

Meal Replacements for Weight Management

代餐用于体重管理



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中国营养保健食品协会

Is there a Problem of Obesity in China?

在中国，肥胖是一个问题吗？

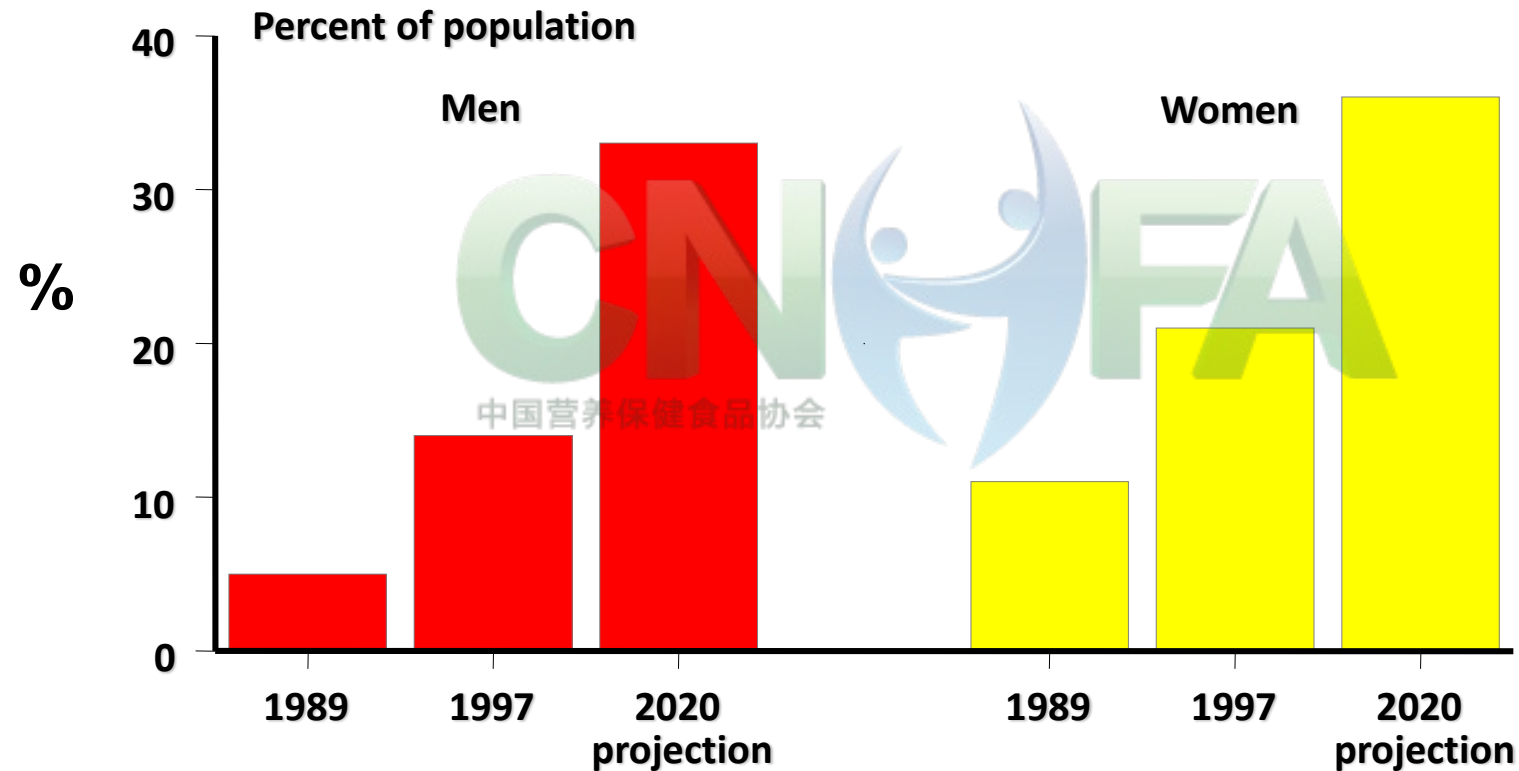


- According to a recent report* China had 15 million obese children in 2015, followed by India with 14 million. **New England Journal of Medicine* **2017**
- 29-year study finds childhood obesity up 17-fold among boys and 11-fold among girls in rural Shandong. *Shandong Centre for Disease Control and Prevention, 2016*
- “This early onset of obesity is likely to translate into a high cumulative incidence of type 2 diabetes, hypertension, and chronic kidney disease” according to Peking University nutrition professor Ma Guansheng.
- In 2014, there were more number of obese men and women in China compared to the U.S. (*Lancet*, 2016)



Prevalence of Adult Overweight in China

中国成年人超重的发生率



Source: Gillespie and Haddad, "Attacking the Double Burden of Malnutrition In Asia," IFPRI, Washington, DC (2000).

Excess Body Fat is a Modifiable Risk Factor for Disease

过量身体脂肪是多种疾病的风险因子

Overweight and excess intra-abdominal fat are key risk factors for:

Hypertension

Heart Disease

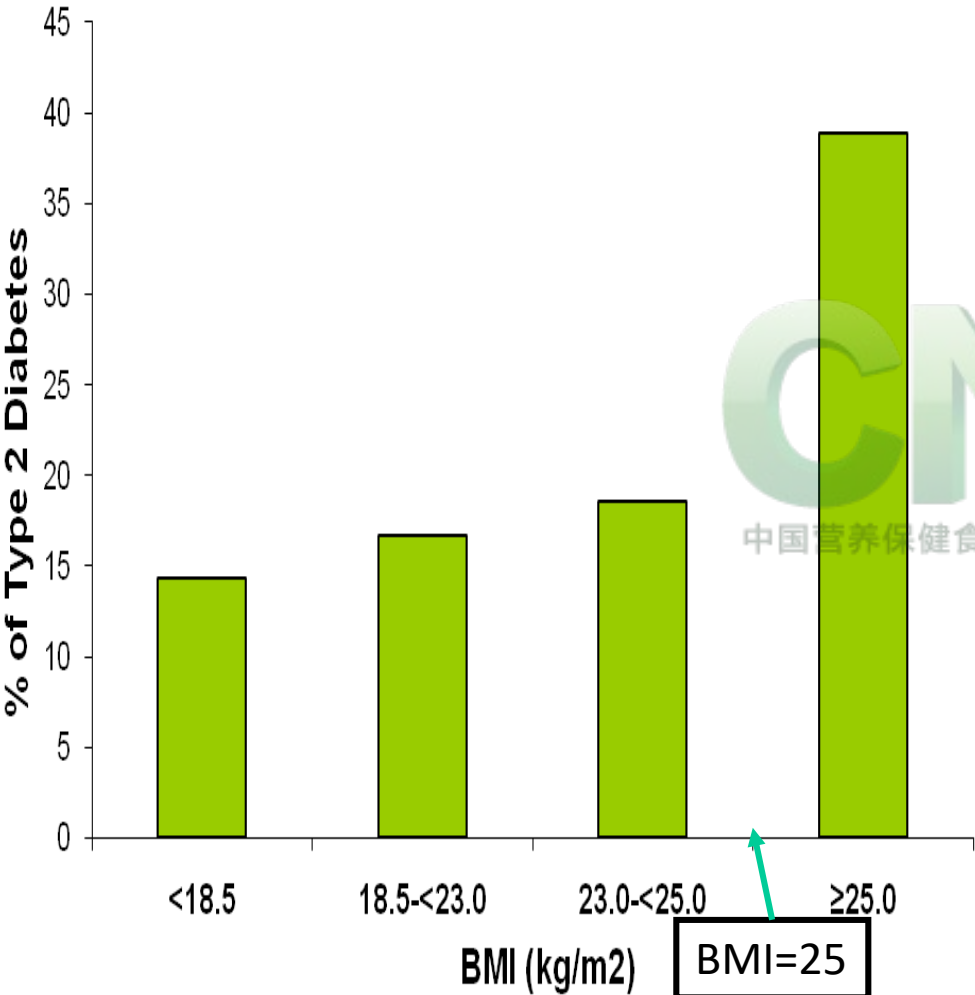
Type 2 Diabetes

Increased Cancer Risk

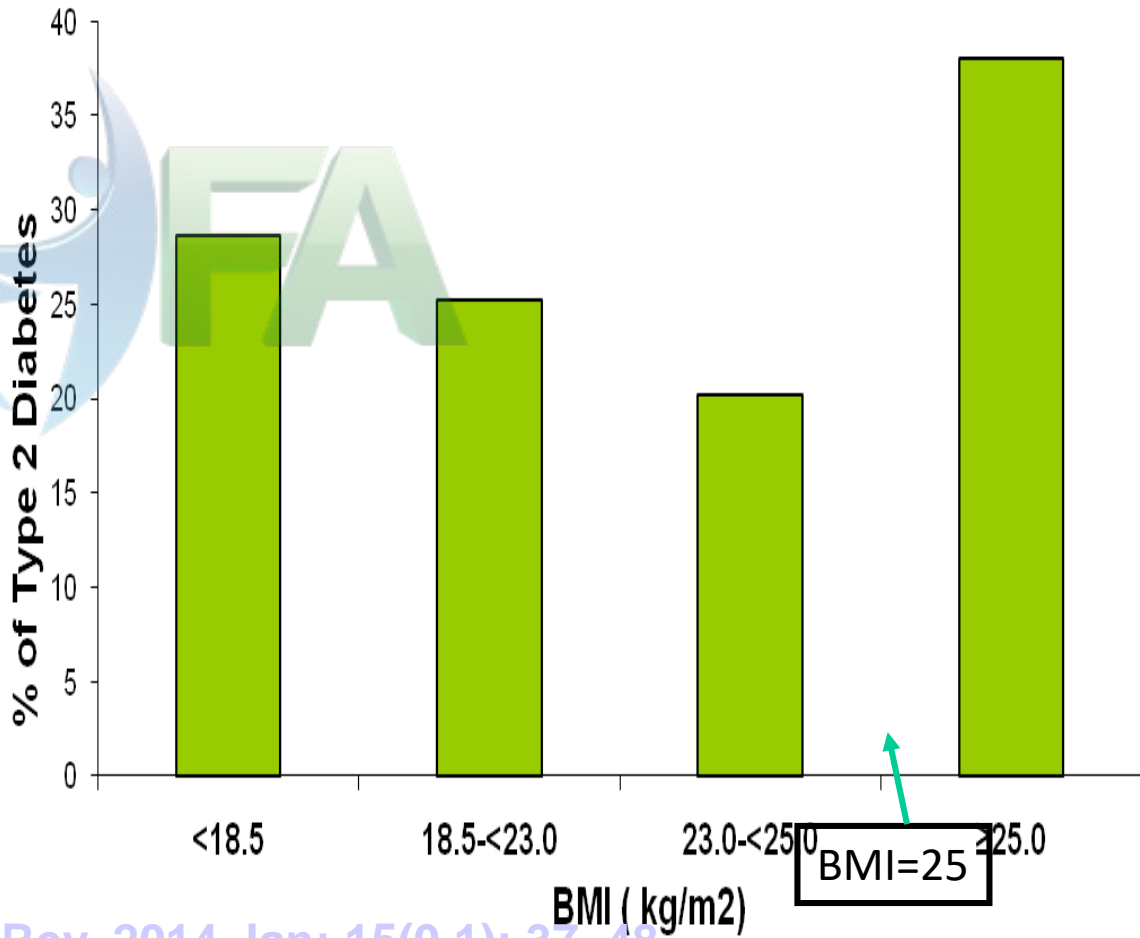
Adults in China Show Increased Diabetes Risks at “Normal” Weight

“正常”体重的成年人的糖尿病风险也在增加

Women



Man



[Penny Gordon-Larsen, et al. *Obes Rev.* 2014 Jan; 15\(0 1\): 37-48.](#)

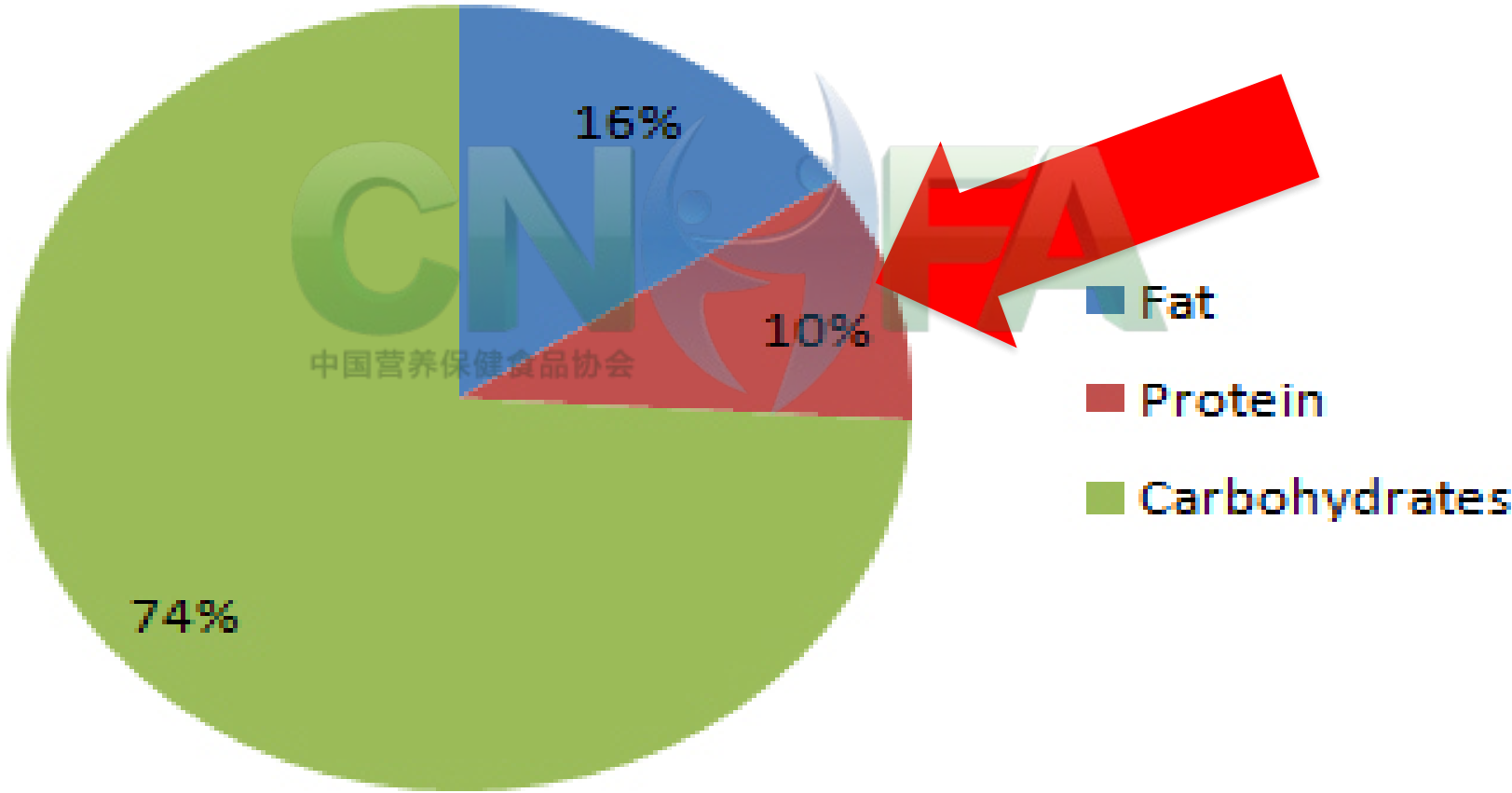
A Typical Chinese Breakfast 典型的中国高碳水化合物早餐



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Average Chinese Macronutrient Breakdown



Glycaemic Responses to Glucose and Rice in People of Chinese and European Ethnicity

中国和欧洲人对糖类和大米类食物摄入的血糖反应

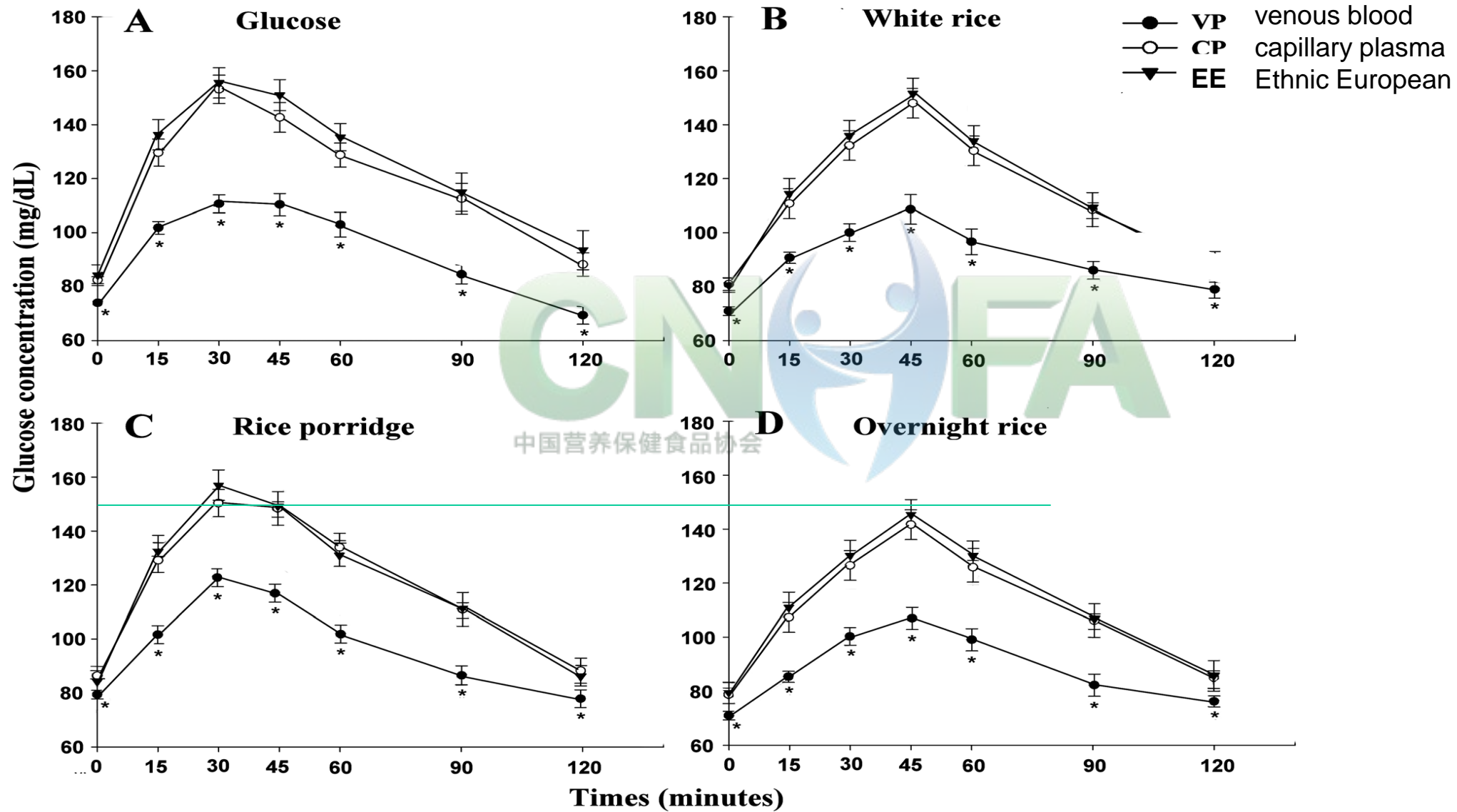
M. Kataoka, et al, Diabetic Medicine 30:2013, pp e101-e107

