obesity, its distribution cardiovascular disease and diabetes

Beverley Balkau
INSERM U780-IFR69
France

epidemiology of adiposity

- definitions
- frequencies
- increases in frequency
- cross-sectional associations with CVD and diabetes
- prospective studies
- clinical trials reducing obesity

adiposity measures

"EPIDEMIOLOGICAL" MEASURES

- weight, height
- waist, hip, thigh circumferences
- skinfolds

- Body Mass Index (weight/height^2)
- waist hip ratio, waist height ratio

- % fat by impedance measures

SCANS

- visceral and subcutaneous fat at different levels

overweight/obesity

- Body Mass Index - BMI

< 18.5 kg/m²	underweight
18.5 – 25 kg/m²	normal weight
25 – 30 kg/m²	overweight/preobese
30 - 35 kg/m²	obese class I
35 - 40 kg/m²	obese class II
≥ 40 kg/m²	obese class III

WHO, 2000

abdominal adiposity

- waist circumference

men	women
> or ≥ 102 cm	> or ≥ 88 cm
≥ 94 cm	≥ 80 cm

Asian population propositions

Africa ?

WHO, 2002; Alberti Lancet 20005

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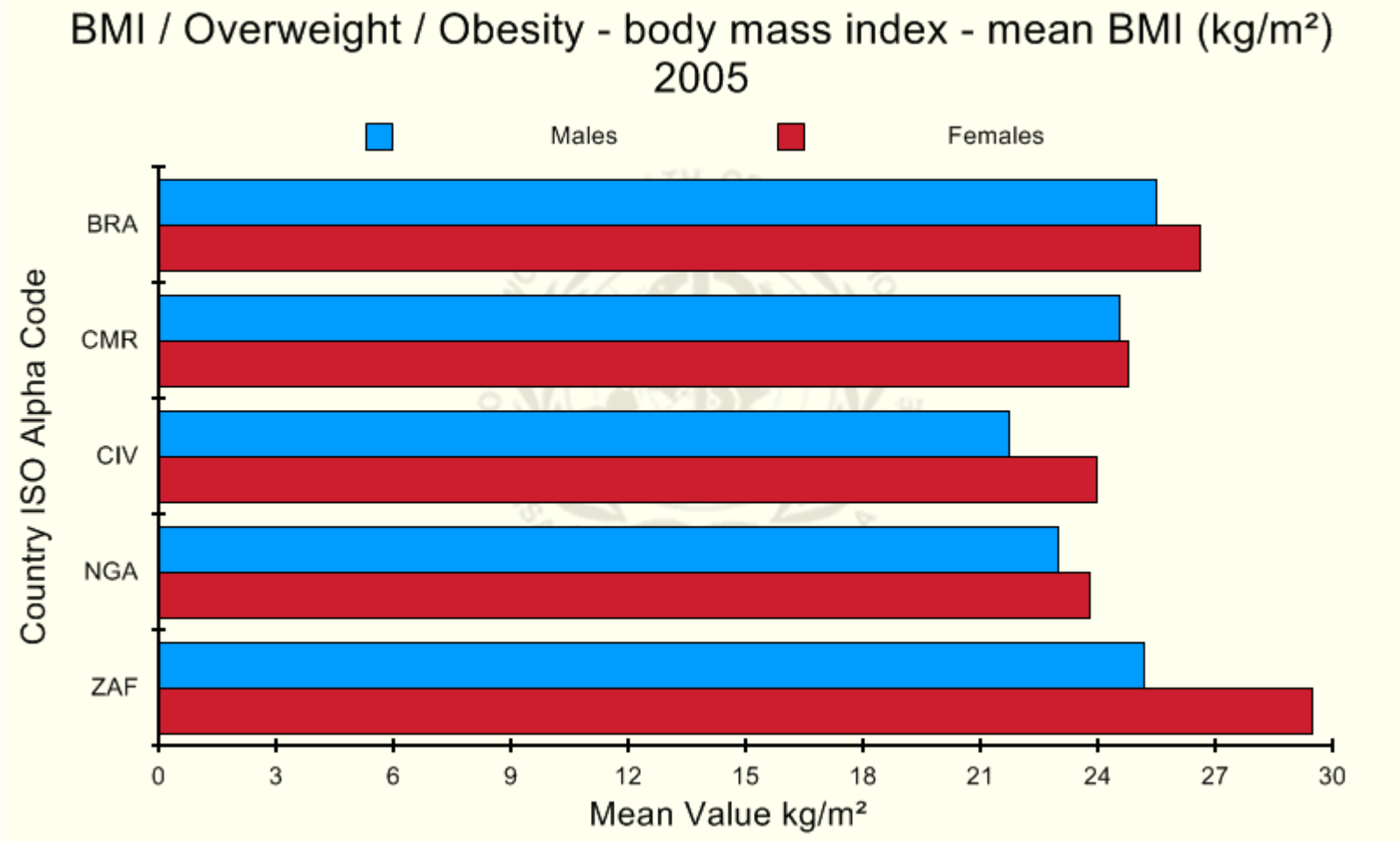
mean BMI (kg/m²)

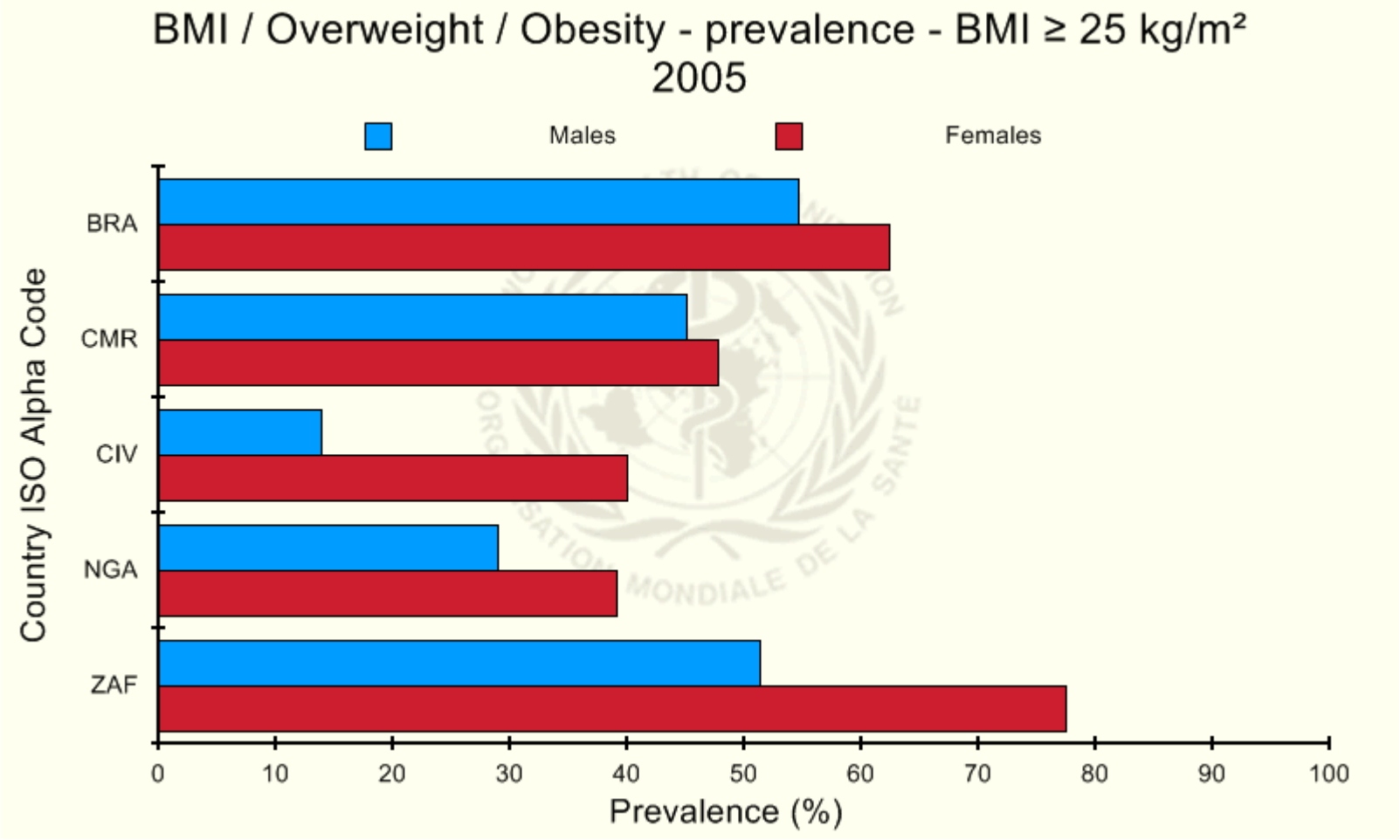
Brazil, Cameroon, Côte d'Ivoire, Nigeria, South Africa



