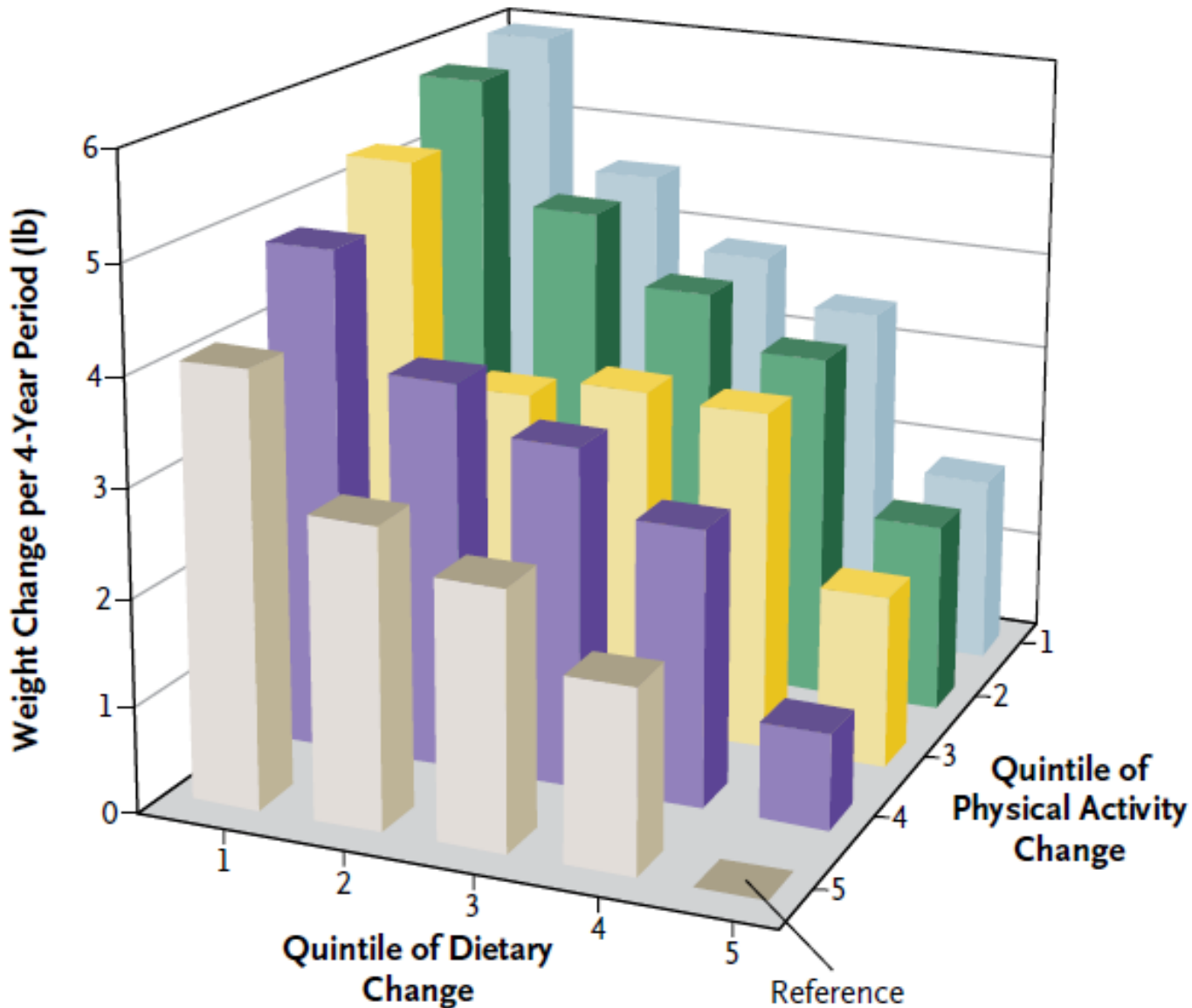|	Q1	Q2	Q3	Q4	Q5
BMI <24	1.5	1.4	1.5	1.5	1.4
BMI ≥24	1.9	1.9	1.8	1.7	1.6

Quintiles of 25(OH)D

Lu et al., Diabetes Care, 2009

25.163

Changes in Food and Beverage Consumption
and Weight Changes Every 4 Years
According to Study Cohort

Food

Beverages

(Mozaffarian D et al., NEJM 2011)

Changes in diet and physical activity and weight changes within each 4-year period in three cohorts

B

Weight Change per 4-Year Period (lb)

Quintile of Dietary Change

Quintile of Physical Activity Change

Reference

23.060

(Mozaffarian D et al., NEJM 2011)

