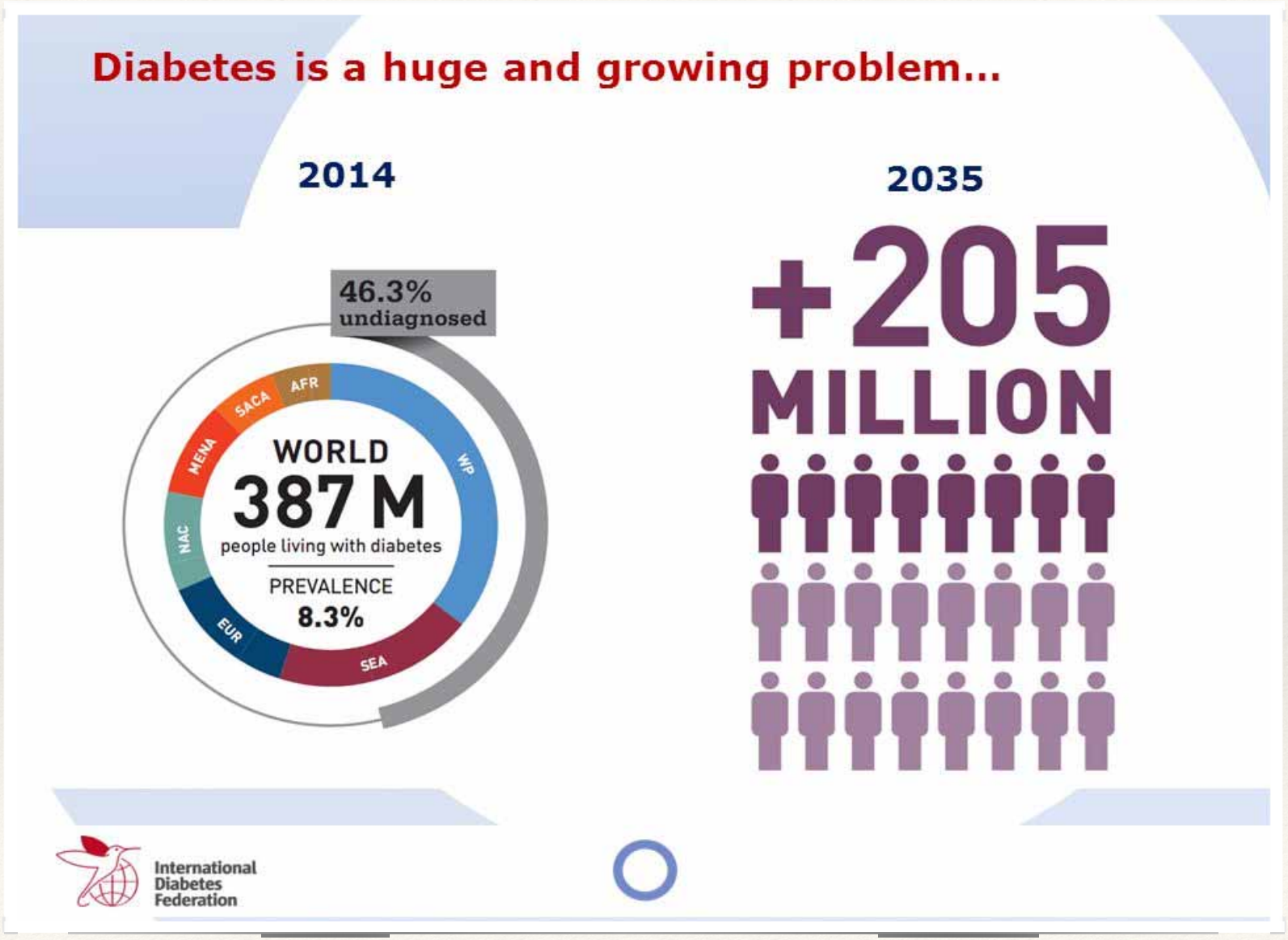