http://www.who.int/ncd_surveillance/

overweight & obesity BMI ≥ 25 kg/m²

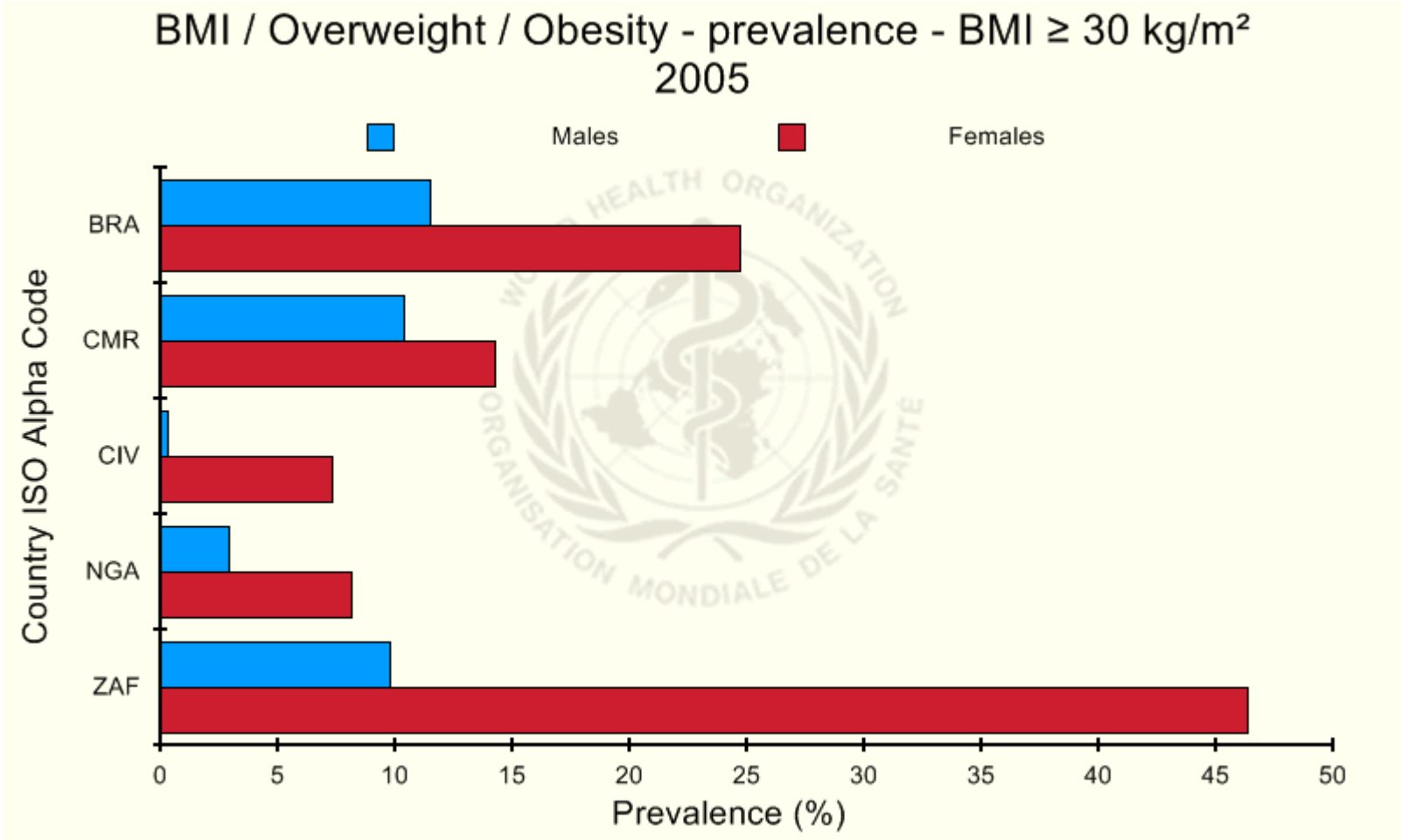
Brazil, Cameroon, Côte d'Ivoire, Nigeria, South Africa



http://www.who.int/ncd_surveillance/

obesity BMI ≥ 30 kg/m²

Brazil, Cameroon, Côte d'Ivoire, Nigeria, South Africa



http://www.who.int/ncd_surveillance/

worldwide
obesity, overweight
abdominal adiposity

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increases in adiposity over time

