PREVIEW

PREVention of diabetes through lifestyle Intervention and population studies in Europe and around the World

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PREVIEW – Impact

- The PREVIEW project aims to **improve the health of the population** by defining a dietary regime, which in combination with physical activity can prevent the escalation of diabetes and its complications.

- The project will also **evaluate the moderating and/or mediating influence of social-ecological variables** such as social-cognitive determinants of behavioural change and habitual behaviour, social environmental influences, cultural habits, socioecological and socio-economic components, as well as sleeping pattern and chronic stress.

PREVIEW – Impact

- ✓ Such a cross disciplinary approach makes the **project the most ambitious of its kind**
- ✓ The project will generate a considerable amount of **new knowledge**, which will give information for successful **prevention of diabetes** and ensuing complications by lifestyle changes

BACKGROUND

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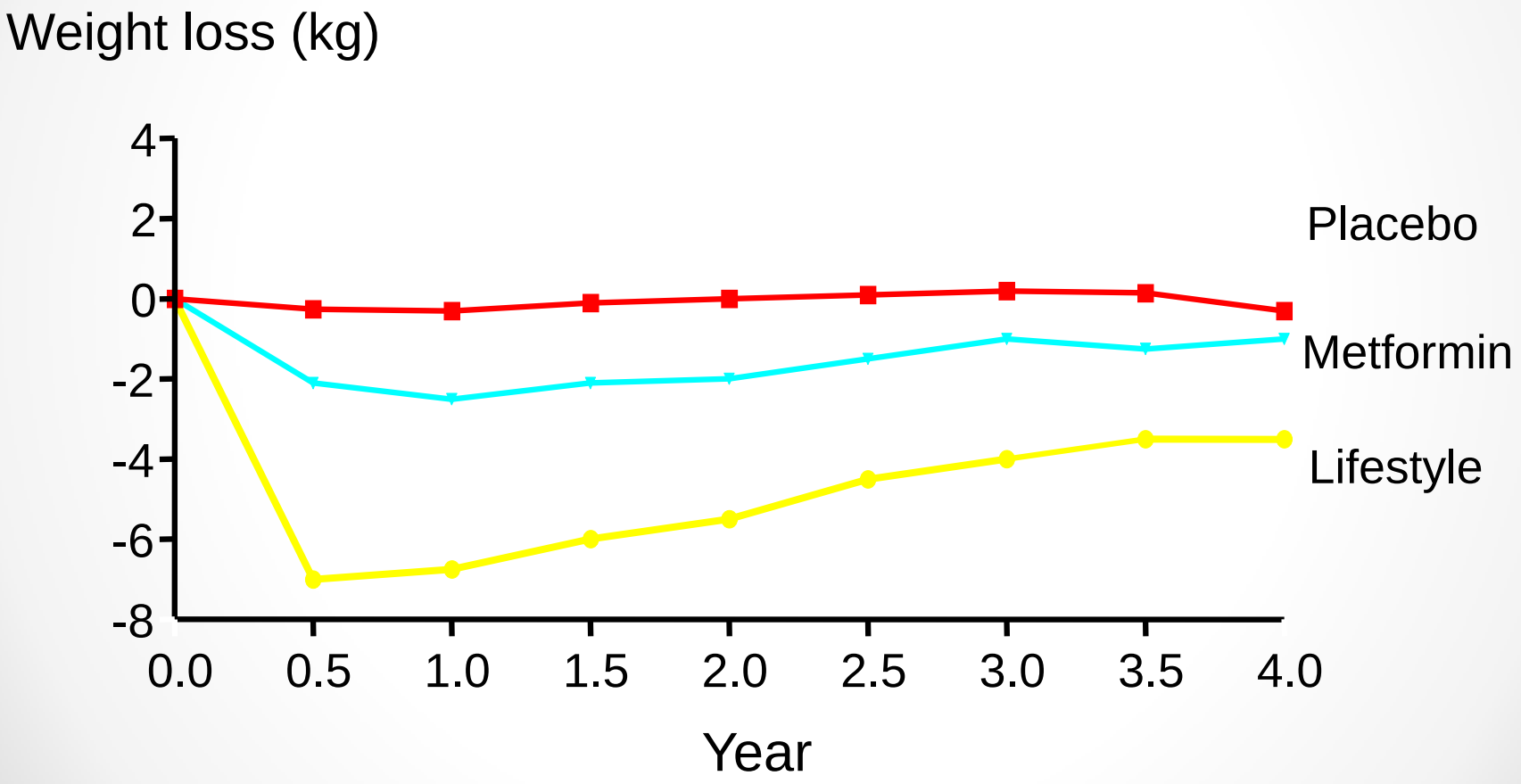
Lifestyle Intervention Studies

Evidence from RCTs

Intensive lifestyle interventions in adults with IGT

- 5 RCT show that **sustained weight loss is** highly effective for T2D prevention:
  - Malmo (Sweden) risk reduction ↓63%
  - DaQing (China) by ↓46%
  - Diabetes Prevention Study (Finland) by ↓58%
  - Diabetes Prevention Program (USA) by ↓58%
  - Japanese Diabetes Prevention Study by ↓67%