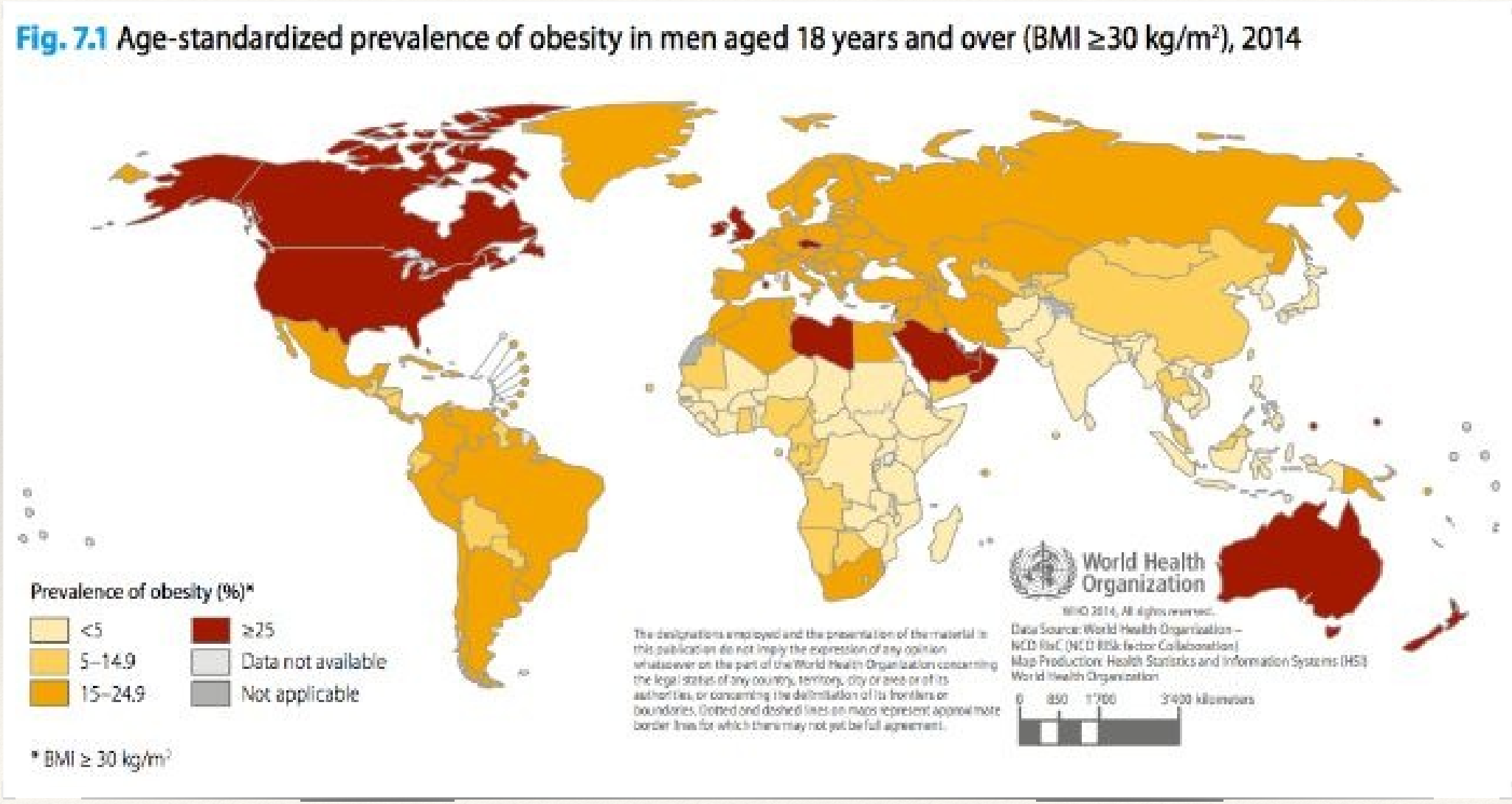
Obesity and diabetes