France: ObEpi - Roche

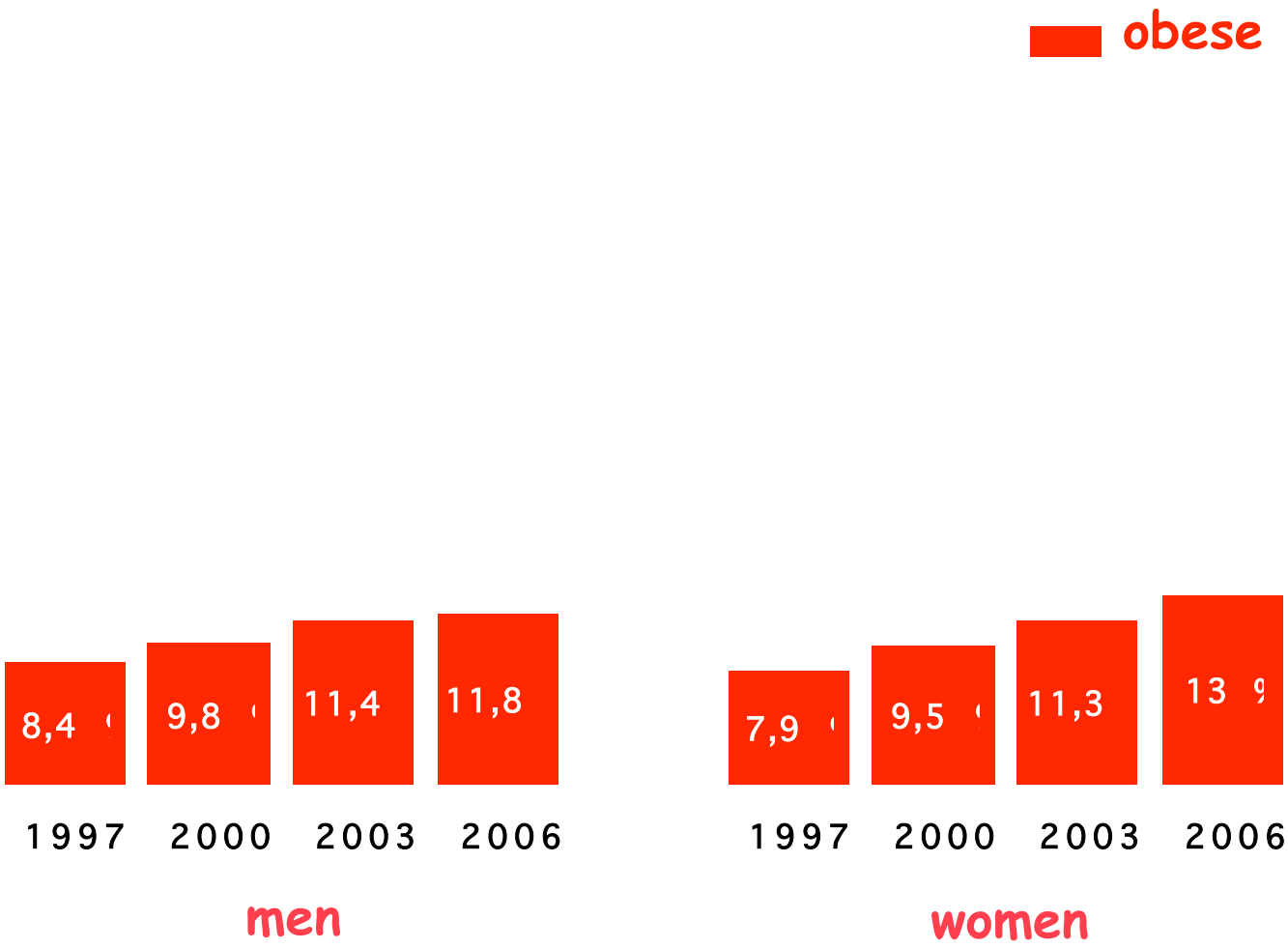
four surveys, every three years

self measure of

weight, height, waist circumference

prevalences 1997-> 2006

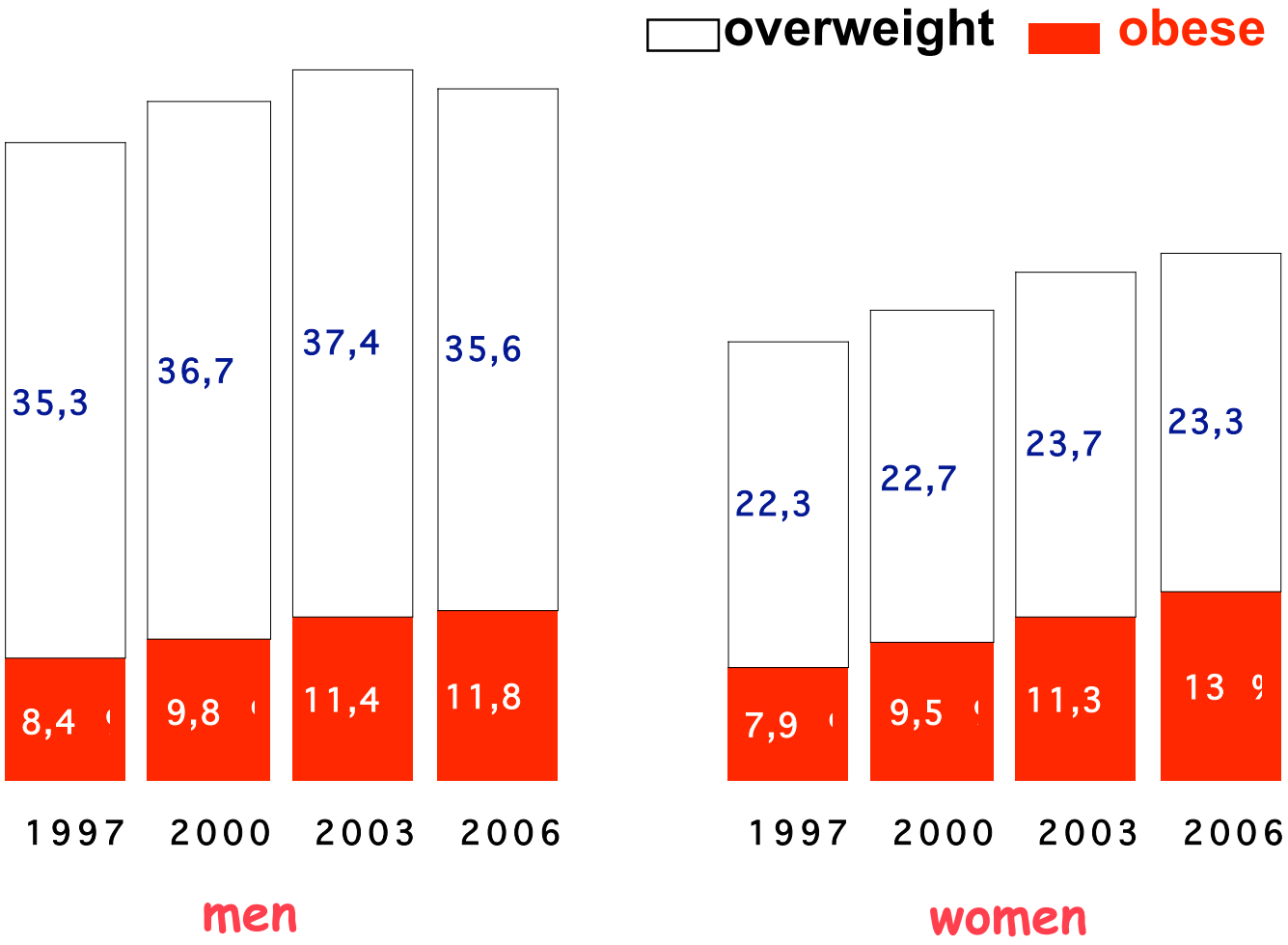
obesity France



ObÉpi - Roche 2006

prevalences 1997-> 2006

overweight, obesity France



ObÉpi - Roche 2006

mean waist 1997-> 2006
France

men

1997	90.5 cm	
		+ 1.2 cm
2000	91.7 cm	
		+ 0.8 cm
2003	92.5 cm	
		+ 0.4 cm
2006	92.9 cm	

mean waist 1997-> 2006
France

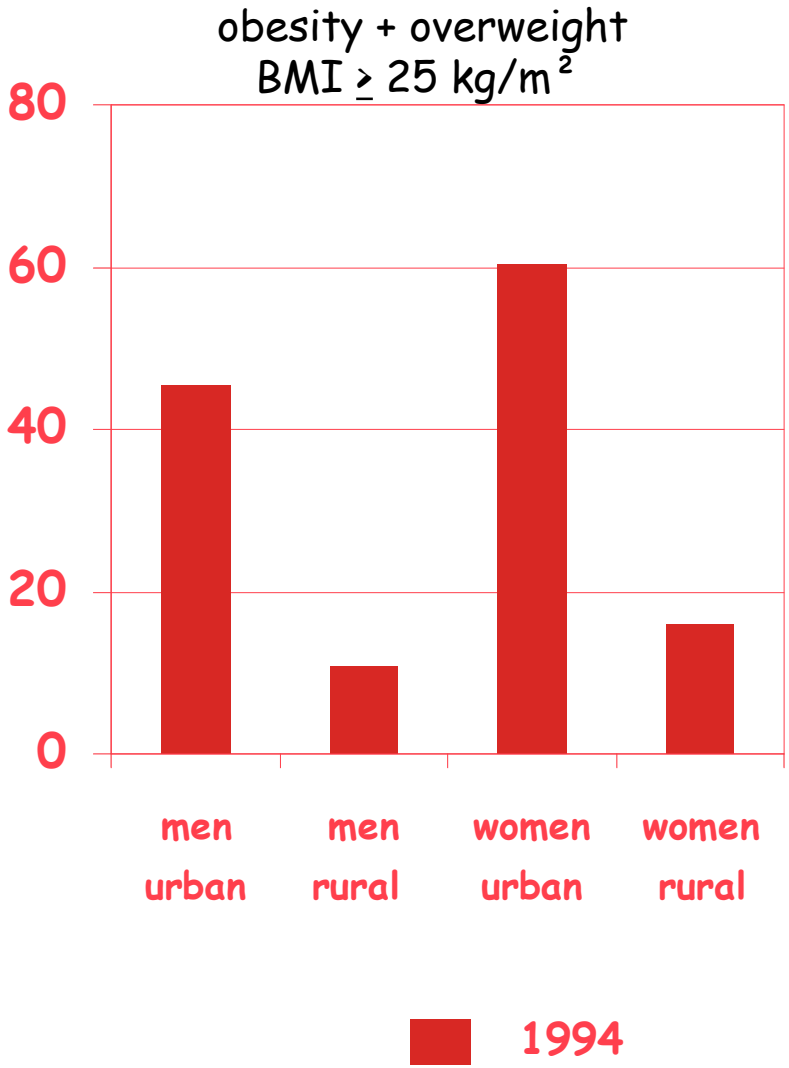
	men		women
1997	90.5 cm		79.2 cm
		+ 1.2 cm	
2000	91.7 cm		81.1 cm
		+ 0.8 cm	
2003	92.5 cm		82.3 cm
		+ 0.4 cm	
2006	92.9 cm		83.7 cm