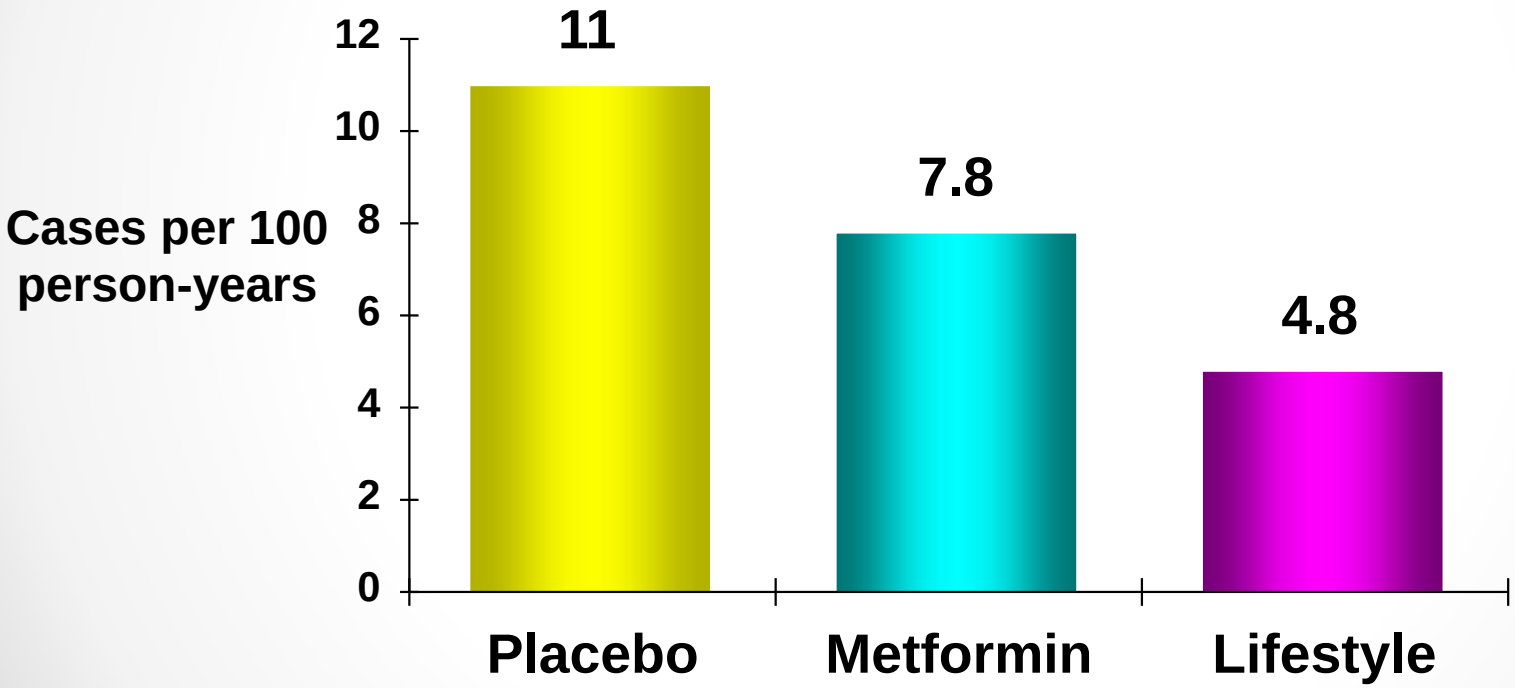
Weight loss in the Diabetes Prevention Program



DPP. N Engl J Med. 2002; 346: 393-403

Diabetes Prevention Program

n = 3234 people with IGT, incidence of diabetes, 3 y of follow-up



DPP Study Group. NEJM 2002; 346; 393

Lifestyle intervention in DPP

- Achieve >7% weight loss using low sat fat/hi carb diet: Tot fat < 30% tot cals, sat fat < 10%
- Exercise at moderate intensity >150 min/wk
- 16 lesson curriculum covering diet, exercise and behaviour modification
  - taught by dietitians = 'lifestyle coaches'
  - emphasis on low fat diet
  - one-to-one during the first 6 months
  - subsequent monthly sessions (individual, group)
- Behavioural self-management

DPP Study Group. NEJM 2002; 346; 393

Diabetes prevention studies show that intensive lifestyle interventions that result in sustained weight loss reduce the risk of type 2 diabetes

They don't tell us which diet is best for weight loss or prevention of weight re-gain