Percentage of Type 2 Diabetes Potentially Preventable by Simultaneous Reduction of Five Modifiable Risk Factors (NHS) *(Hu et al.)*
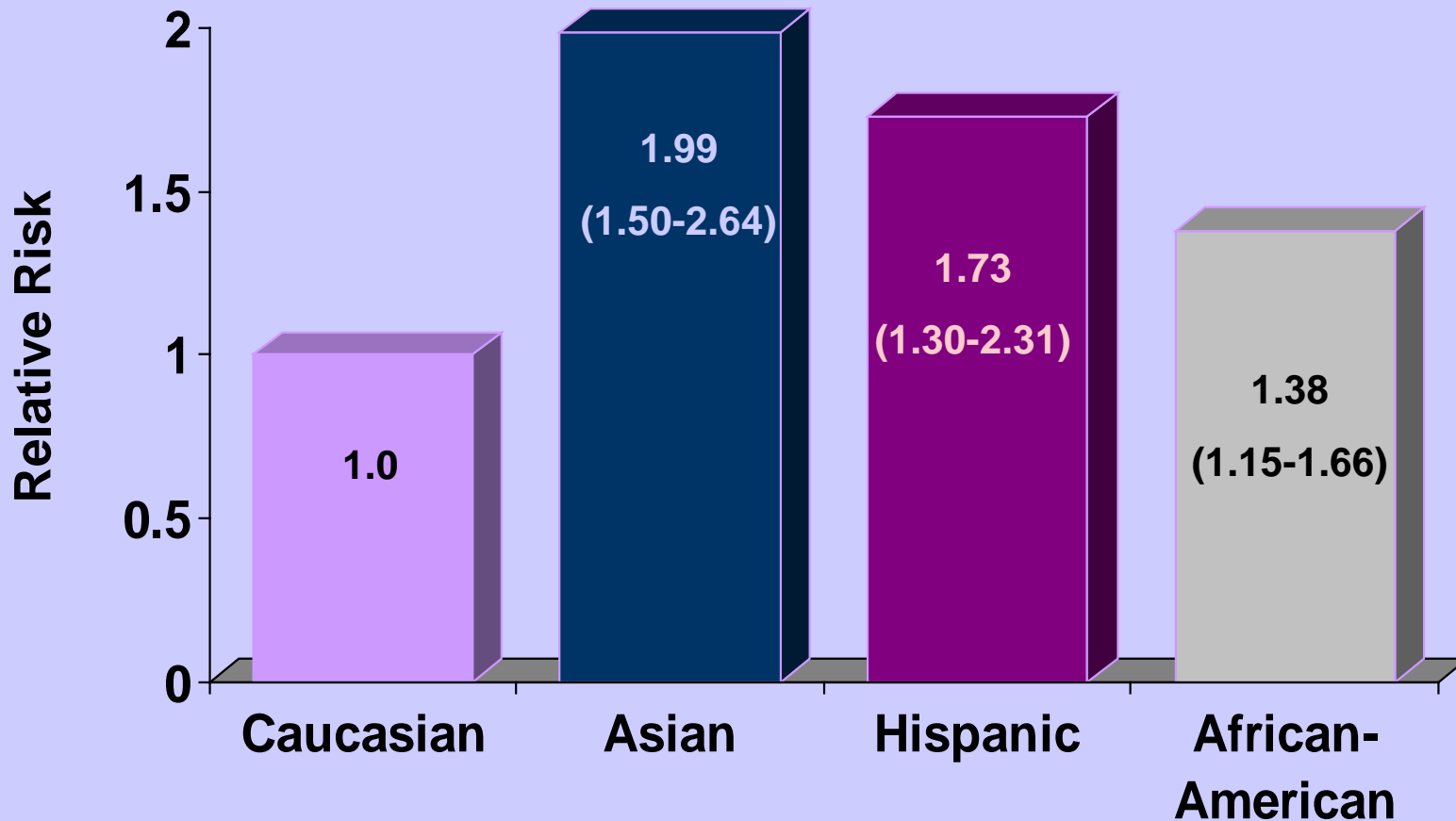
Low Risk