- Glycemic responses following ingestion of glucose and several rice varieties are appreciably greater in ethnic Chinese compared with ethnic Europeans.

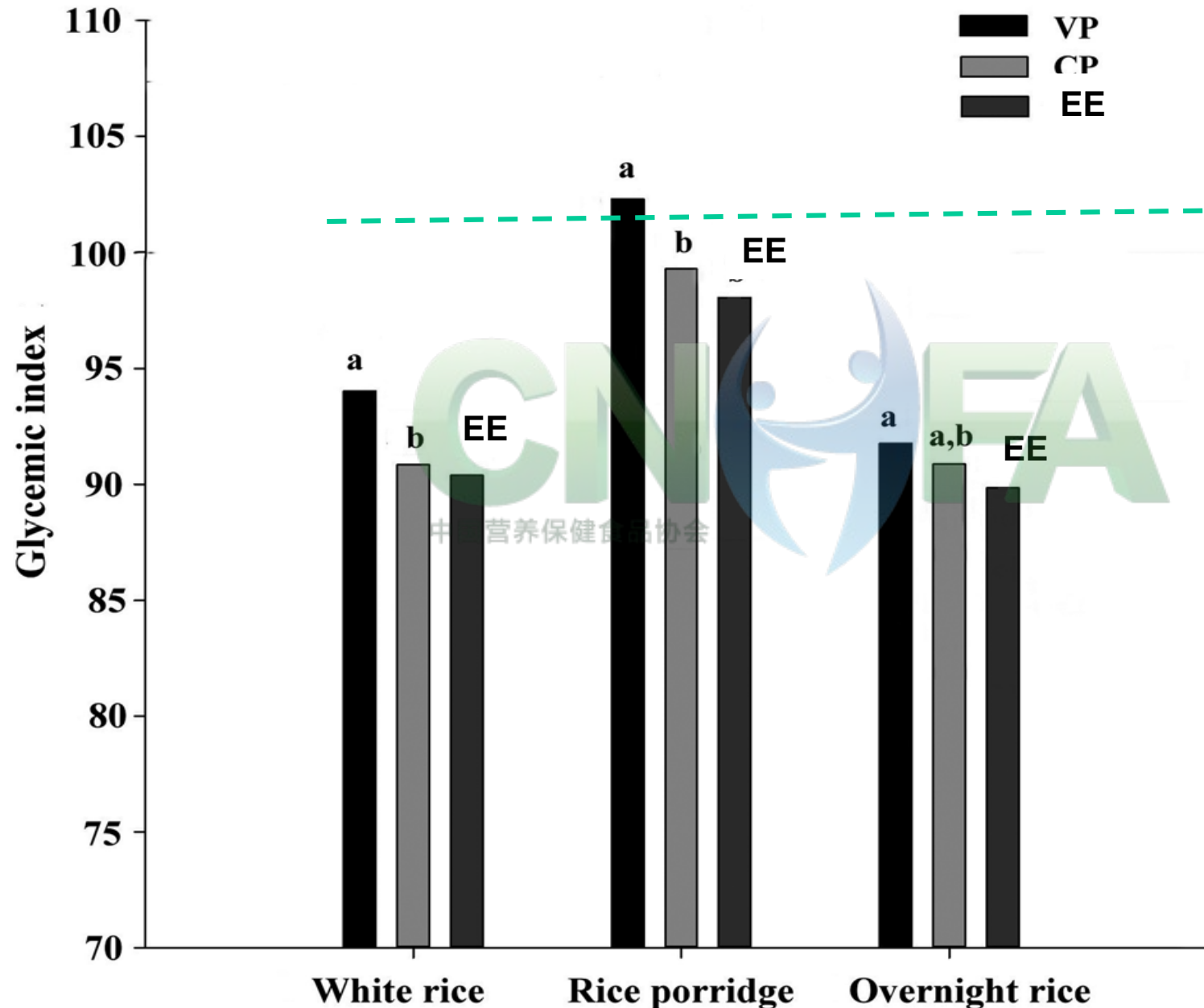
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Blood Glucose response to 50 g of available carbohydrates in test foods

50克碳水化合物的血糖响应



Glycemic Index GI 指数



glycemic index (GI) It is calculated as the incremental area under the curve (iAUC) for blood glucose after consumption of a test food divided by the iAUC of a reference food (glucose or white bread) containing the same amount of carbohydrate.

- Most rice varieties have been classified as High-Glycemic Index foods,
- The long-term consumption of high-GI foods increases the risk of obesity, type 2 diabetes, and diabetes-related complications
 - (Pi-Sunyer, 2002; Wolever, 2006; Livesey 2008).

Some Popular Dietary Treatments of Obesity in USA

美国一些流行的肥胖饮食疗法

- Food Diets:
 - DASH Diet; Mediterranean Diet; The Flexitarian Diet, Atkins Diet:
- Commercial Dietary Programs
 - Weight Watchers; Jenny Craig; Nutrisystem; ...
- Meal Replacements [*Have low glycemic Index]
 - Herbalife*; Slim-Fast*; Walmart; Kroger; Costco; Premier Protein; ...

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- Any one of the various dietary treatments will result in weight loss IF followed according to recommendations.
- Meal replacements are the most popular in the US

What is a Meal Replacement In the USA?

代餐在美国的定义是什么？

- It is A Food For Special Dietary Use:* has complete nutritional composition. It is a low Calorie food (usually a liquid) to be eaten in place of a high calorie meal.
 - Calories: ~160 - 220 Calories
 - Source of CHO 1-30 Gm ~5-30% of Cal (low sugar products sweetened with Sucralose)
 - Source of fiber 2-5 Gm
 - Source of fat 1- 6 Gm ~3-30% of Cal
 - **Source of protein 10-30 Gm ~35-90% of Cal** (usually soy or milk protein isolate)
 - Essential minerals; vitamins; trace minerals ~ 30% of RDA

*FDA Regulations Title 21, CFR 105.66 2017 definition

Programs for Use of Meal Replacements

代餐使用程序

- Total Meal Replacements (TMR): elimination of all regular food
 - It replaces breakfast, lunch and dinner
 - Requires medical supervision required
- Partial Meal Replacements (PMR): regular food as part of plan
 - Eat one or two meal replacements (breakfast, lunch or dinner) plus a calorie-controlled nutritious meal
 - No requirement for medical supervision

The Partial Meal Replacement Weight Loss Plan

部分代餐减肥计划

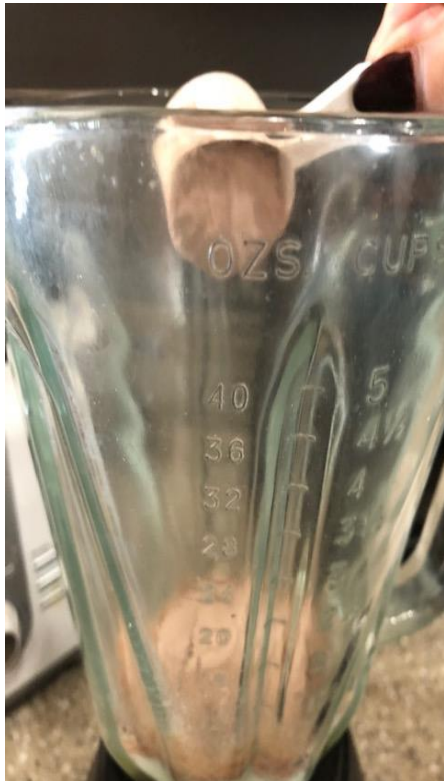
	Breakfast	Lunch	Dinner
Option 1			
Option 2			
Option 3			