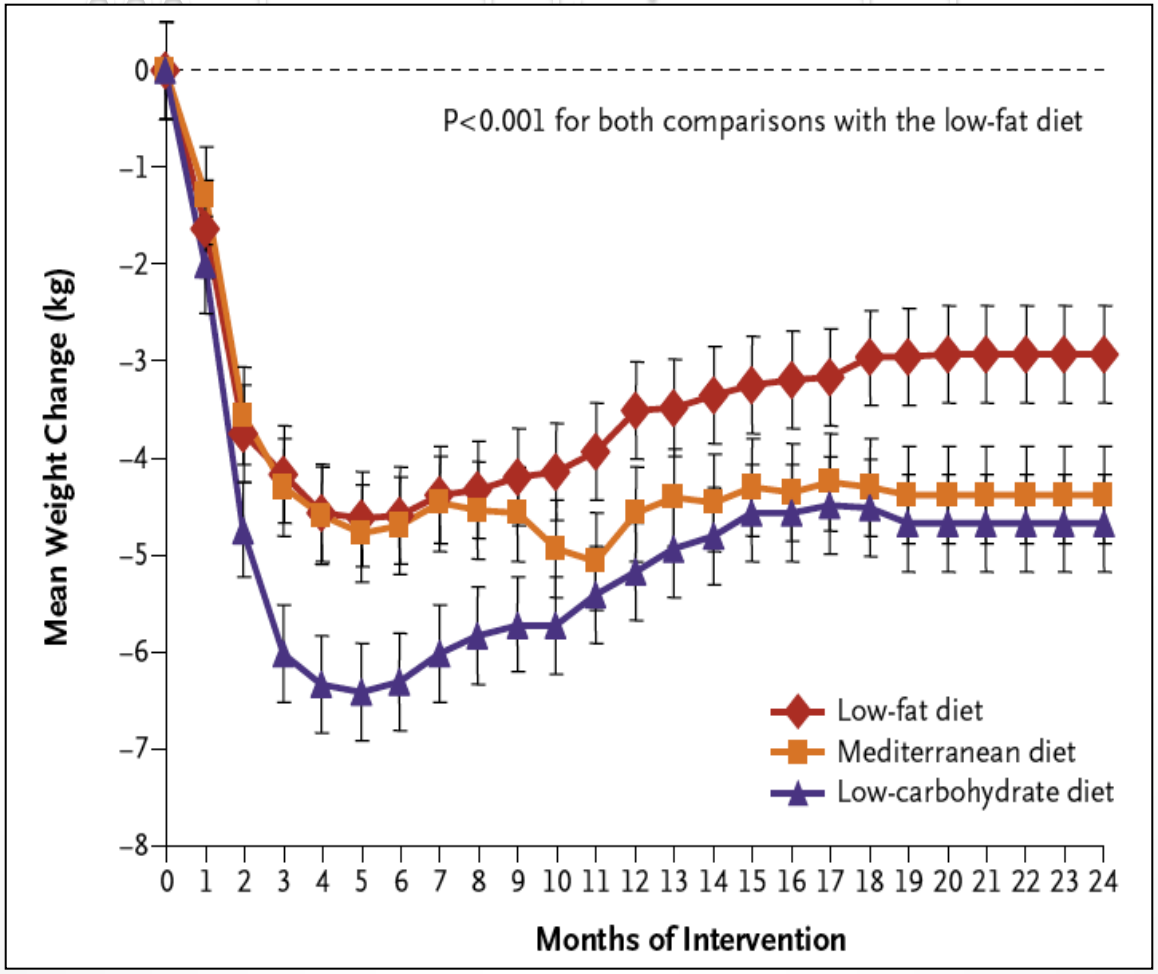
Which diets work?

What do we mean by 'work'?

- For weight reduction?
- For prevention of weight re-gain?
- To reduce risk of chronic disease?
- Sustainable (adherence)?

Mediterranean diets prevent re-gain

322 obese subjects, 3 diets for 2 y follow up



Shai et al. New Engl J Med 2008

Mediterranean diet for Primary Prevention of CVD

Estruch R et al, NEJM 2013

- Spanish multicentre trial, n = 7447 at high CVD risk
- 3 diets: i) Med diet supplemented with olive oil (1L/wk); ii) Med diet with mixed nuts (30g/d); iii) control diet: just advised to reduce saturated fat

Table 1. Summary of Dietary Recommendations to Participants in the Mediterranean-Diet Groups and the Control-Diet Group.

Food	Goal
Mediterranean diet	
Recommended	
Olive oil*	≥4 tbsp/day
Tree nuts and peanuts†	≥3 servings/wk
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/day
Fish (especially fatty fish), seafood	≥3 servings/wk
Legumes	≥3 servings/wk
Sofrito‡	≥2 servings/wk
White meat	Instead of red meat
Wine with meals (optionally, only for habitual drinkers)	≥7 glasses/wk
Discouraged	
Soda drinks	<1 drink/day
Commercial bakery goods, sweets, and pastries§	<3 servings/wk
Spread fats	<1 serving/day
Red and processed meats	<1 serving/day
Low-fat diet (control)	
Recommended	
Low-fat dairy products	≥3 servings/day
Bread, potatoes, pasta, rice	≥3 servings/day
Fresh fruits	≥3 servings/day
Vegetables	≥2 servings/day
Lean fish and seafood	≥3 servings/wk
Discouraged	
Vegetable oils (including olive oil)	≤2 tbsp/day
Commercial bakery goods, sweets, and pastries§	≤1 serving/wk
Nuts and fried snacks	≤1 serving /wk
Red and processed fatty meats	≤1 serving/wk
Visible fat in meats and soups¶	Always remove
Fatty fish, seafood canned in oil	≤1 serving/wk
Spread fats	≤1 serving/wk
Sofrito‡	≤2 servings/wk