	+ 1.9 cm
	+ 1.2 cm
	+ 1.4 cm

increases in adiposity over time

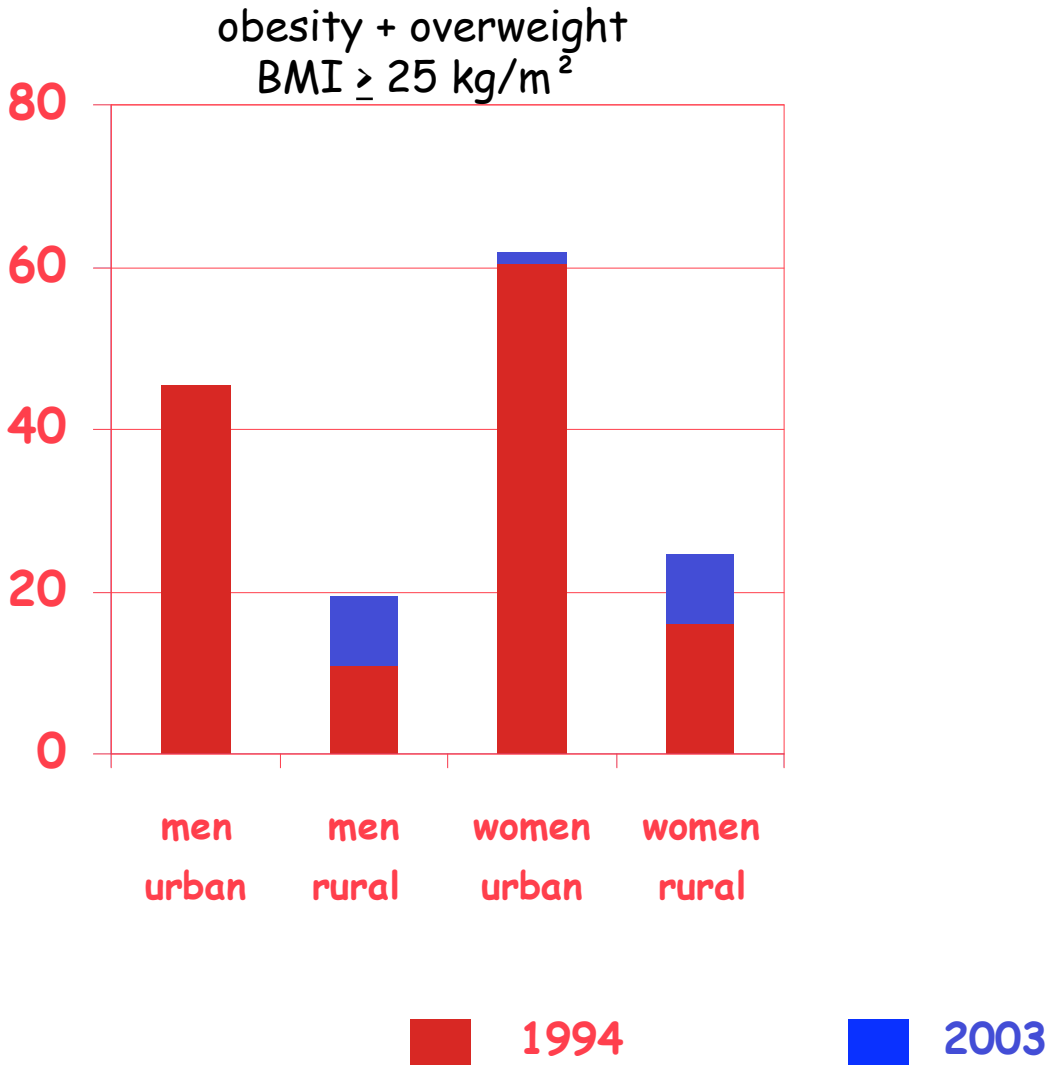
Cameroon surveys

obesity increasing in Cameroon



Fezeu, submitted

obesity increasing in Cameroon



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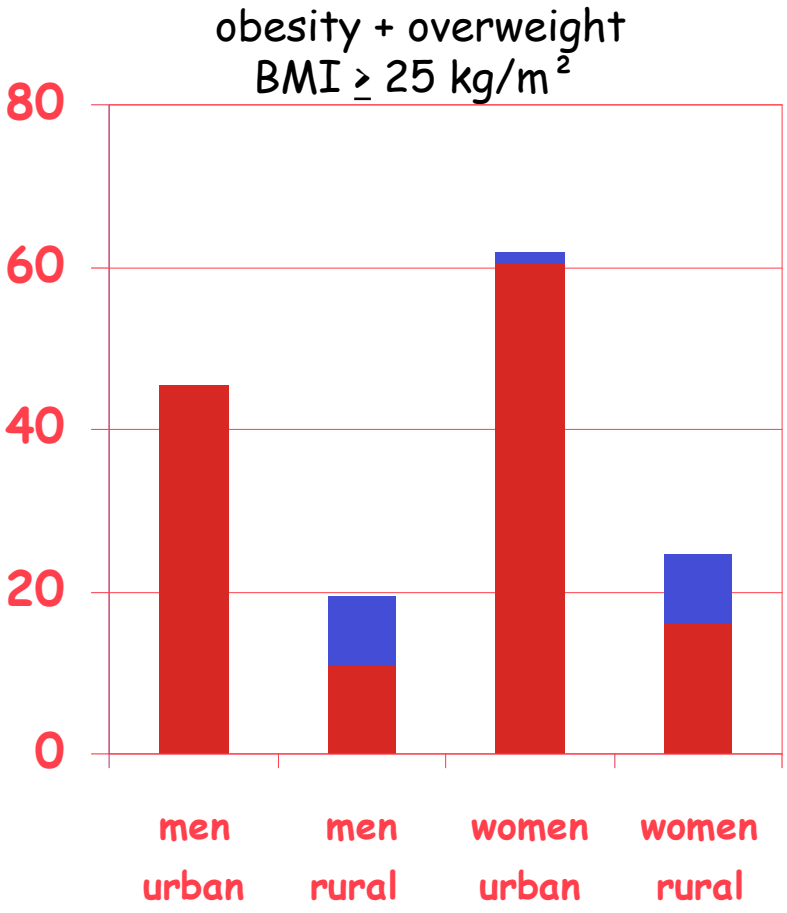
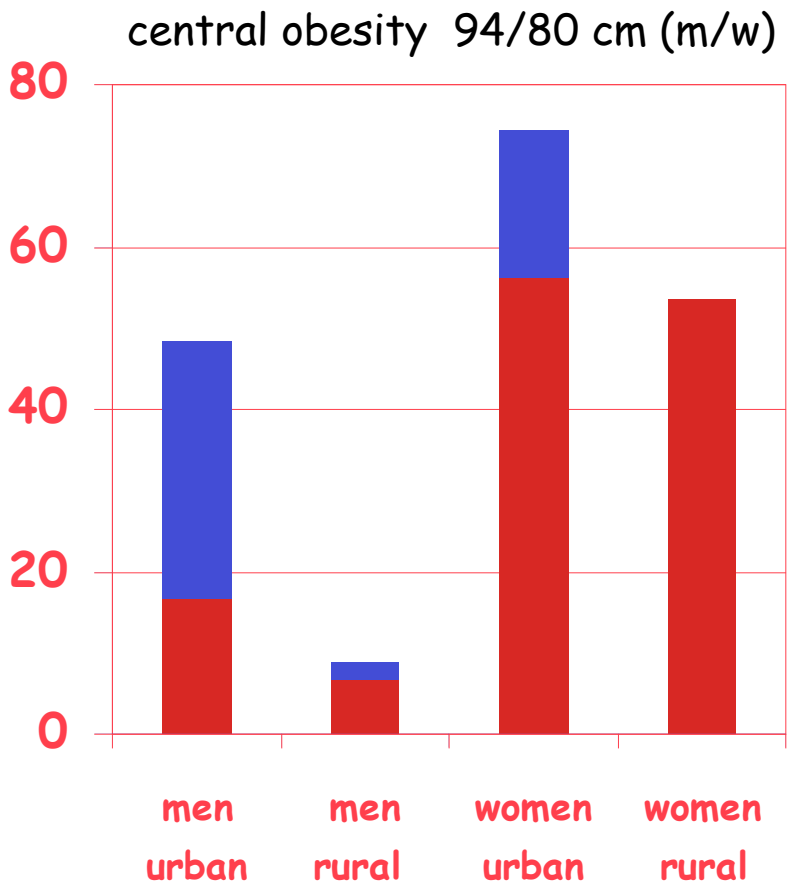
obesity increasing in Cameroon