Steps To Make a Slushy Shake Meal Replacement

制作一杯雪泥奶昔代餐的步骤

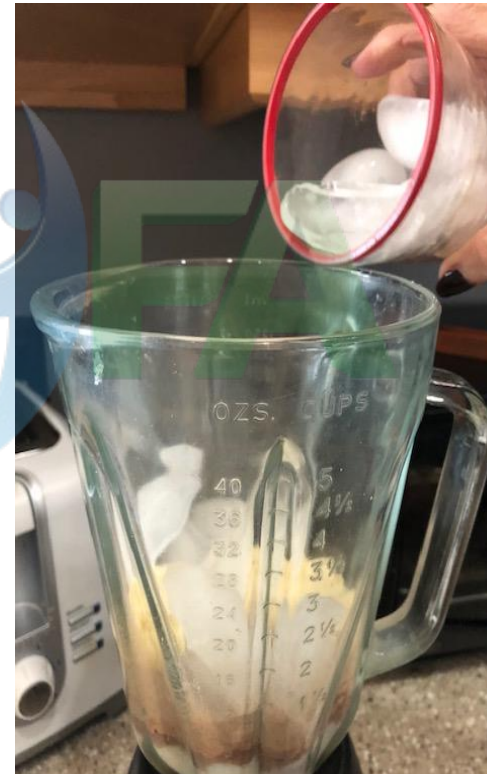
1. Powder/water in blender



2. Add fruit to increase consistency



3. Add Ice For Slushy



4. Pour in glass, spoon out to eat



Safety and Efficacy of PMR Plan From Published Studies

已发表研究显示的PMR计划的安全性和有效性

- There are 59 studies involving over 5,000 patients from several countries published in peer-reviewed medical journals
- Partial Meal Replacements (PMR) are an important tool used in several NIH sponsored studies that require dietary management.
- Health Care Professional's attitudes and approach to weight management using PMR is significantly improved by published clinical studies
- The next slides summarize weight loss results from seven publications using Partial Meal Replacement plans.
- There were no safety issues and all studies show significant weight loss

Summary of Clinical Research Using Partial Meal Replacement Plan 部分代餐临床试验介绍

Summary of Clinical Research Using Partial Meal Replacement Plan		
Completed /published clinical studies	59	Mayo, Harvard, UCLA, Brown U., Columbia, U. Minnesota,... Mexico City, Sao Paulo, Brazil, Ulm, Ger, Derby, UK, Adelaide, Aus, Soul, Korea, China,
Peer Reviewed Publications	52	Overweight/obese, diabetics, osteoarthritis, divergent ethnic groups, self help etc.
Other Prospective Studies	<ol style="list-style-type: none"> 1. NIH: Diabetes Prevention (multi-center; 2. Adolescents (Children' s of Philadelphia; Harvard, UC Davis) 3. NIH Look AHEAD Diabetes study* 	<p>www.niddk.nih.gov/patients</p> <p>www.ftc.gov/opa/1999/9902</p> <p>Centers for Obesity Research and Education</p>

*Look AHEAD (Action for Health in Diabetes): design & methods for weight loss & prevention of CVD in type 2 diabetes. *Controlled Clinical Trials* (2003) 24: 1-19

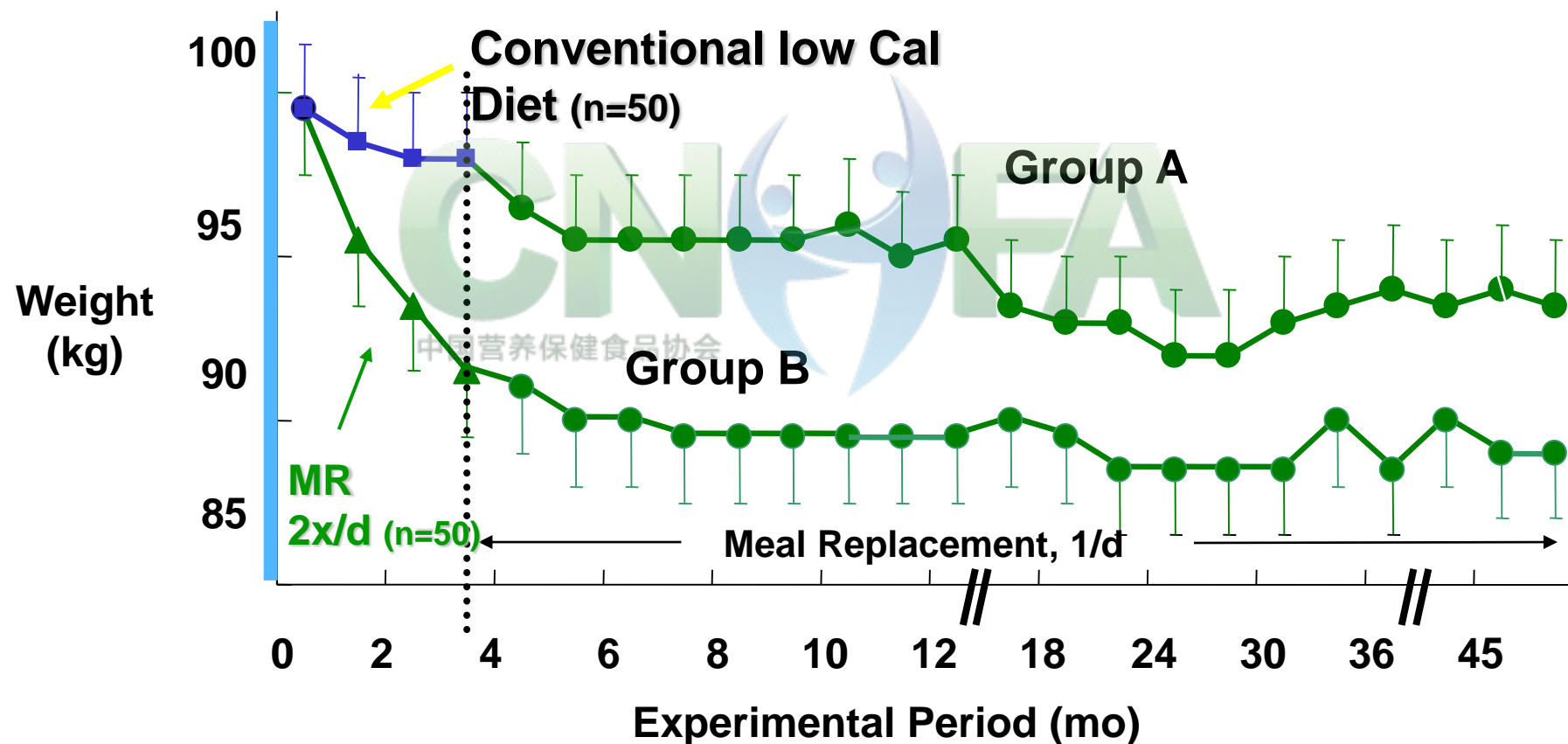
(1) Four-Year Study 四年期研究

- 100 patients randomized into a Group A (N=50) and Group B (N=50)
- Group A received dietician-led counseling prescribing daily low calorie meals (1200 Cal/day) and exercise
- Group B received the same counseling plus a Partial Meal Replacement Plan of a MR in place of two regular meals and a low calorie meal of regular food (~1200 Cal/day)
- After 12 Weeks, Group A received a prescription for 1500 Cal/d meals and Group B switched to one meal replacement/d and two regular meals (1500 Cal/d). If they gained weight they restarted the two MR/d regimen until weight stabilized.
- After 4 years all 100 patients were available for weight measurements

A Partial Meal Replacement MD Led Study

Weight Change Over 4 Years 超过4年的时期内引起的体重变化

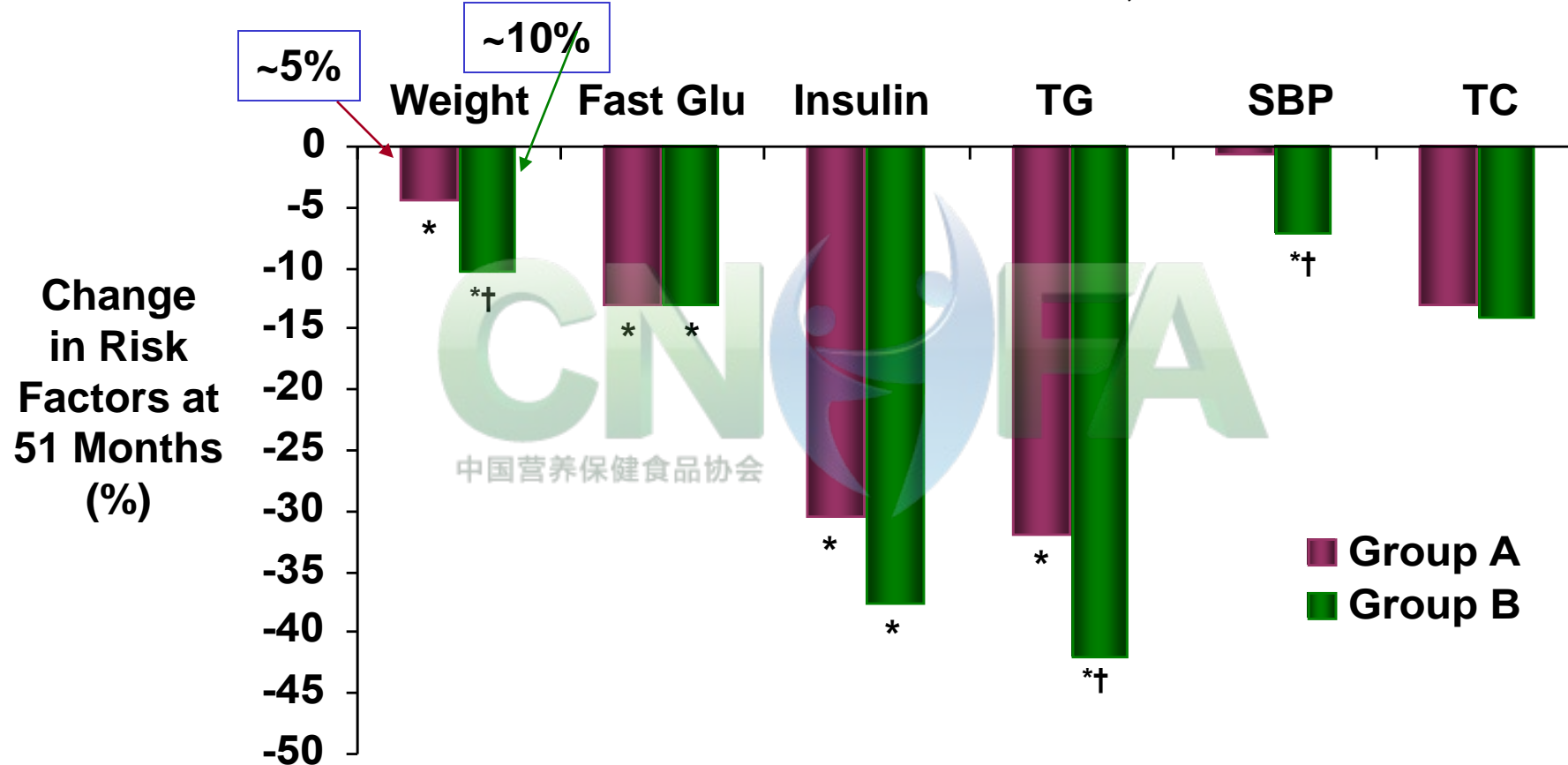
Flechtner-Mors, et al. *Obes Res.* 2000;8:399-402.