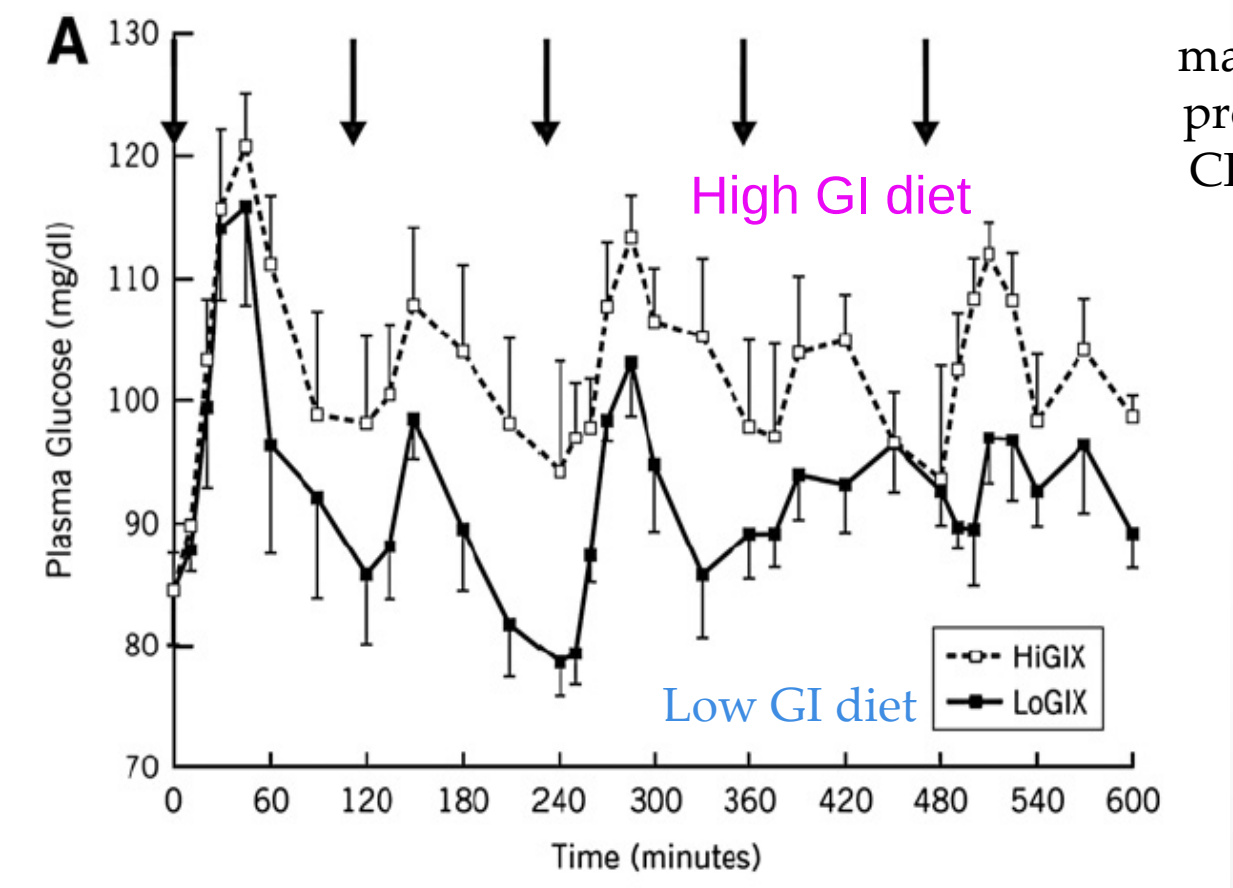
Mediterranean diet for Primary Prevention of CVD

Estruch R et al, NEJM 2013

- Similar adherence to Med diet in 3 gps at baseline
- Post intervention - 2 Med diet gps: ↑Scores on 12/14 item Med diet screener, in particular ↑fish and ↑legumes, ↑olive oil/nuts
- Trial stopped at median 4.8 yrs f/u, 30% risk reduction in CVD with Med diet