1. Nonsmoking
2. BMI < 25
3. Moderate to vigorous exercise
4. Diet score in upper 40% (low trans fat, high cereal fiber, low glycemic load, high P:S ratio)
5. Alcohol 5+ grams/day
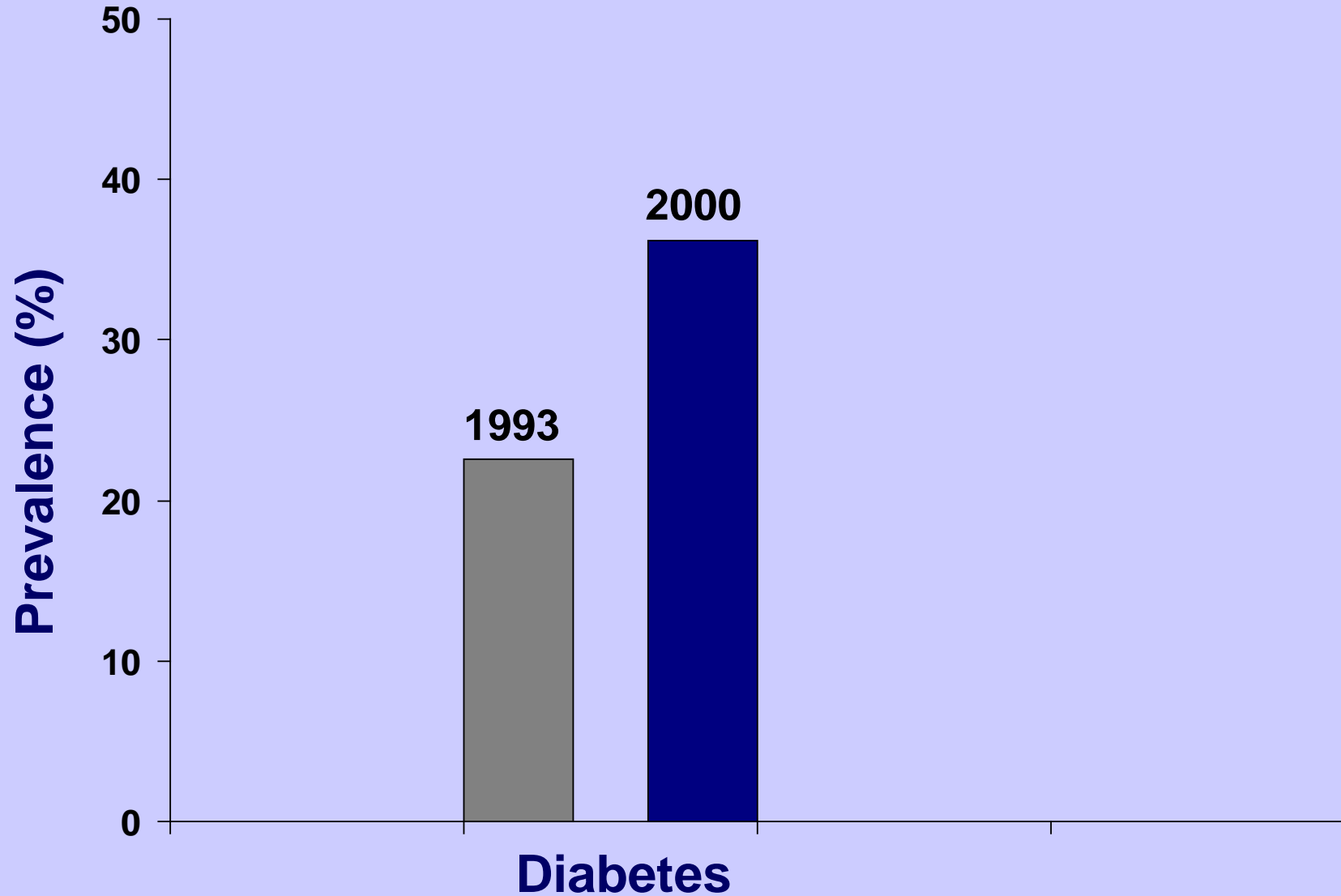
Percent in low risk group: 4.1%

Population attributable risk (PAR): 92% (82-96)

25.026R

# RR of Type 2 Diabetes Adjusted for BMI & Dietary & Lifestyle Variables

Relative Risk

- Caucasian: 1.0
- Asian: 1.99 (1.50-2.64)
- Hispanic: 1.73 (1.30-2.31)
- African-American: 1.38 (1.15-1.66)

(Shai I, Diabetes Care 2006)

25.082R

Diabetes Among Japanese-Brazilians

(Gimeno S, et al. *Diabetologia* (2002) 45:1635-38)

25.111

Diabetes Risk Reduction with Adherence to Healthy Diet Score
(Above Median Adherence)

(Shai et al., Diabetes Care, 2006)