Risk Factors After 4 Years

4年后的风险因素

Flechtner-Mors M et al. *Obes Res.* 2000;8:399-402.



Group A = conventional diet; **Group B** = Partial meal replacement.

SBP = systolic blood pressure; TC = total cholesterol.

* $P < 0.05$ from baseline; † $P < 0.05$ Group A vs Group B.

(2) Dietitian-Led Weight Management For Two Years

由营养师主导的为期两年的体重管理研究

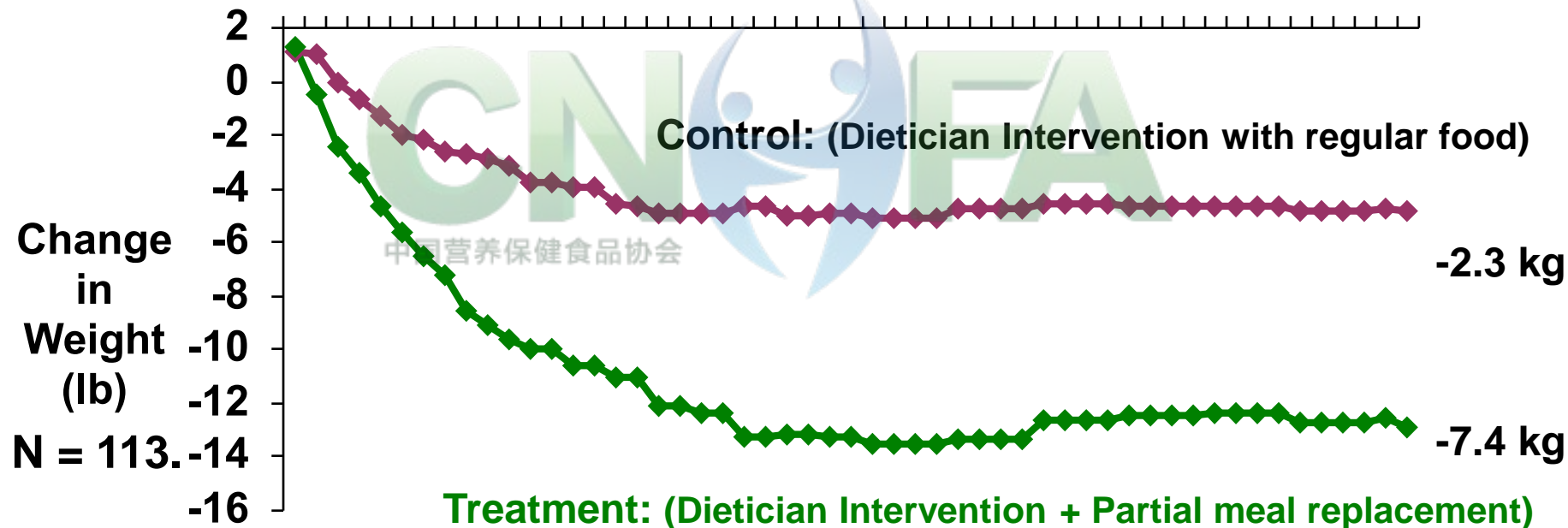
- 49 overweight, premenstrual women were randomized to either a control Group or treatment Group
- Both Groups received dietitian-led counseling about low calorie foods, meal plans and regular exercise at weekly or monthly clinic visits.
- The treatment Group also received counseling on the use of meal replacements
 - During the first 3 months (weight loss period) they were to replace two of three meals a day with a PMR and have a reduced calorie third meal.
 - During the remainder of the study (weight maintenance period) they were to replace one meal a day with a PMR.
 - If they regained weight they were to restart the two PMR Plan until weight stabilized.

Weight Change in a Dietitian-Led Practice Using Standard Care or PMR Plan For 2 years

在营养师主导的实践中使用标准治疗或PMR计划两年带来的体重变化

Ashley JM, et al *Arch Intern Med*

2011;161:1599-1604

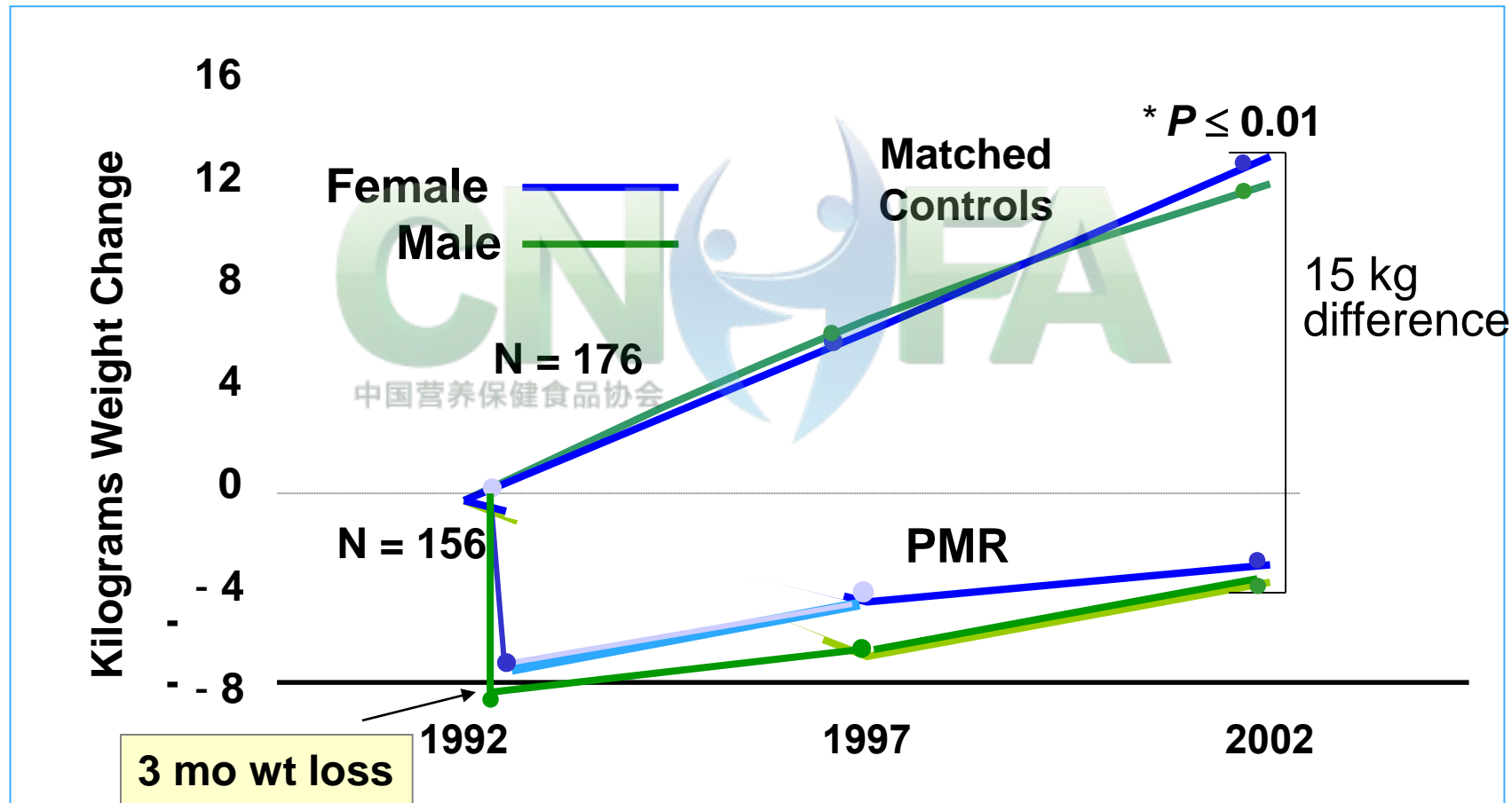


(3) A Self-Help Trial For Weight Loss Over 10 Years 为期10年以上的自助减肥试验

- Rural community in Wisconsin
 - Total population ~950; 15% of the community joined a trial to lose weight.
 - 165 participants were provided a booklet about the meal replacement plan healthy eating and meal recipes. They were prescribed to substitute two meals a day with a liquid meal replacement and have a small regular meal either at night or lunch. After 12 weeks they were to take one MR and two meals of regular reduced Calorie food.
 - Encouraged to be active with regular exercise
 - Local grocery store provided meal replacement products
 - Weighed by PhD twice a year
 - 85% were followed for ten years
- Surrounding community of 176 individuals served as controls (matched for age, sex, BMI)