Low GI diets reduce day-long glucose levels

CGMS in overweight, pre-diabetic subjects

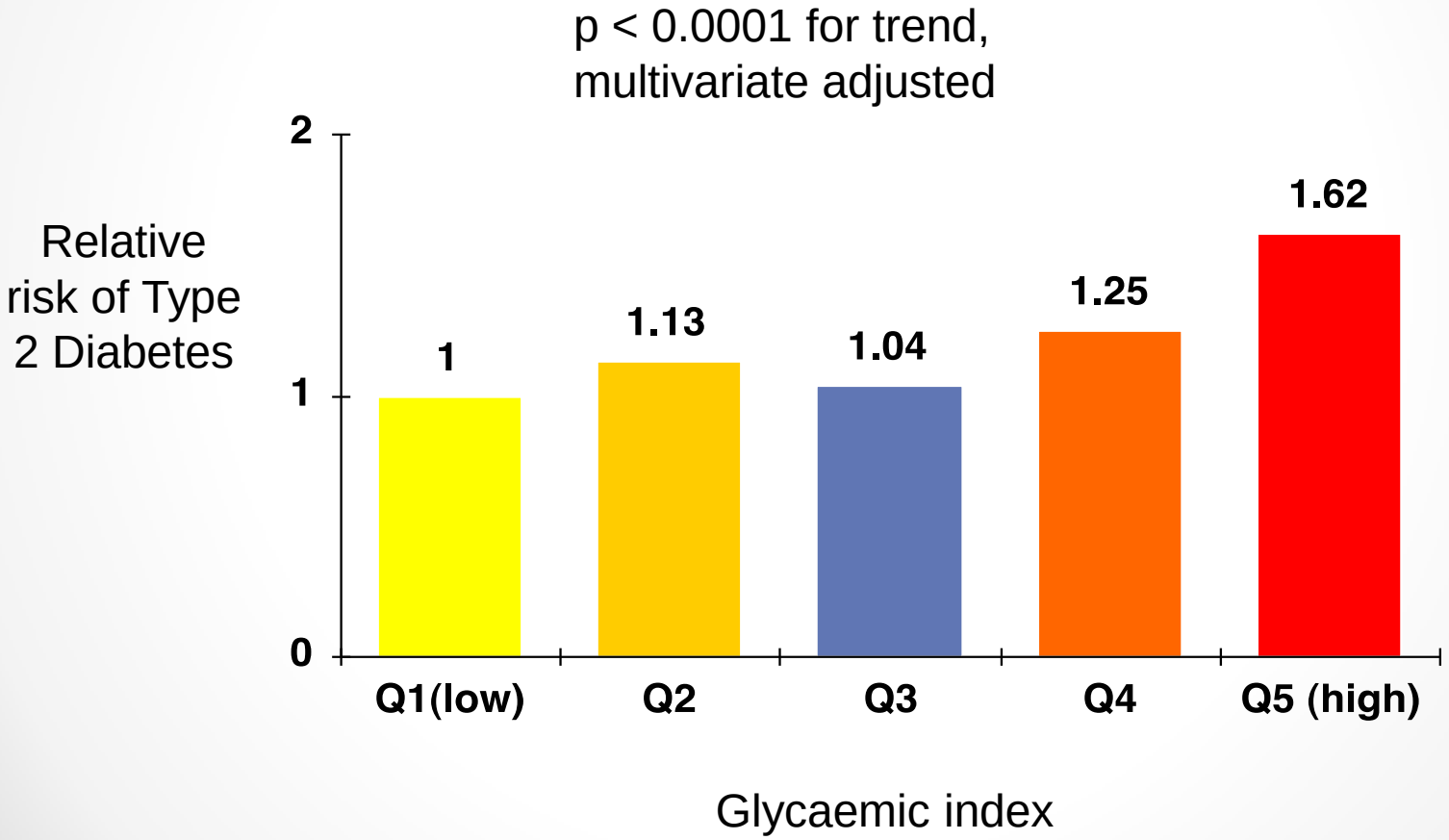


matched for protein, fat, CHO, fibre

Solomon et al. Am J Clin Nutr 2010

Low GI diets reduce risk of T2D

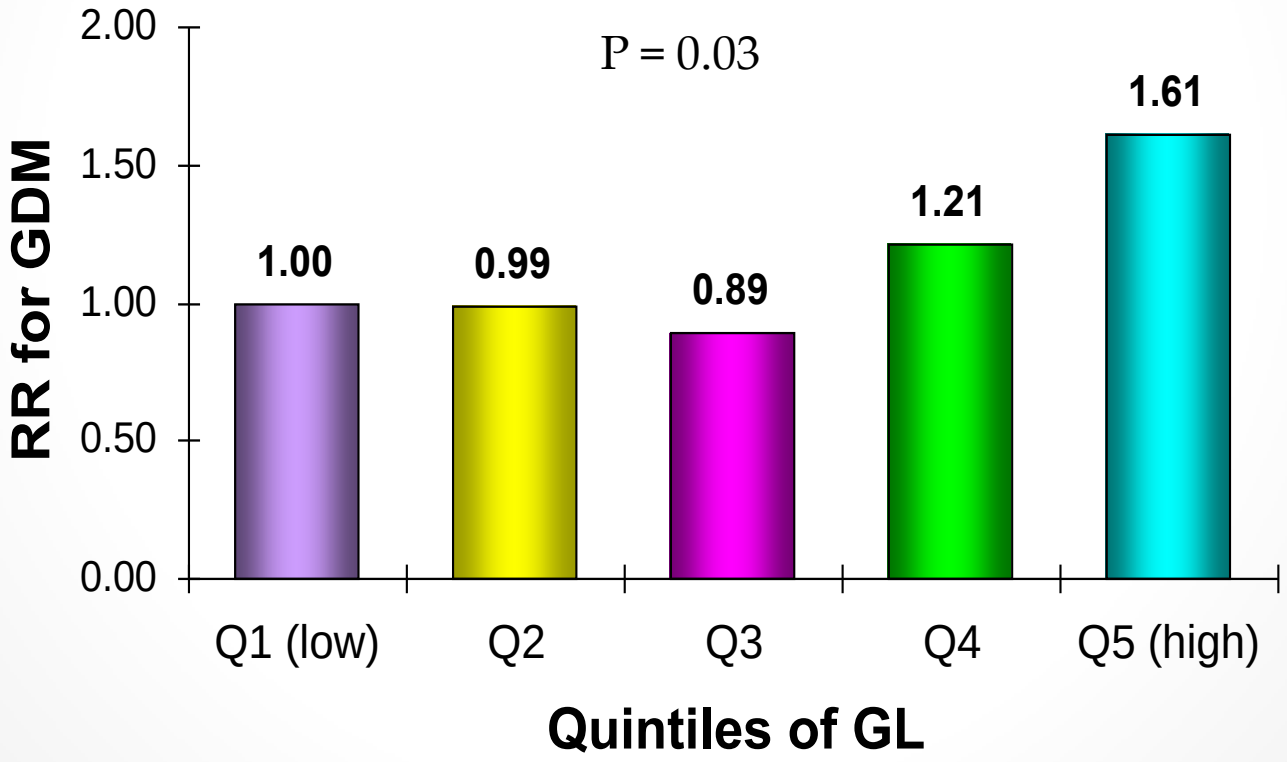
Nurses Health Study II, 8 years of follow-up in 91,000 women