1994 2003

Fezeu, submitted

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protocol – IDEA study

- random selection of primary care physicians in each region of each participating country
- physicians trained to
  - measure waist circumference, weight, height
  - complete a short form with
    - age,
    - sex,
    - presence of diabetes,
    - presence of cardiovascular disease

IDEA
INTERNATIONAL DAY FOR THE EVALUATION OF ABDOMINAL OBESITY

Odds Ratios (95% CIs) age and region adjusted **for CVD and Diabetes**

	waist quintiles (cm)				
	<76	**≥76 to <84**	**≥84 to <92**	**≥92 to <101**	**≥101**
CVD	1				
Diabetes					

odds ratios

- odds = probability / (1-probability) = [p/(1-p)]

odds ratios

- odds = probability / (1-probability) = [p/(1-p)]

- odds ratio = odds of one group/
  odds of reference group

odds ratios

- odds = probability / (1-probability) = [p/(1-p)]
- odds ratio = odds of one group/
  odds of reference group
- use logistic regression to evaluate odds

$$\log [p/(1-p)] = \alpha + \beta * \text{age} + \chi * \text{region} + \delta_i * \text{waist quintile}_i$$

Odds Ratios (95% CIs) age and region adjusted for CVD and Diabetes men &women

	waist quintiles (cm)				
	<84	≥84 to <92	≥92 to <99	≥99 to <107	≥107
	<76	≥76 to <84	≥84 to <92	≥92 to <101	≥101
CVD	1	1.1 (1.0-1.3)	1.3 (1.2-1.5)	1.6 (1.5-1.8)	2.2 (2.0-2.5)
	1	1.3 (1.1-1·4)	1.5 (1.3-1.7)	1.8 (1.6-2.0)	2.6 (2.4-2.9)
Diabetes	1	1.5 (1.3-1.7)	1.9 (1.7-2.1)	2.4 (2.1-2.7)	4.0 (3.6-4.4)
	1	1.8 (1.5-2.0)	2.5 (2.2-2.8)	3.7 (3·3-4.1)	6.8 (6.2-7.6)

IDEA
INTERNATIONAL DAY FOR THE EVALUATION OF ABDOMINAL OBESITY

odds ratios for diabetes

for a 1 Standard Deviation increase in waist and BMI

	waist	BMI
S Africa		
Men	1.7 (1.3-2.2)	1.5 (1.2-1.9)
Women	1·9 (1.5-2.4)	1.7 (1.3-2.1)
Overall		
Men	1.6 (1.5-1.7)	1.5 (1.4-1.6)
Women	1.8 (1.7-1.9)	1.7 (1.6-1.8)

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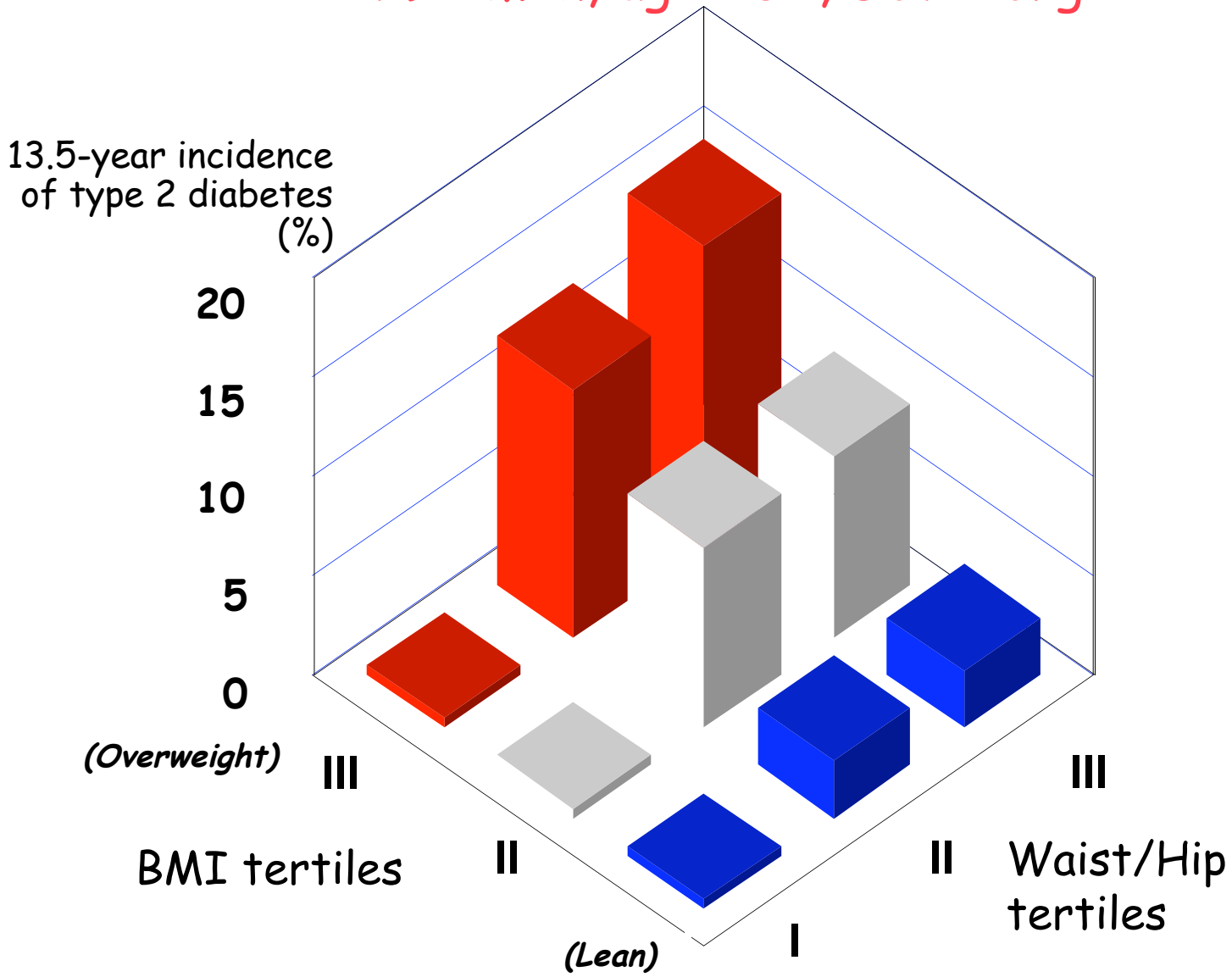
incidence of type 2 diabetes