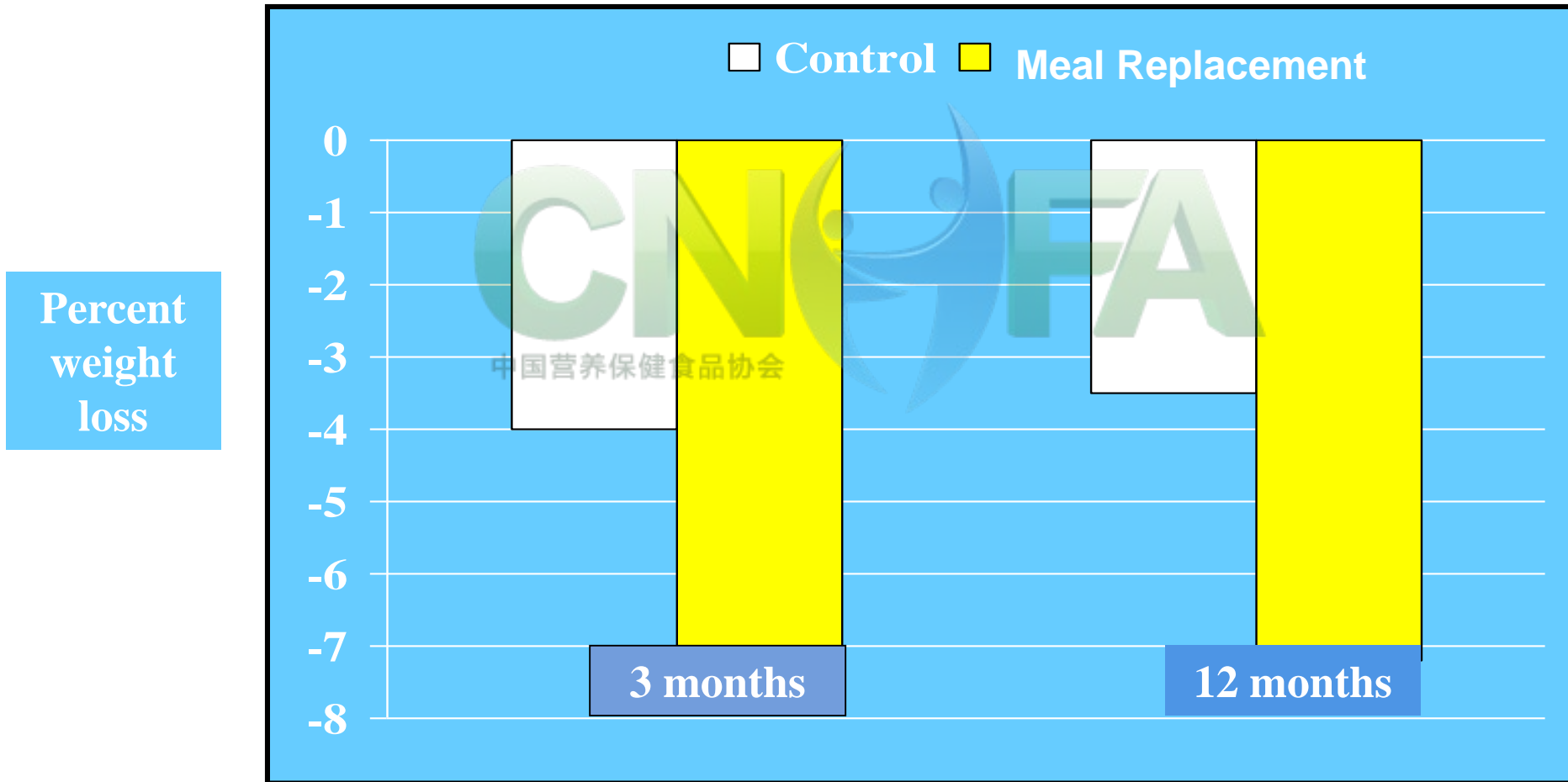
10 Year Weight Control Study: a Self Help Plan: Case Controlled Comparison In Separate Communities

10年体重控制研究:自助计划:不同的群体中的个案对照比较



(4) Meta Analysis of 6 Studies: 6试验的荟萃分析

Body Weight Reduction at 3 and 12 Months Columbia U, New York



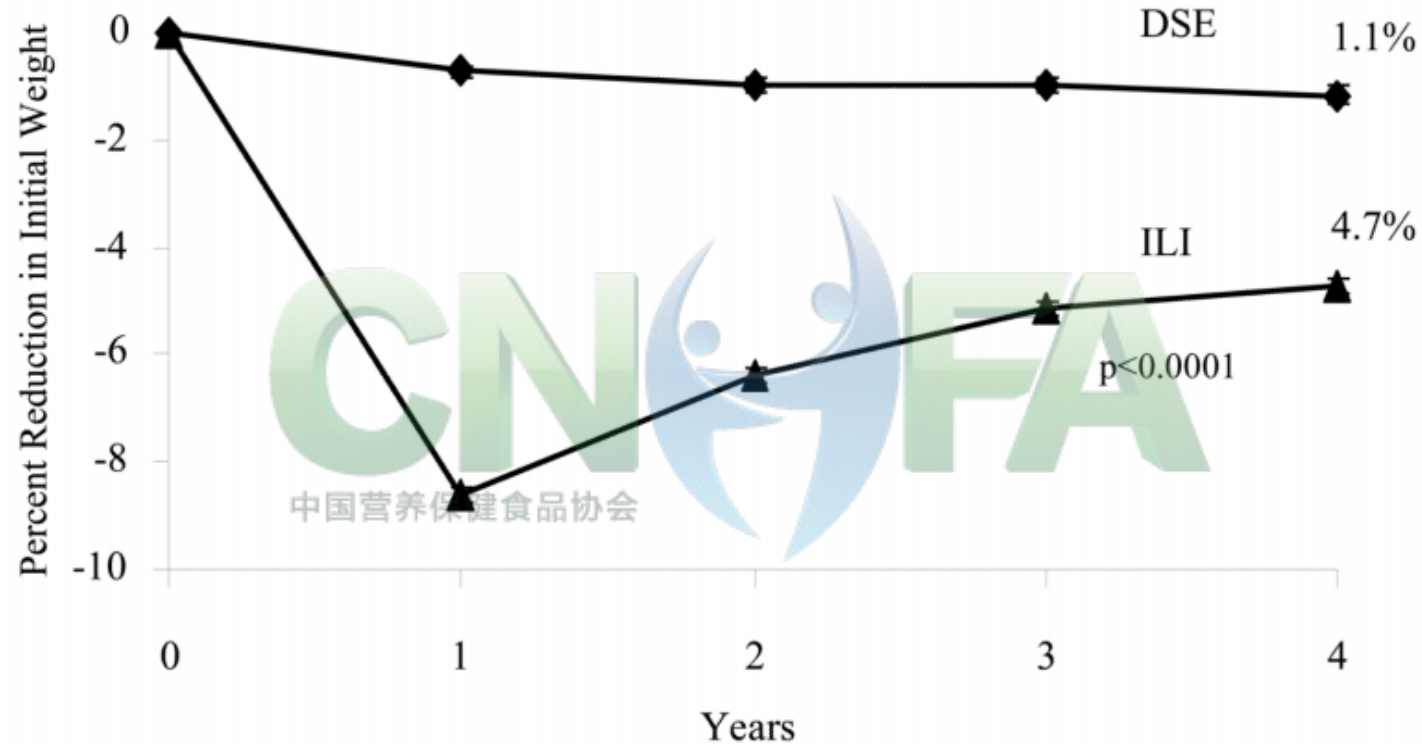
Heymsfield et al., International Journal of Obesity, Mar, 2003,

(5) NIH Study of Patients With Type II Diabetes II型糖尿病患者的NIH研究

- Look AHEAD trial is a large multicenter NIH-sponsored trial in patients with Type 2 Diabetes Mellitus.
- 5,000 patients were randomized to receive either **Standard Diabetes Support and Education (DSE)** or **Intensive Lifestyle Intervention (ILI)** which included the use of a **Partial Meal Replacements**.