Schultz et al, Am J Clin Nutr, 2004

Low GL diet reduces risk of GDM

RR of gestational diabetes over 8 y of follow up in 13,110 women



RR = relative risk

Zhang et al. Diabetes Care 2006

“DiOGenes” diet intervention

Multicentre trial in 8 European countries

Copenhagen (Astrup A, Larsen TM)
Maastricht (van Baak M, Saris W)

Berlin (Pfeiffer A)
Cambridge (Jebb S)
Prague (Kunesova M)
Pamplona (Martinez JA)
Sofia (Hanjieva S)
Heraklion (Kafatos A)

www.diogenes-eu.org

DIOGENES: Diets with High or Low Protein & GI for weight maintenance

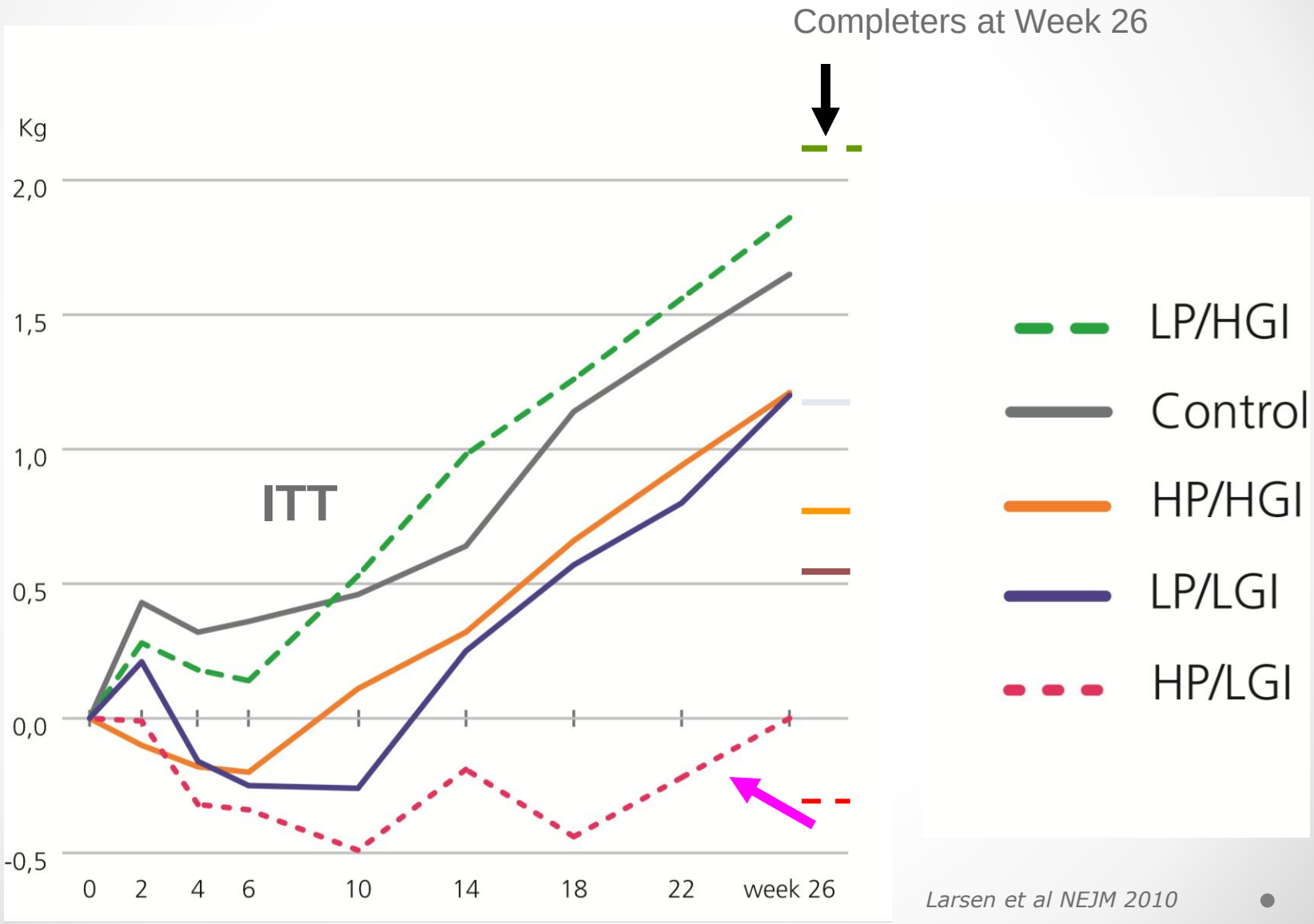
Larsen TM et al, NEJM 2010

- n = 773 assigned to 5 weight maintenance diets for 26 wks after 8% (11 kg) weight loss on LED
- Diets: HP(25%)/LGI, HP/HGI, LP (13%)/LGI, LP/HGI, Control Gp – as per guidelines, mod protein, no advice re GI
- Least weight regain on high protein/low GI diet