25.113
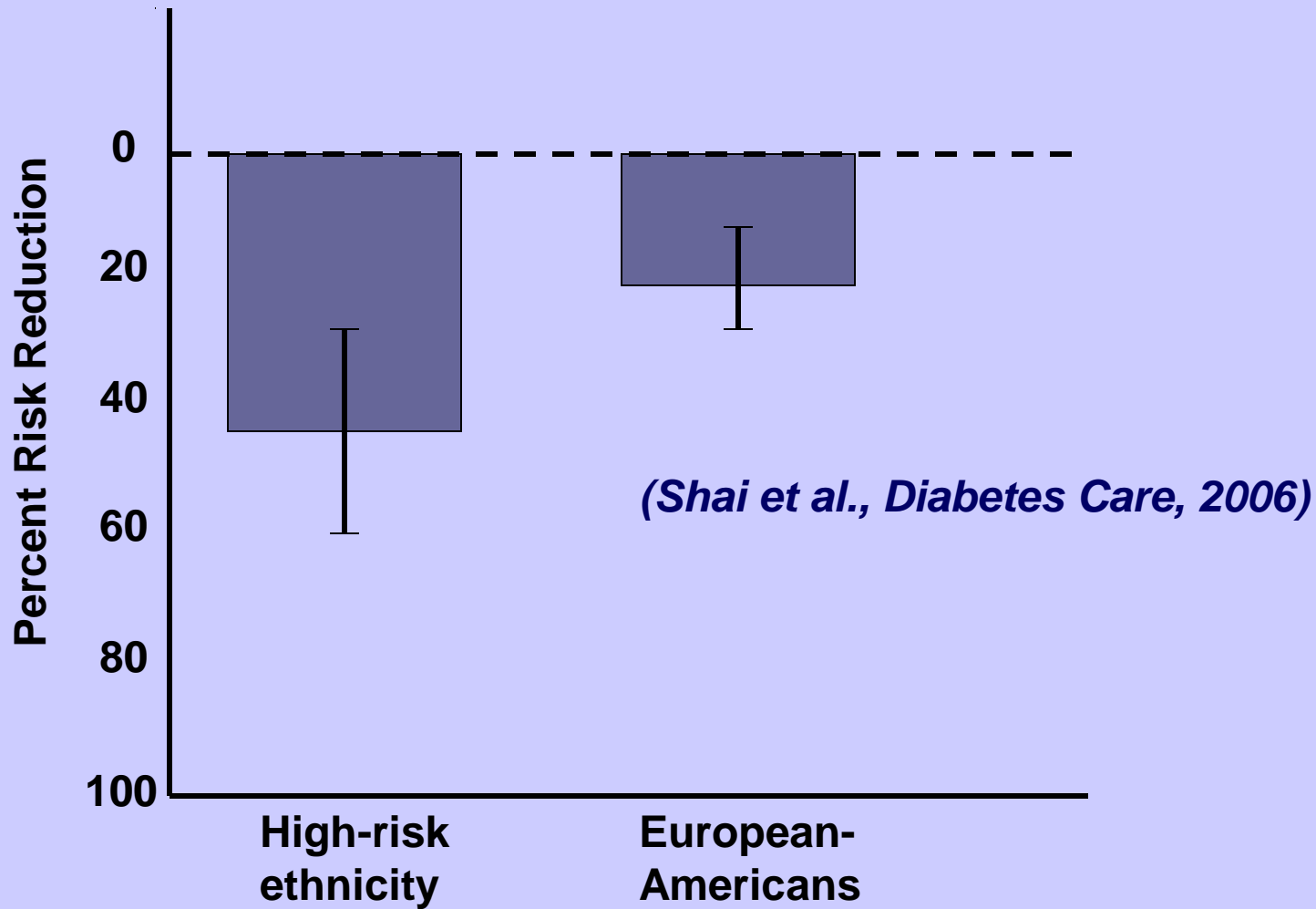
2-Year Randomized Trial of Mediterranean Diet in Patients with Insulin Resistance Syndrome *(Esposito E, et al. 2004)*

Resolution of Syndrome

Med Diet   50/90
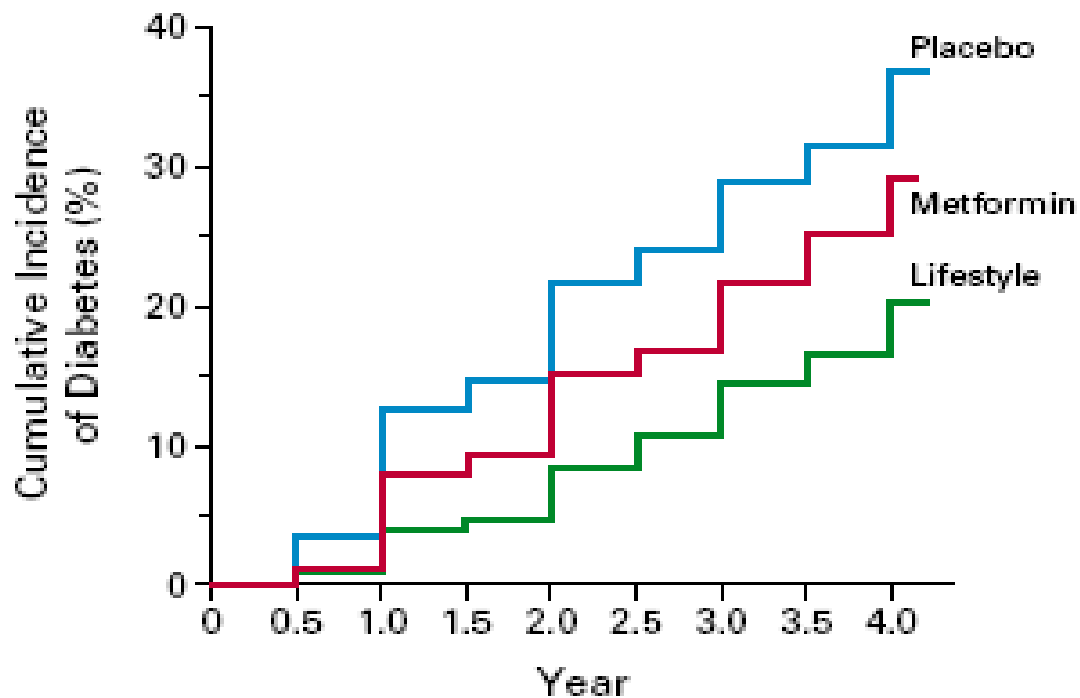
Control Diet   12/90

P < 0.001

Figure 2. Cumulative Incidence of Diabetes According to Study Group.

The diagnosis of diabetes was based on the criteria of the American Diabetes Association.[11] The incidence of diabetes differed significantly among the three groups (P<0.001 for each comparison).