Four-year Weight Loss in the Look AHEAD Study

四年期前瞻性减肥研究



DSE: :Diabetes Support and Education group (control)

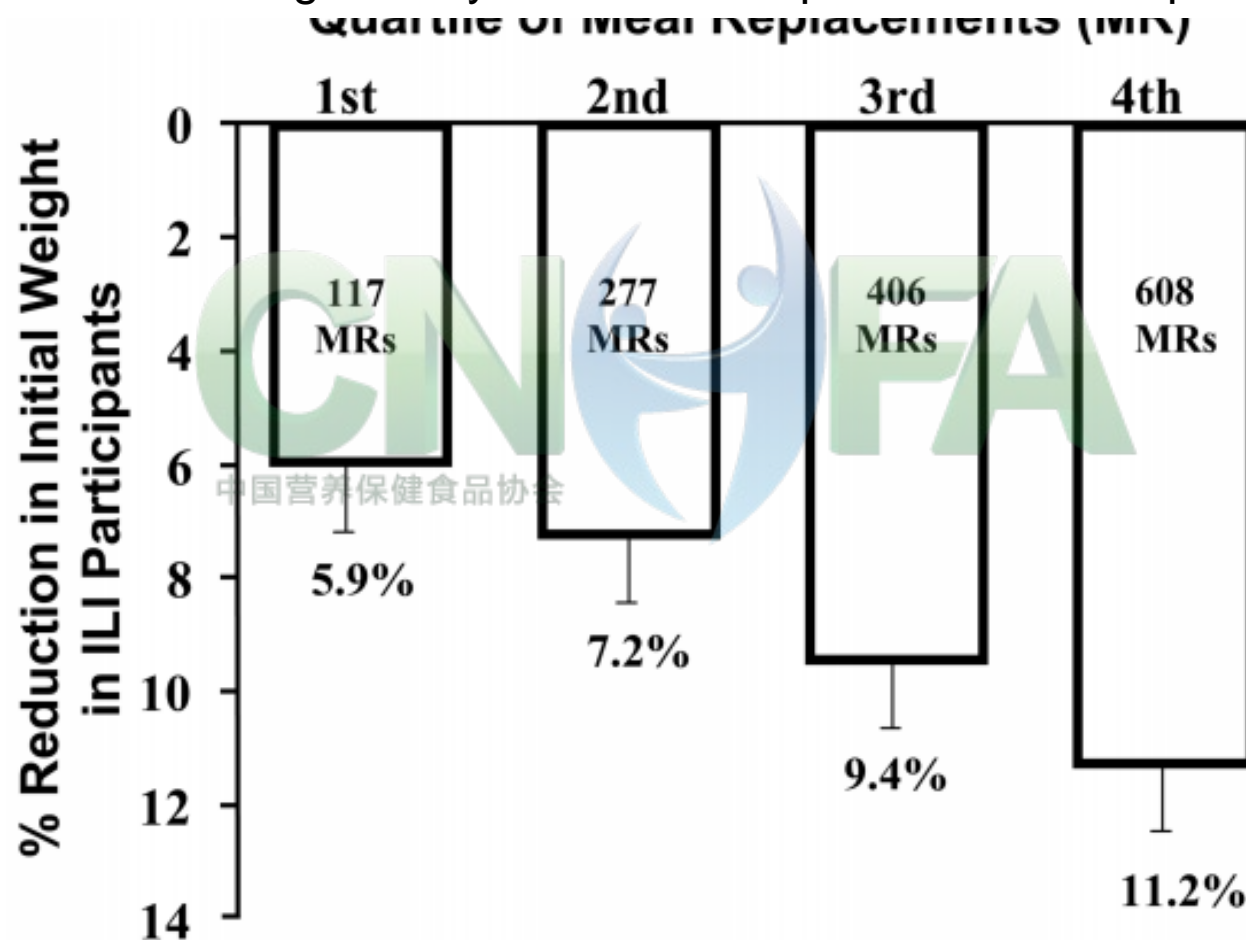
ILI: Intensive Lifestyle Intervention group

Dietary intervention included the intensive use of MR and structured meal plans: The first 4 months 2 MR per day, the following months 5-12, 1 MR per day

Wadden et al. Obesity (Silver Spring). 2011;19(10):1987-1998

Weight Loss in the Look AHEAD Study: Meal replacements were associated with greatest success 代餐方案实施时间长度是减肥效果的最关键因素

Percentage reduction in initial weight at 1 year based on quartile of meal replacement products used..

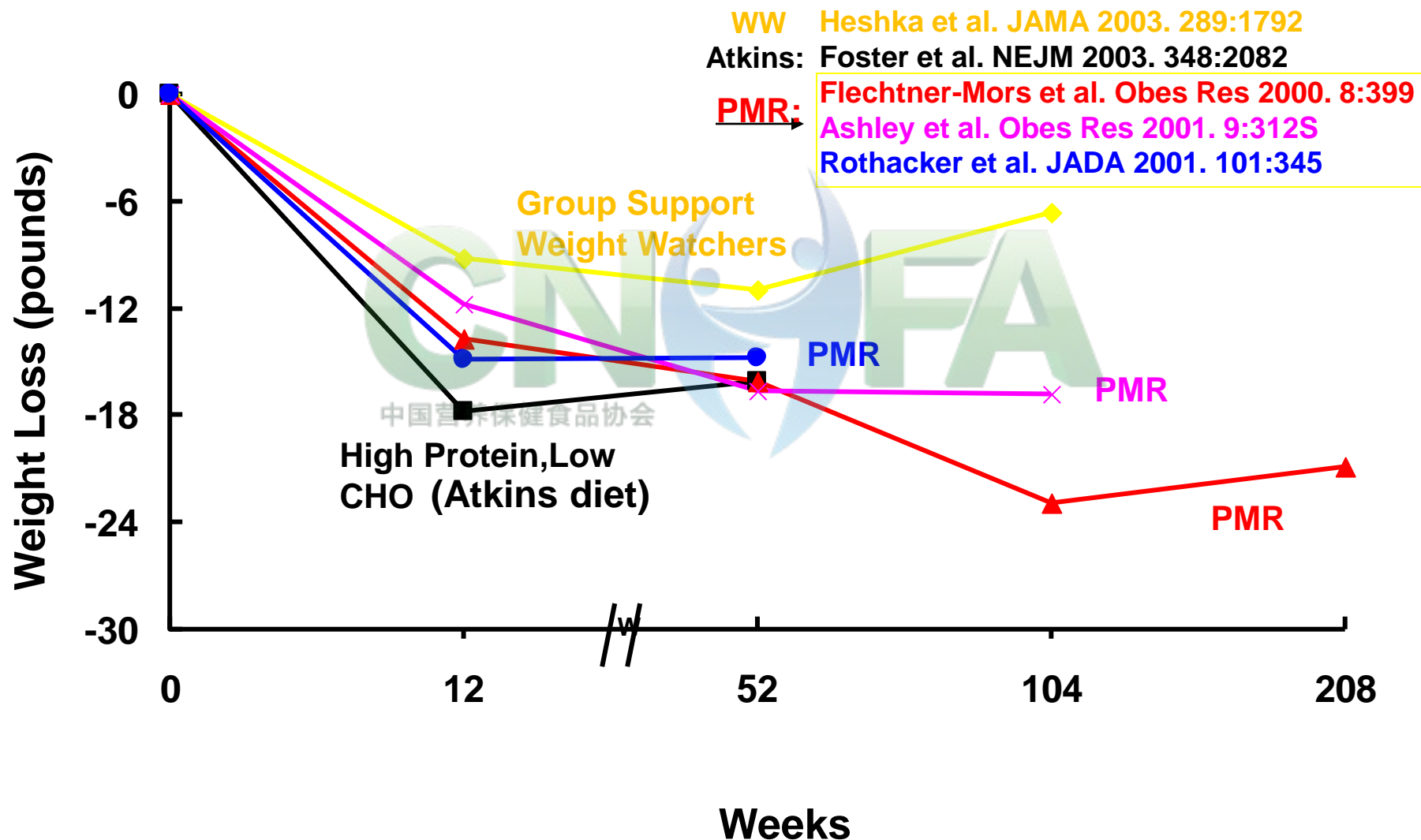


Wadden TA et al. Obesity (Silver Spring) 2009;17(4):713-22

How Does the PMR Compare With Other Treatments?