High protein, low GI

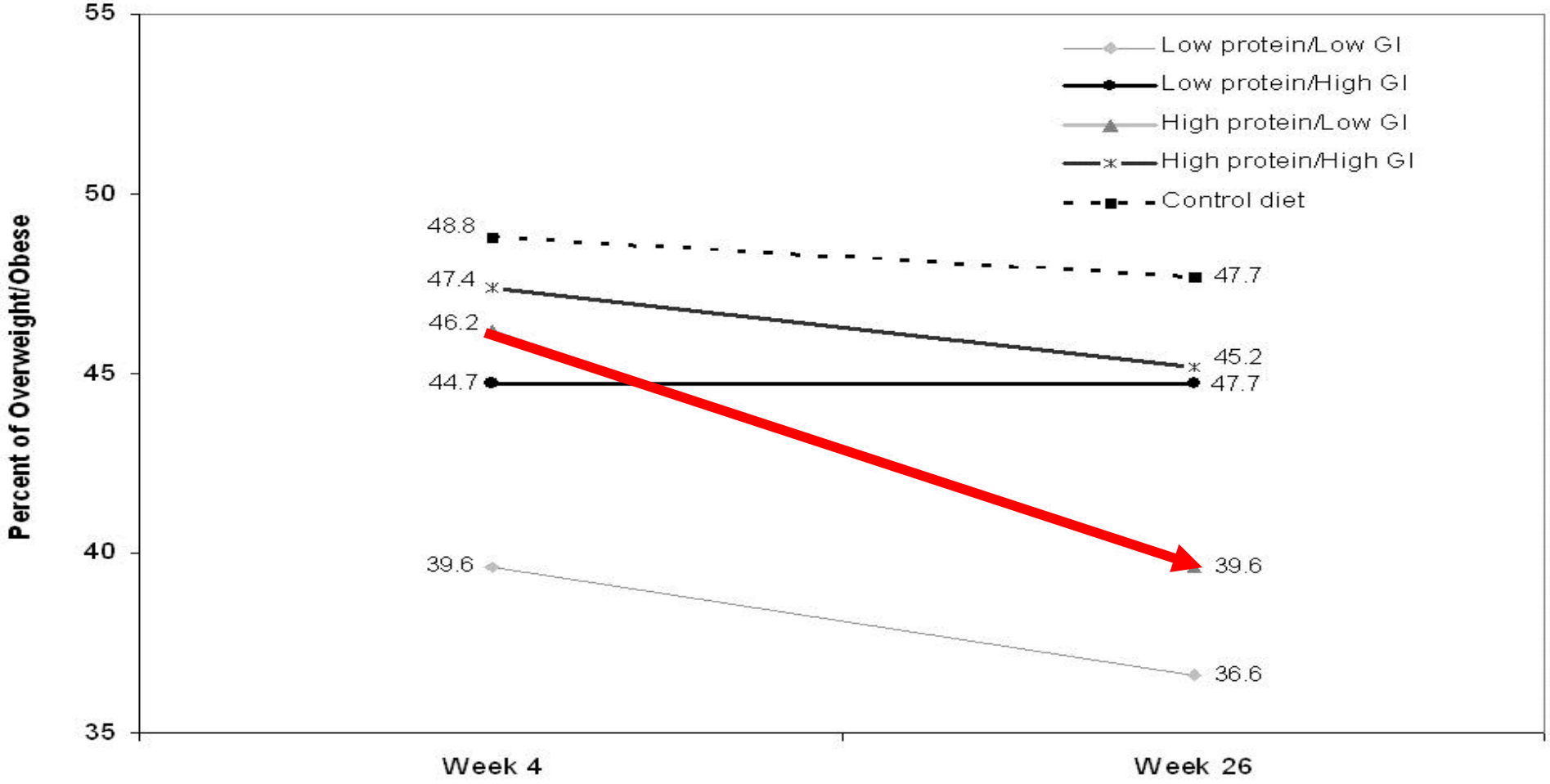
Low protein, high GI

DiOGenes: Low GI and high protein intake gave the best weight maintenance and compliance



Larsen et al NEJM 2010

Spontaneous change in prevalence of overweight/obesity in household children



Papadaki A et al, Pediatrics, 2010

Preview – Main Objectives

1. To determine the preventive effect of a HP/LGI **diet** with either mod (MI) or high intensity (HI) **physical activity** on incidence of **T2DM**

- **Hypothesis:** a HP/LGI diet will be superior in preventing T2DM to presently used dietary recommendations, and that HI physical activity will be superior compared to MI physical activity

PREVIEW – Main Objectives

2. To evaluate role of **sleeping pattern & chronic stress** on development of T2DM - & their interaction with **diet & physical activity**