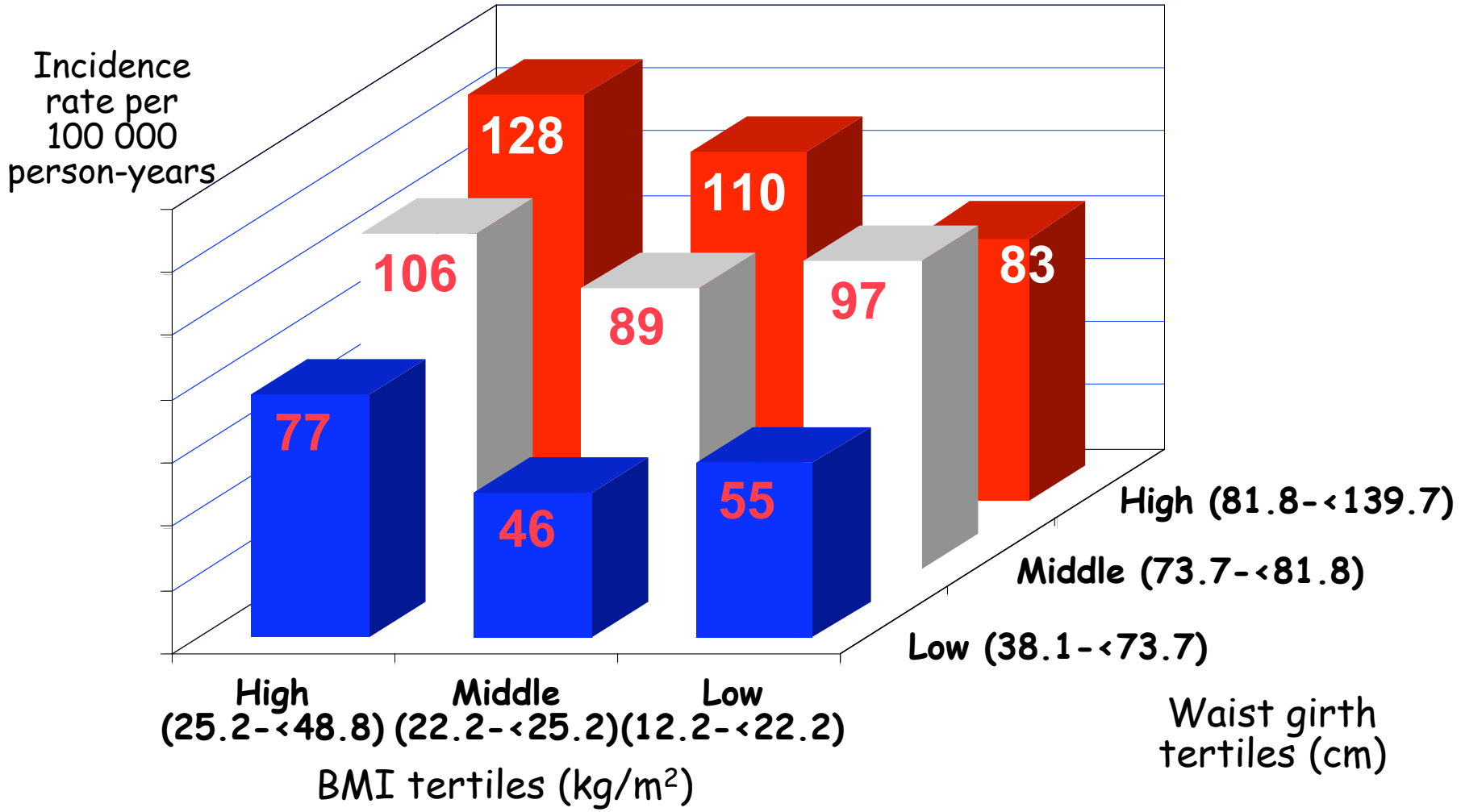
792 men, aged 54, Goteborg



Ohlson Diabetes 1985

coronary heart disease in women

The Nurses' Health Study : 8 year follow-up



Rexrode JAMA 1998

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Finnish Diabetes Prevention Study

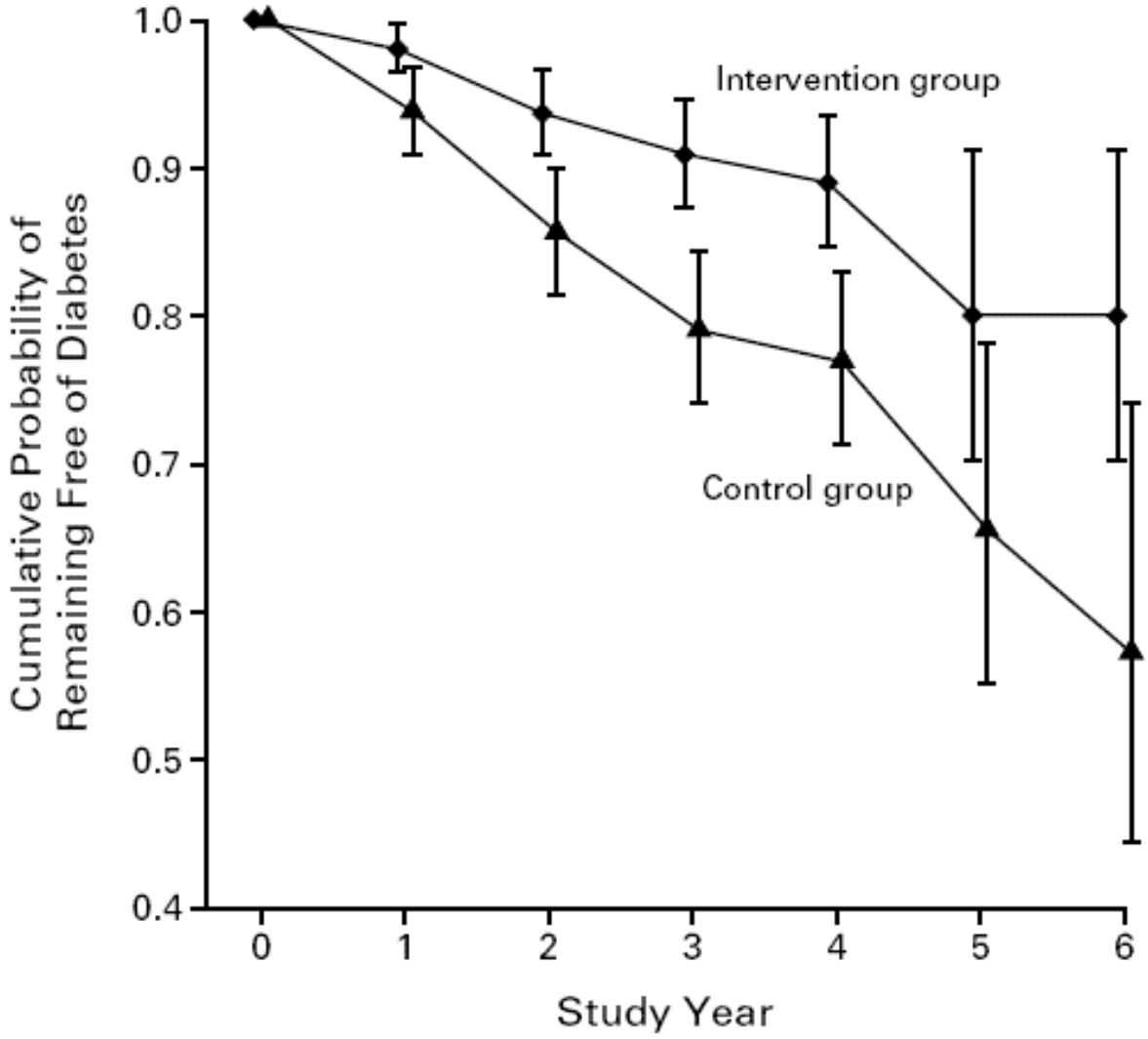
Aim: delay onset of Type II diabetes in overweight (BMI $\geq$ 25 kg/m^2) & impaired glucose tolerance (OGTT) by lifestyle changes

intervention and success for goals
Finnish Diabetes Prevention Study

	intervention n=256	control n=250	p
weight loss > 5%	43%	13%	0.001
fat intake < 30% energy	47%	26%	0.001
saturated fat < 10% energy	26%	11%	0.001
fibre intake < 15 g/1000 kcal	25%	12%	0.001
exercise > 4hr/wk	86%	71%	0.001
change in weight (kg)	-4.2	-0.8	0.001
change in waist (cm)	-4.4	-1.3	0.001