(Diabetes Prevention Program Research Group, NEJM 2002)

The Da Qing IGT and Diabetes Study

- 577 with IGT

- Subjects were randomized by clinic into a clinical trial, either to a control group or to one of three active treatment groups: diet only, exercise only, or diet plus exercise

- 6 years of follow-up

- 30-46% reduction in diabetes in all groups

(Pan 1997 Diabetes Care)

# Western Dietary Pattern and Risk of Type 2 Diabetes Mellitus According to Family History of Diabetes
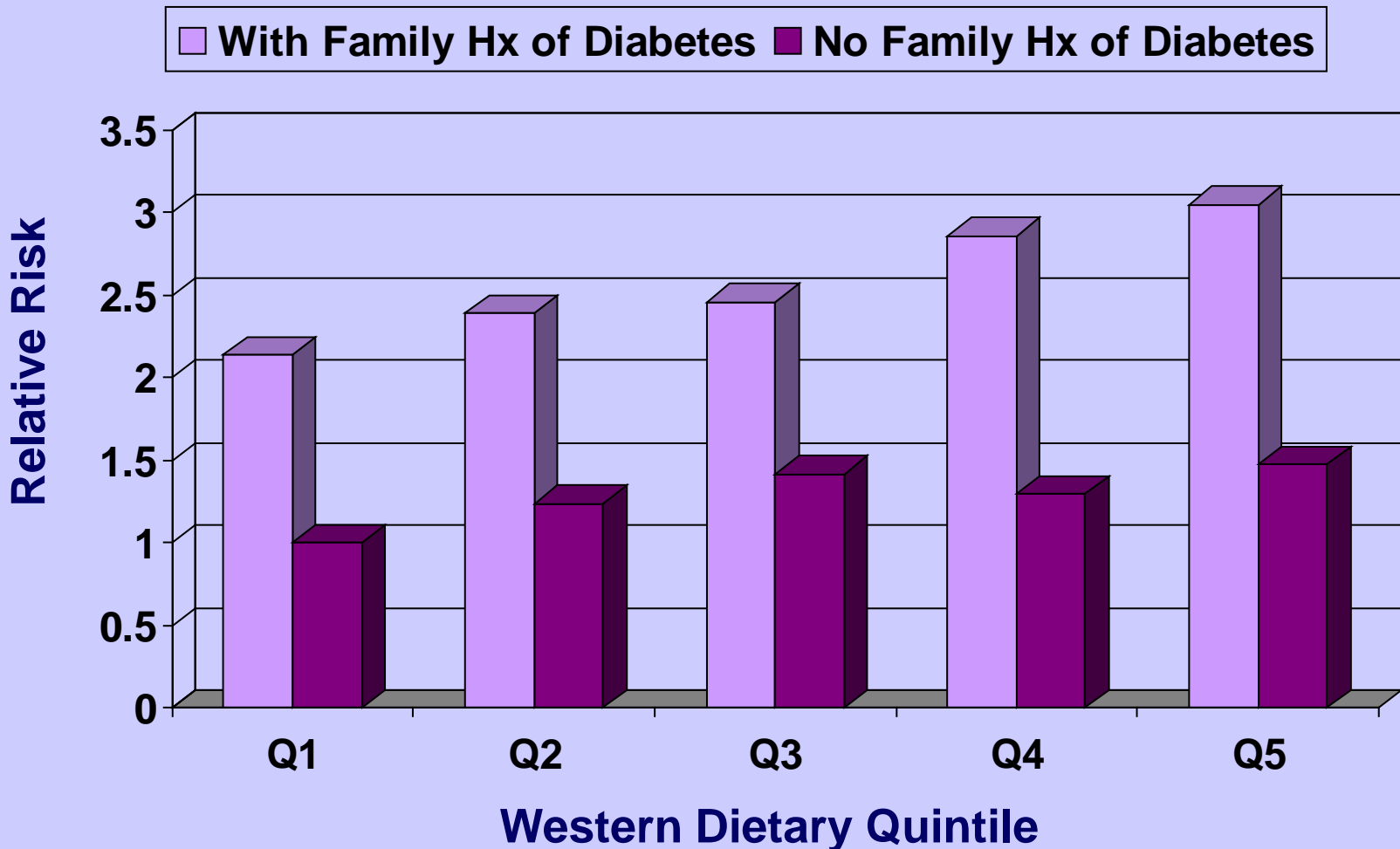
(Fung TT, et al. 2004)

21.124

Dietary Patterns in Japanese Men
(Kim MK et al. Int J Cancer, 2004)

Healthy	Traditional	Western
White vegetables	Salted roe	Beef
Yellow vegetables	Pickled vegetables	Bacon
Green vegetables	Dried fishes	Cheese
Fruits	Salted gut	Liver
Seaweed	Sake	Butter
Potatoes	Miso soup	Poultry
Soy and soy products	Fish and shellfish	Pork
Mushroom	Rice	Fruit juice
Yogurt	Beer	Vegetable juice
Eggs	Shochu	Soda beverages
Mayonnaise	Butter	Instant noodles
Fish and shellfish	Bread	Mayonnaise
Milk		Japanese tea
Dried fishes		Dressing
Pickled vegetables		Bread
Beans		Black tea
		Noodles
		Beer
		Coffee