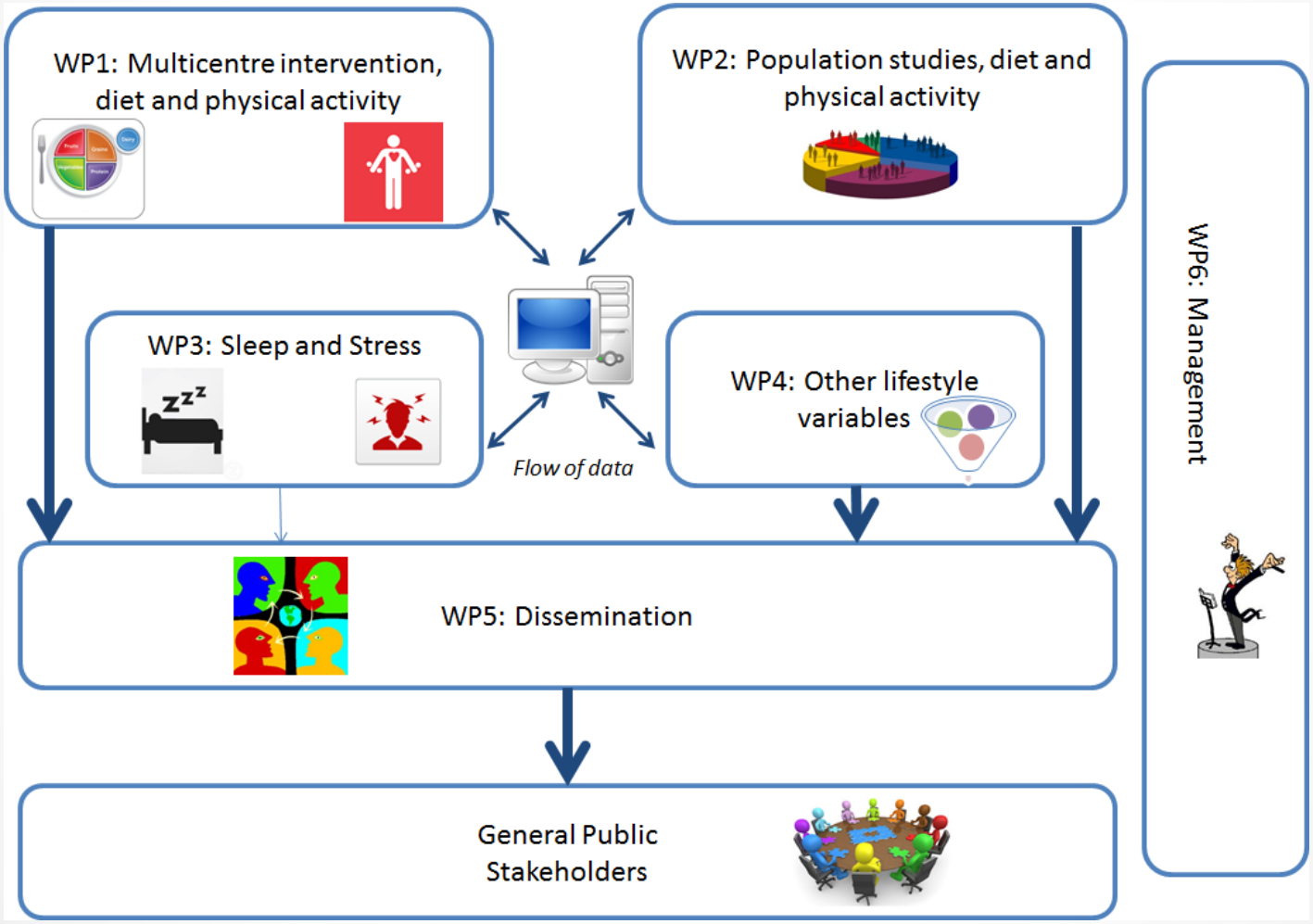
- **Hypothesis:** a HP/LGI diet + HI physical activity may improve the sleeping pattern & reduce level of chronic stress during weight maintenance & thus reduce risk for T2DM

PREVIEW – main objectives

3. To evaluate the influence of social-ecological variables such as social-cognitive determinants of **behavioural change & habitual behaviour, social environmental influences, cultural habits, socio-ecological and socio-economic components** for individuals at risk of T2DM

- **Hypothesis:** the recommended behaviour change & its maintenance is influenced by these variables. Thus, low self-efficacy & lack of social support could both cause a relapse back to an earlier, unhealthy behaviour

PREVIEW – Work Packages interaction & flow



PREVIEW – WP1

- Diets:
  - Moderate protein (MP): protein intake 15% , CHO 55%, GI ≥ 56
  - High protein (HP): protein 25%, CHO 45%, GI ≤ 55
- Exercise Interventions
  - Moderate intensity (MI): 60 – 75% max HR, for 150 min/wk, eg. Brisk walking
  - High intensity (HI): 79 – 90% max HR, for 75 min/wk, eg. Running
- Review sessions
  - 3-4 gp sessions during LED (0-2 mon)
  - 8 meetings from 2-12 mon
  - 3 meetings in 2nd yr and 2 meetings in last year
- N = 2200 in 3 age-cohorts
  - 1) children and adolescents (10 - 18 y, n=200)
  - 2) young adults (25 – 45 y, n=800),
  - 3) older adults (55 - 70 y, n=1500)
  - In 6 EU nations, Australia and New Zealand

PREVIEW – Partners

www.previewstudy.com

PREVIEW – All partners

Participant no.	Participant organisation name	Principal Investigator	Country
1 Coordinator	University of Copenhagen (UCPH)	Prof A Raben	Denmark
2	University of Helsinki (HEL)	Prof M Fogelholm	Finland
3	Wageningen University (WUR)	Prof E Feskens	Netherlands
4	Maastricht University (UM)	Prof M Westerterp-Plantanga	Netherlands
5	University of Nottingham (UNOTT)	Prof I MacDonald	United Kingdom
6	University of Navarra (UNAV)	Prof A Martinez	Spain
7	Medical University Sofia (MU)	Prof S Handijev	Bulgaria
8	John Moores University (LJMU)	Prof G Stratton	United Kingdom
9	University of Stuttgart (USTUTT)	Prof W Schlicht	Germany
10	Meyers Madhus (MM)	Dir C Meyer	Denmark
11	NetUnion (NETUnion)	Dir T Lam	Switzerland
12	Nat Institute for Health and Welfare (THL)	MSc J Sundvall	Finland
13	University of Sydney (USYD)	Prof J Brand-Miller	Australia
14	University of Auckland (UOA)	Prof S Poppitt	New Zealand
15	Laval University (ULAVAL)	Prof A Tremblay	Canada