Tuomilehto NEJM 2001

diabetes incidence
Finnish Diabetes Prevention Study



Tuomilehto NEJM 2001

diabetes incidence post intervention

Finnish Diabetes Prevention Study

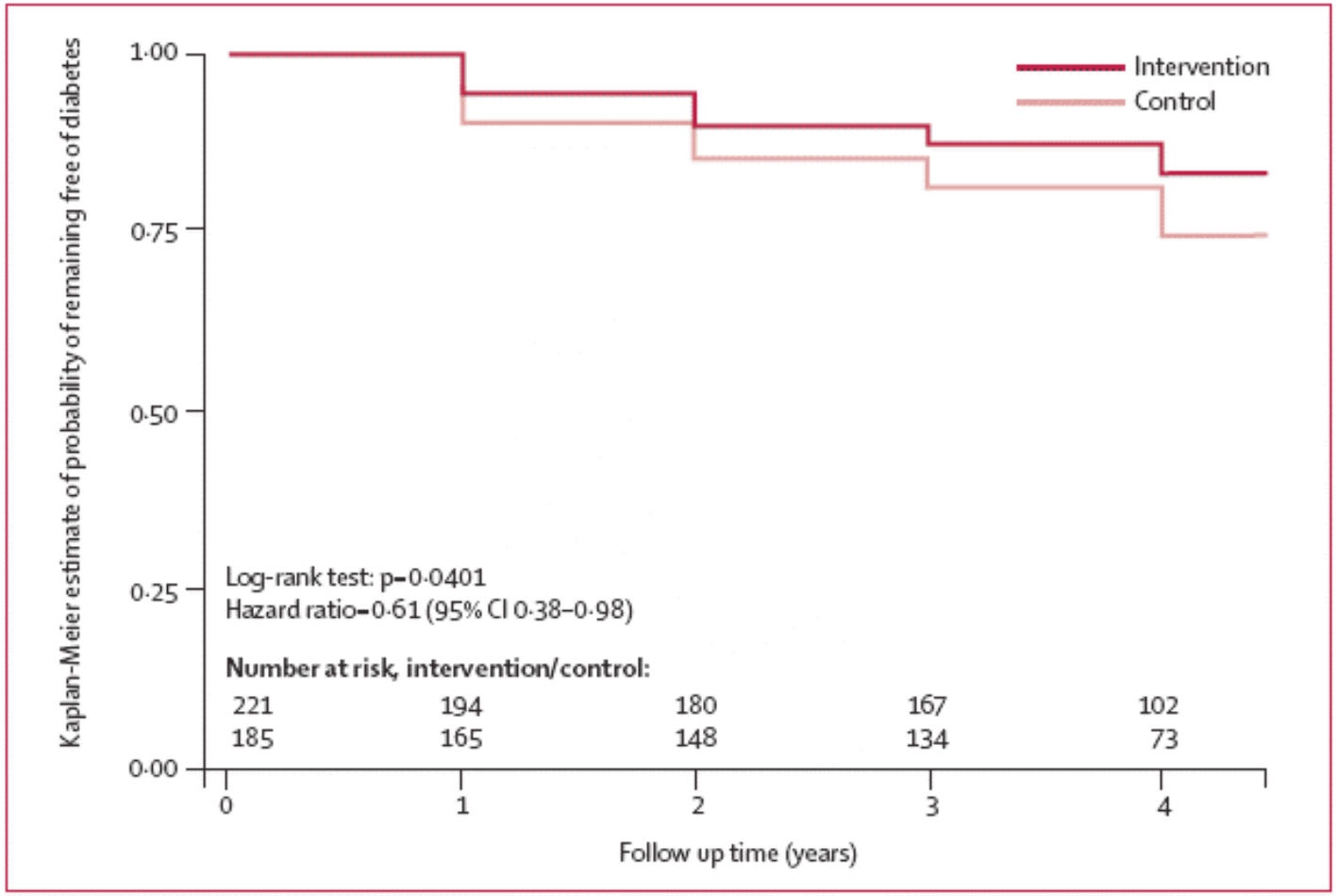


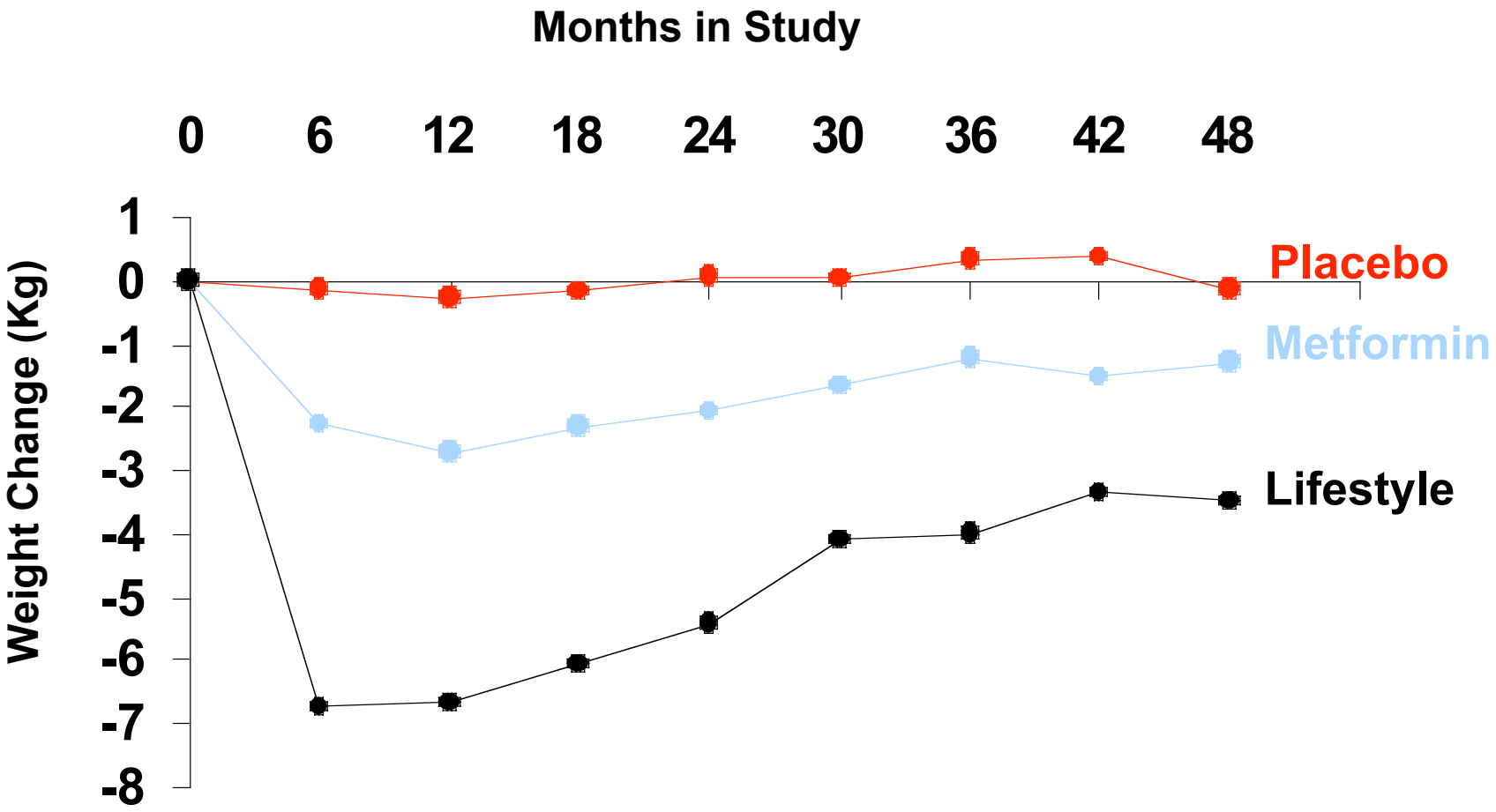
Figure 3: Diabetes by treatment group during the post-intervention follow-up period

Lindstrom Lancet 2006

Diabetes Prevention Program

Aim: delay onset of Type II diabetes in
by lifestyle changes
or by metformin treatment
in IGT patients