Traditional, Western, and Healthy Dietary Patterns and Risk of Gastric Cancer in Japanese Women (Kim MK et al. IJE, 2004)
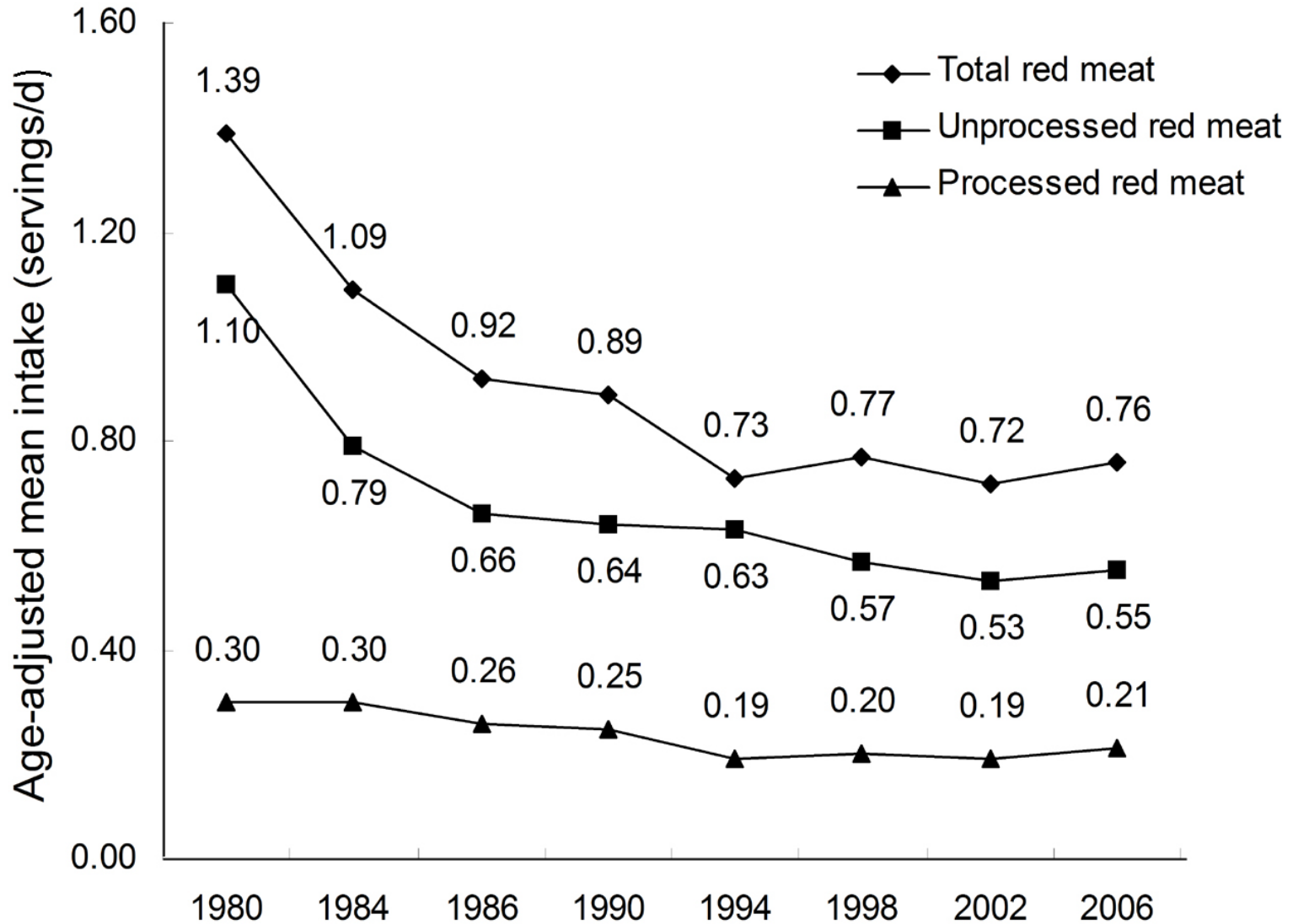
20.368
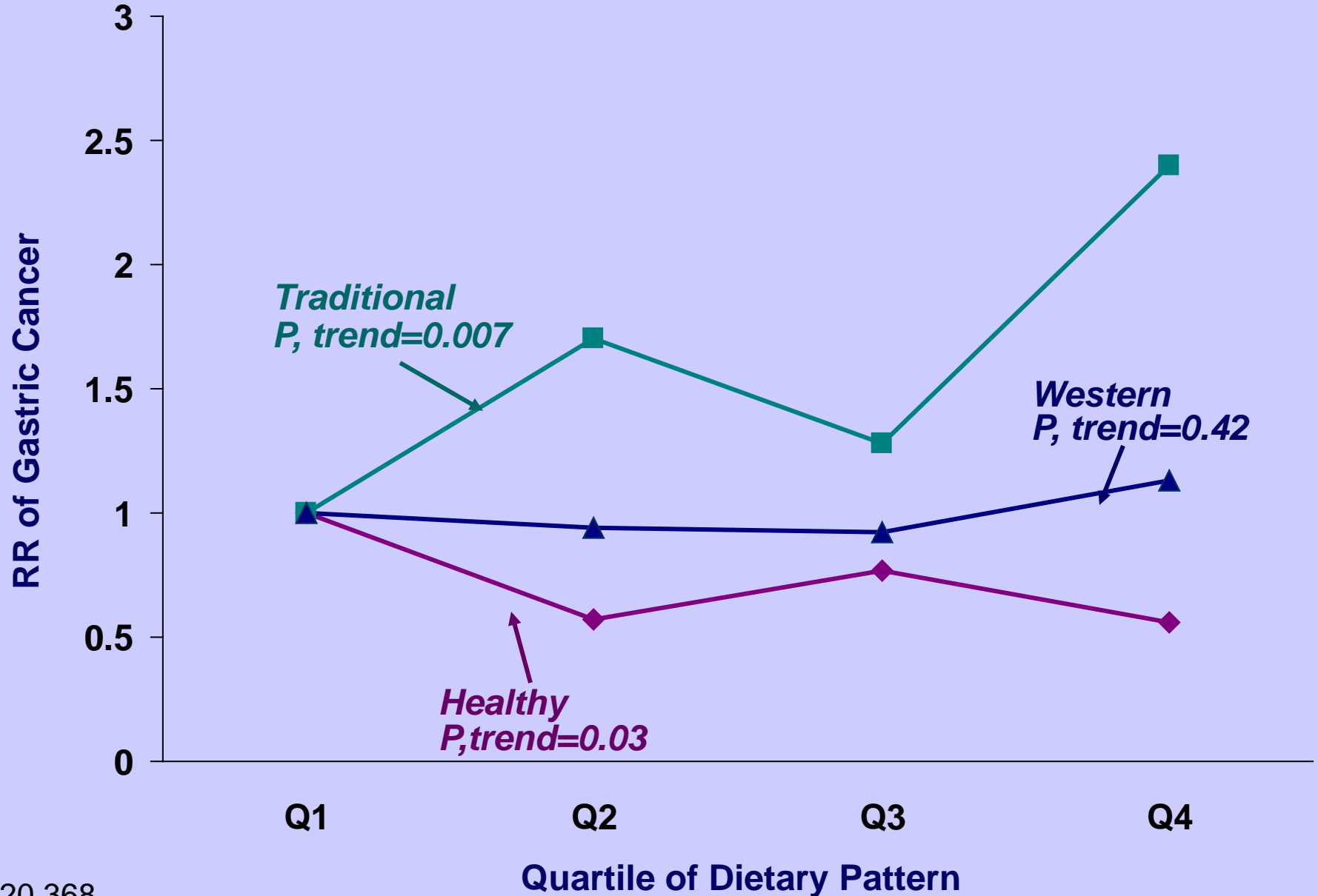
100-fold variation in obesity prevalence
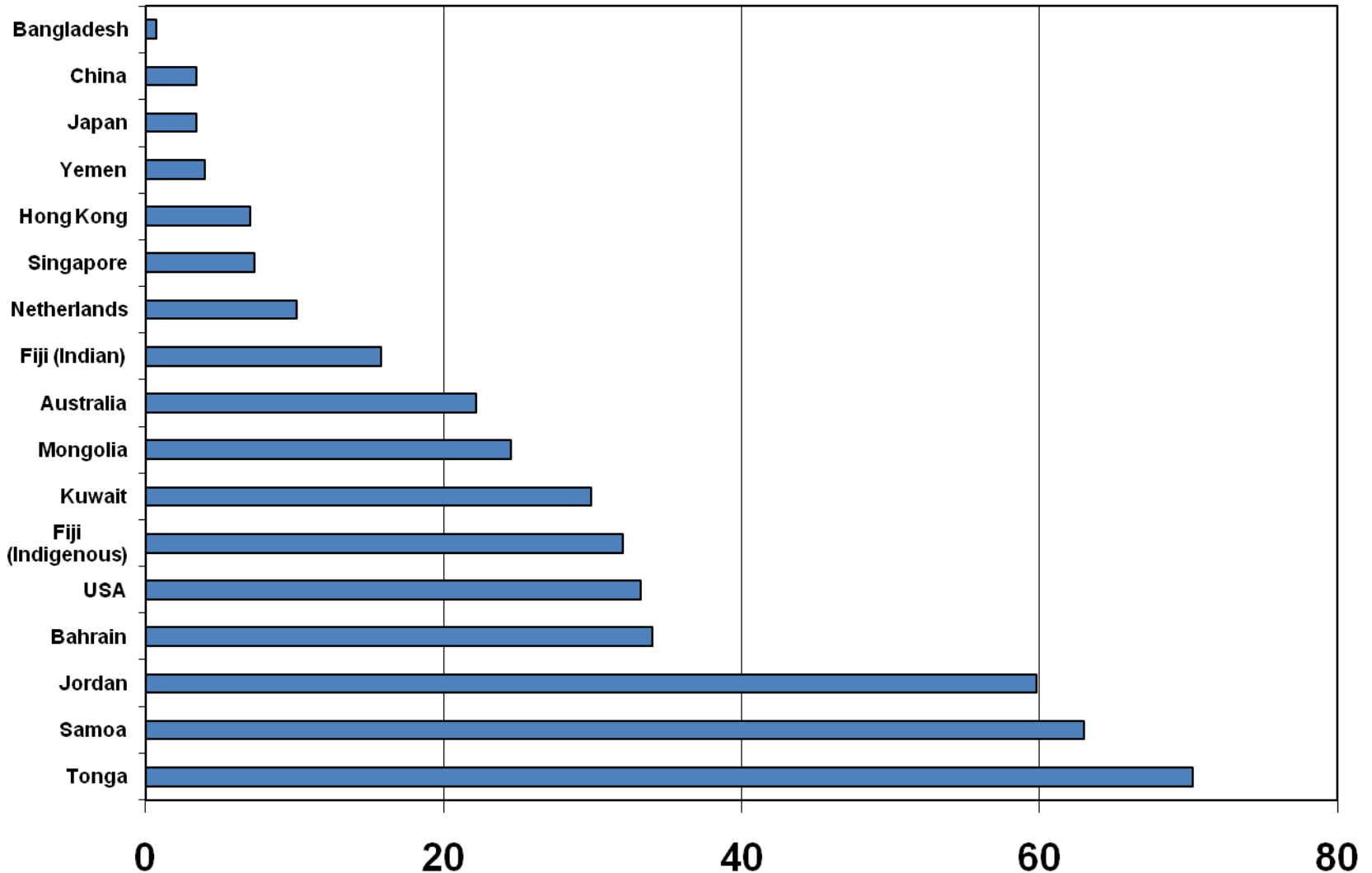
Prevalence of obesity (BMI>30) in adult women