Published Results From Three Methods of Weight Management

PMR与其他治疗方法相比如何？ 三种体重管理方法的发布结果



(6) Protein-enriched Partial Meal Replacement Increase Weight Loss in Patients with Metabolic Syndrome

富含蛋白质的部分代餐提高了代谢综合征患者的体重减轻水平

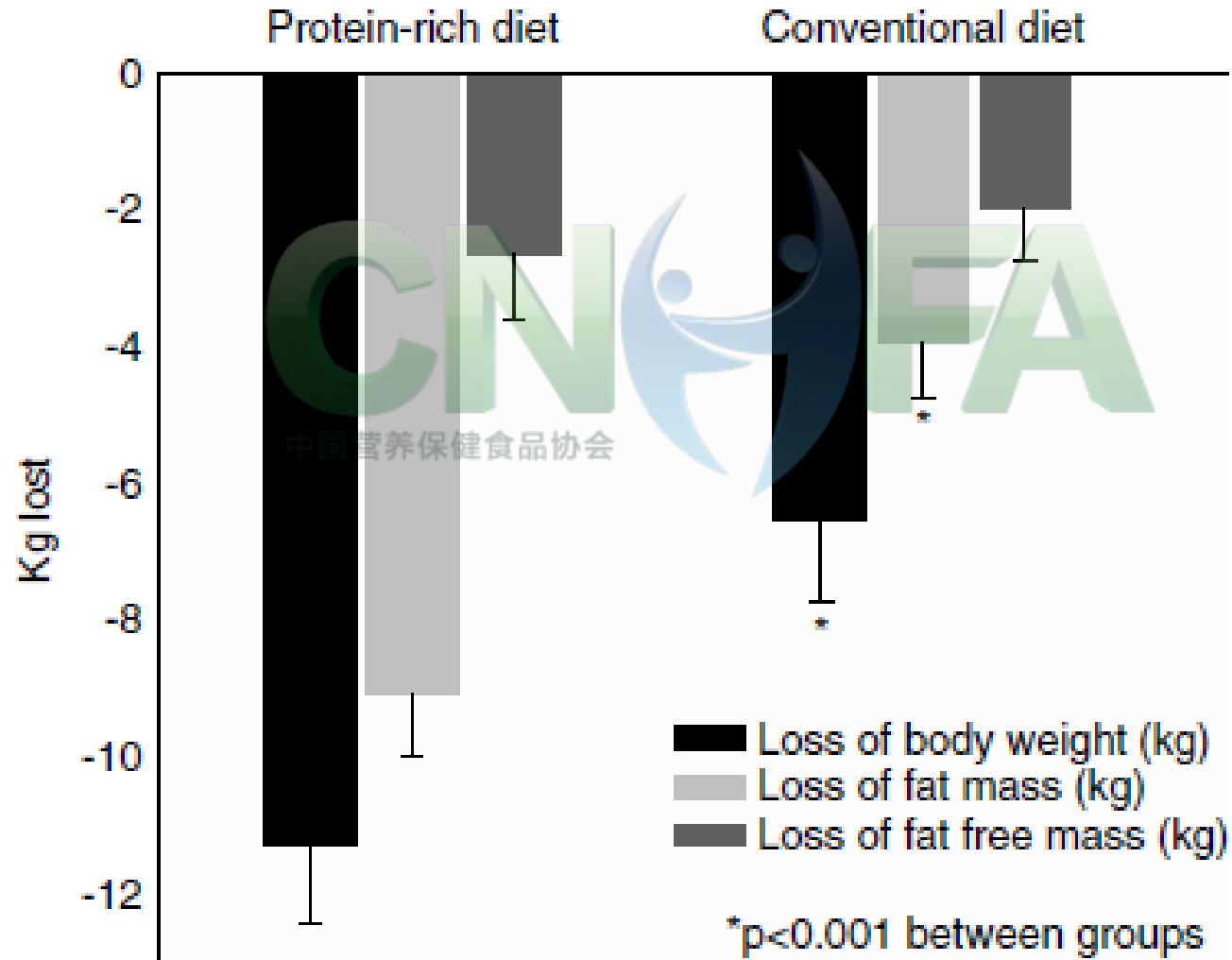
The logo for the Chinese Nutrition Society (CNIFA) is centered in the background. It features the letters 'CNIFA' in a light green, sans-serif font. To the right of the letters is a stylized blue figure of a person with arms raised, suggesting health or vitality. Below the logo, the Chinese text '中国营养学会' is visible in a smaller, lighter font.
Marion Flechtner-Mors*, et al
Diabetes Metab Res Rev 2010; 26: 393–405.
Ulm, Germany

Methods 临床方案设计

- 110 obese subjects received instructions for lifestyle modification including an energy-restricted diet of ~12-1500 Cal/day.
- Subjects (55 in each group) were randomly assigned to either a high-protein (1.34 gm/kg BW) or a conventional protein diet (0.8gm/kg BW) for 12 months.
- During the first 12 wks, subjects on the high protein diet received two meal replacements (20gm/MR) whereas the low protein group received 10gm/MR meal replacements.
- During the remainder of the study, both groups received one meal replacement/d of either 20gm or 10gm/d
- 67% of the participants completed the 1-year study

Changes in Body Composition

身体成分变化



(7) Protein-Enriched Meal Replacements Do Not Adversely Affect Liver, Kidney or Bone Density: An Outpatient Randomized Controlled Trial

代餐不会对肝脏、肾脏或骨骼密度造成不利影响:门诊随机对照试验

Zhaoping Li, et al UCLA, California
Nutrition Journal 2010, 9:72

Table 4 Renal function, calcium, phosphate excretion and bone mineral density

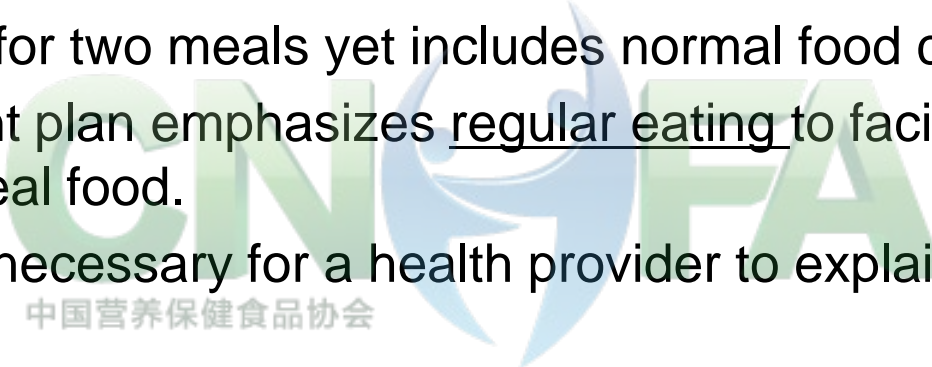
	HP		SP	
	Baseline	Month 12	Baseline	Month 12
Serum Creatinine (mg/dL)	0.82 ± 0.20	1.13 ± 1.85	0.87 ± 0.20	0.82 ± 0.18
Serum urea nitrogen (mg/dL)	12.37 ± 3.06	14.13 ± 5.77	12.14 ± 3.77	11.97 ± 3.73
Creatinine Clearance (mL/min)	129.78 ± 60.06	138.69 ± 40.39	116.89 ± 44.43	116.89 ± 42.84
Urine urea nitrogen (g/24 hr)	10.91 ± 4.49	12.22 ± 4.64	10.89 ± 4.73	9.58 ± 3.95
Urine Calcium (mg/24 hr)	184.68 ± 119.10	153.46 ± 77.07	25.2 ± 103.60	23.33 ± 75.74
Urine Protein (mg/24 hr)	141.25 ± 71.23	158.55 ± 88.82	114.39 ± 38.25	180.00 ± 86.56*
Bone mineral density (g/cm ³)	1.00 ± 0.00	1.04 ± 1.19	1.03 ± 0.17	1.01.00 ± 0.03

All values are mean ± SD. There were no significant differences between groups. HP, high protein group; SP, standard protein group. *p < 0.05 compare with baseline.

Both the HP and SP diets were well tolerated, resulted in expected weight loss, were sustainable, and did not result in any adverse effects. There were no changes of liver function, renal function or bone mineral density over one year in either group using protein-enriched partial meal replacement.

Advantages of a Meal Replacement Plan

代餐计划的优势

- Meal Replacement Plans provide fixed-portion and calorie amounts that take the guesswork out of estimating calories.
 - MR are convenient to use, widely available and less expensive than a diet of mixed foods... and have a low glycemic index
 - MR simplify food selection for two meals yet includes normal food choices in the 3rd meal.
 - A Partial Meal Replacement plan emphasizes regular eating to facilitate learning calorie control and dietary adherence to real food.
 - The plan reduces the time necessary for a health provider to explain three daily diet plans.
- 
- 中国营养保健食品协会
- 代餐计划可提供固定的份量和卡路里量，不必再估算热量值。
 - MR使用方便，成本低，且升糖指数更低。
 - MR为一天中的两餐简化了食物选择。
 - 部分代餐计划强调定期进食，以帮助建立良好进食习惯。
 - 提高膳食指导的沟通效率。

Summary 总结

- Obesity in China poses a serious health problem.
- High glycemic index (GI) foods such as white rice pose an increase risk of obesity related complications such as diabetes.
- There are several diet plans in the USA; Meal Replacements that follow the PMR Plan is the most popular tool for weight management
- Over 50 published clinical studies involving more than 5,000 individuals from several countries provide clear evidence for the safety and efficacy of the PMR Plan for weight management.
- A high protein/low carbohydrate, reduced calorie diet, is effective for weight management and is best achieved using Meal Replacements.
- 在中国，肥胖症是一个严重的健康问题。
- 高升糖指数(GI)食物(如白米)导致肥胖相关并发症(如糖尿病)的风险增加。
- 美国有几种饮食计划; 遵循PMR计划的代餐是最受欢迎的体重管理工具
- 涉及来自多个国家5,000多名个体的50多个已发表的临床研究为PMR体重管理计划提供了明确的证据。
- 高蛋白质/低碳水化合物、低卡路里饮食对控制体重有效，最好使用代餐。



2018 中国特殊食品合作发展会议(第三届)
The 3rd China Special Food Conference

2018 特殊食品产业展览会
Special Food Industry Exhibition

中国营养代餐发展论坛 China Meal Replacement Development Forum

2018.10.30-11.01 中国·北京 Beijing, China

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