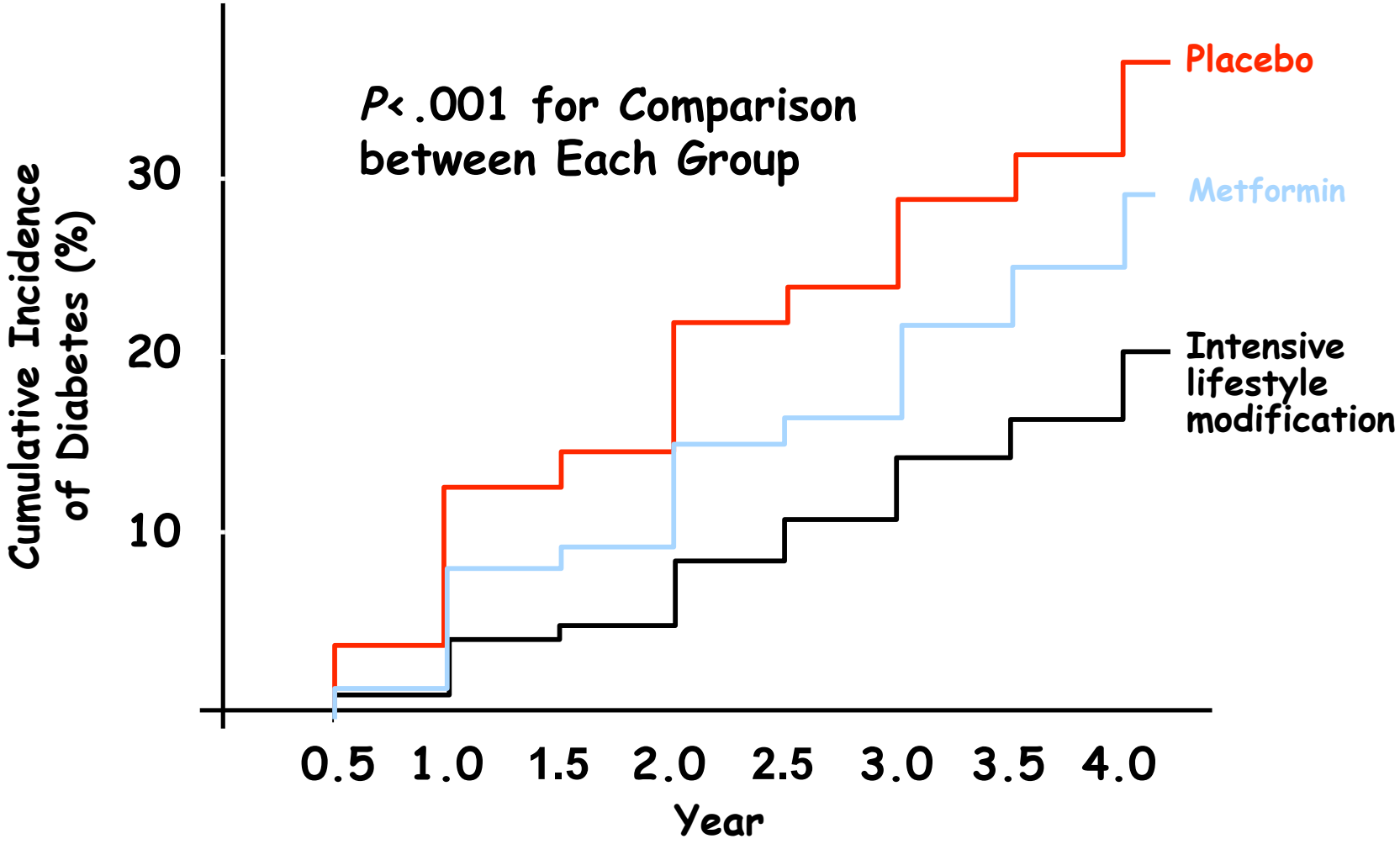
mean weight change:
Diabetes Prevention Program



Diabetes Prevention Program Research Group. N Engl J Med. 2002.

incidence of type 2 diabetes

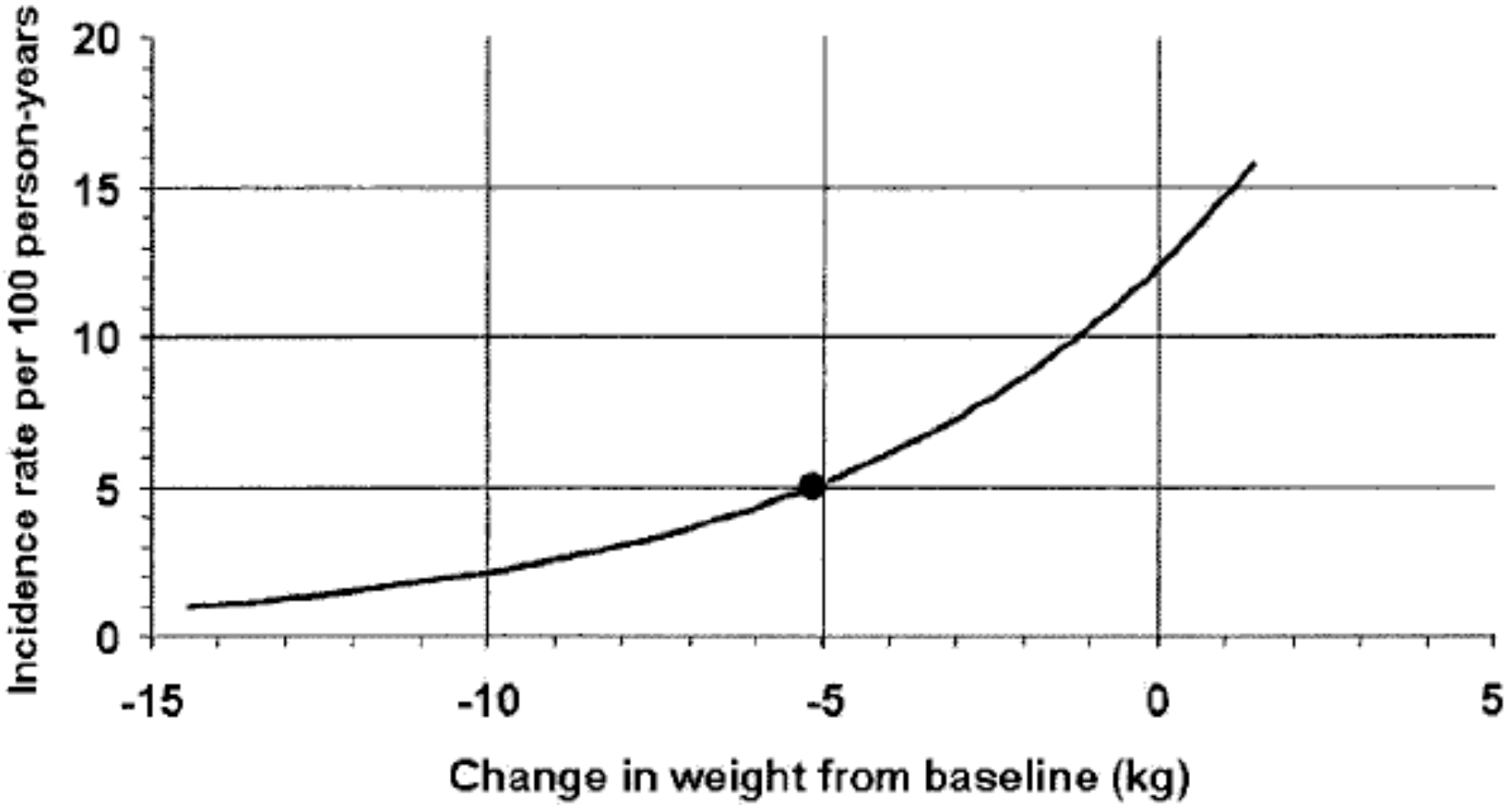
Diabetes Prevention Program



Diabetes Prevention Program Research Group. N Engl J Med. 2002

incidence of type 2 diabetes

Diabetes Prevention Program
lifestyle intervention group



Hamman Diabetes Care 2006

in conclusion

- overweight, obesity, abdominal adiposity are common
- they are generally increasing in all parts of the world
- they are associated with and are precursors of
  - CVD
  - Diabetes
  - … many other health problems
- reducing obesity/abdominal adiposity **probably** has an effect on CVD and diabetes