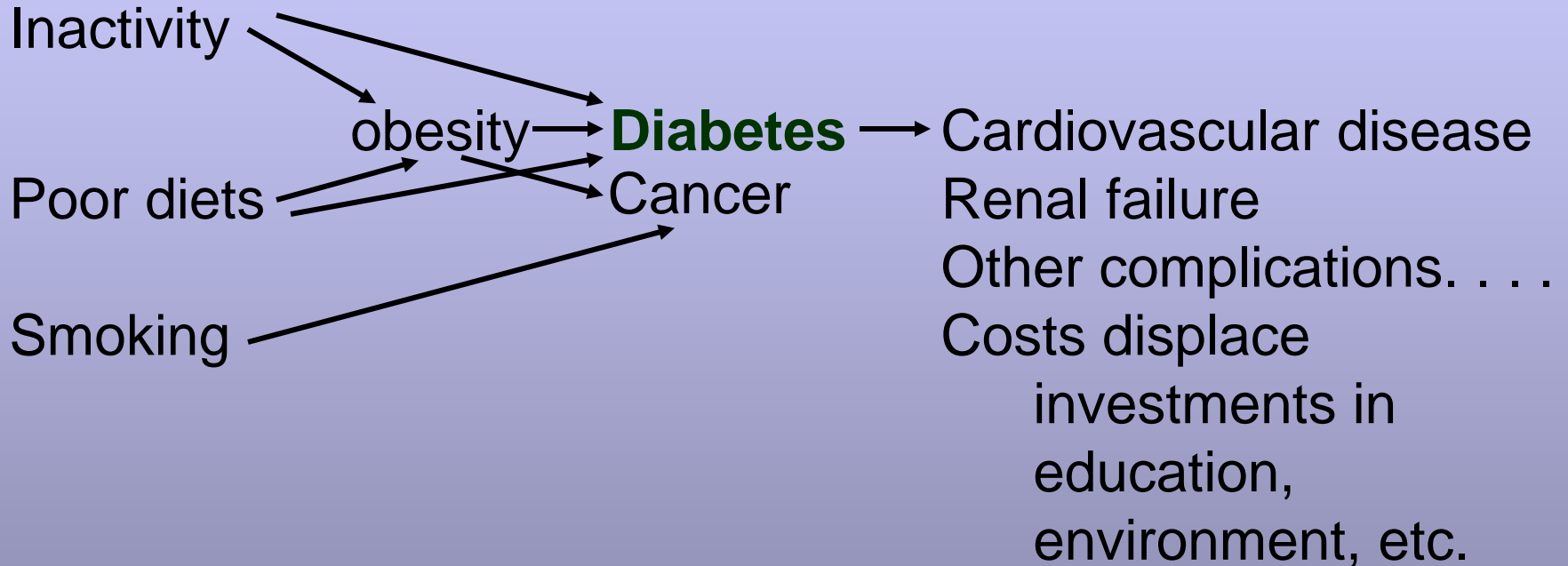
29.302

IOTF database

(Age-adjusted change in red meat consumption in NHS women, 1980-2006)

(Pan et al. AJCN)

0.325

Reason to Focus on Diabetes

**Underlying
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Inactivity

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Smoking

obesity ⟶ **Diabetes** ⟶ Cardiovascular disease

Cancer

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Other complications. . . .

Costs displace
     investments in
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Approach to Diabetes Prevention: Holistic (Ecological) vs Medical

- Education
- Healthy environment
- Availability of healthy foods
- Economic
- All policies (more than MOH)

25.156