Dr Yovan MAHADEB

Diabetes Worldwide- Now and Later



Global Obesity Burden



WHO Europe


In the WHO/European Region
over 50%
of people are
overweight or obese
over 20%
of people are
obese
www.euro.who.int/obesity
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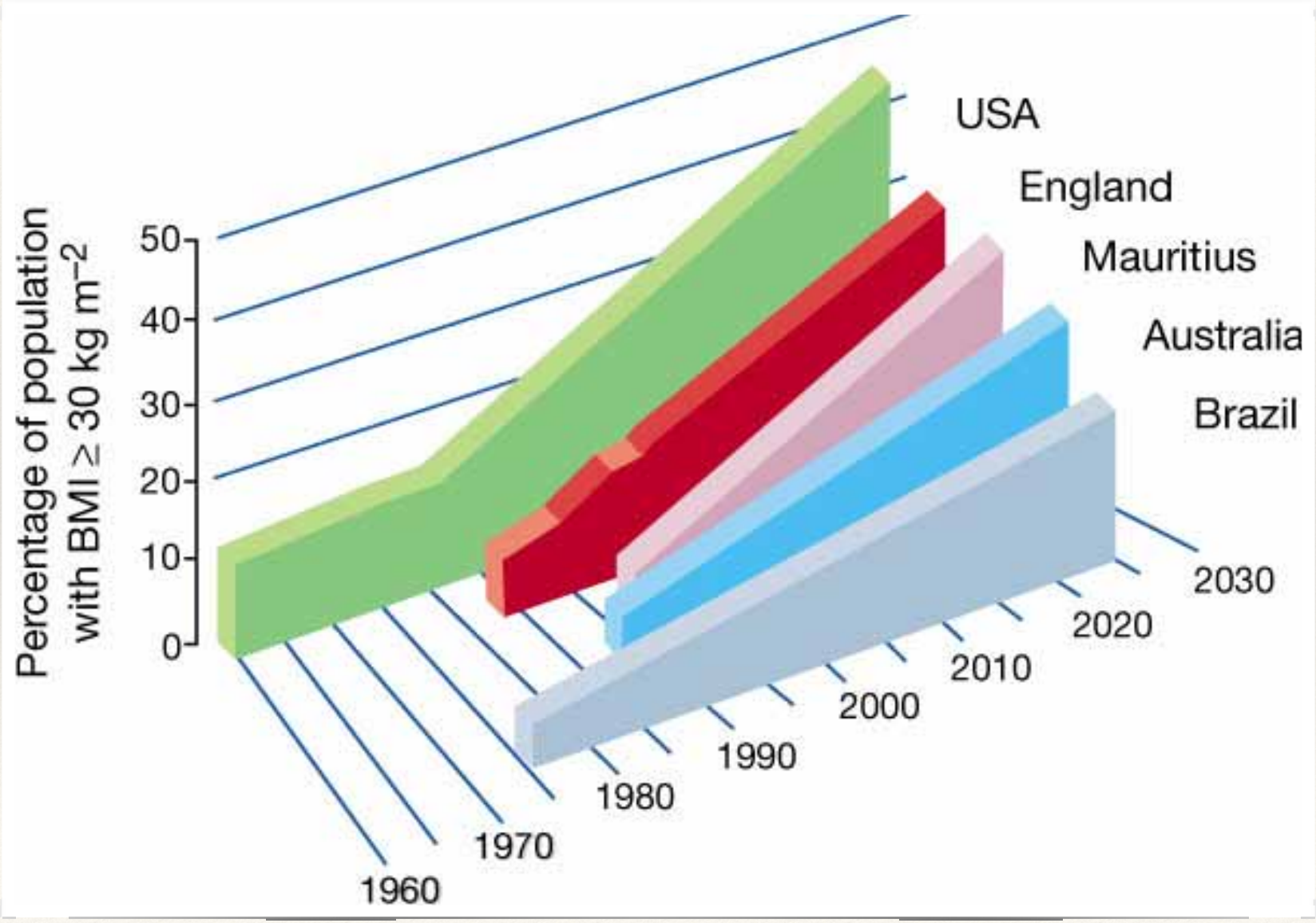
World Health Organization
Europe

Global Obesity Burden



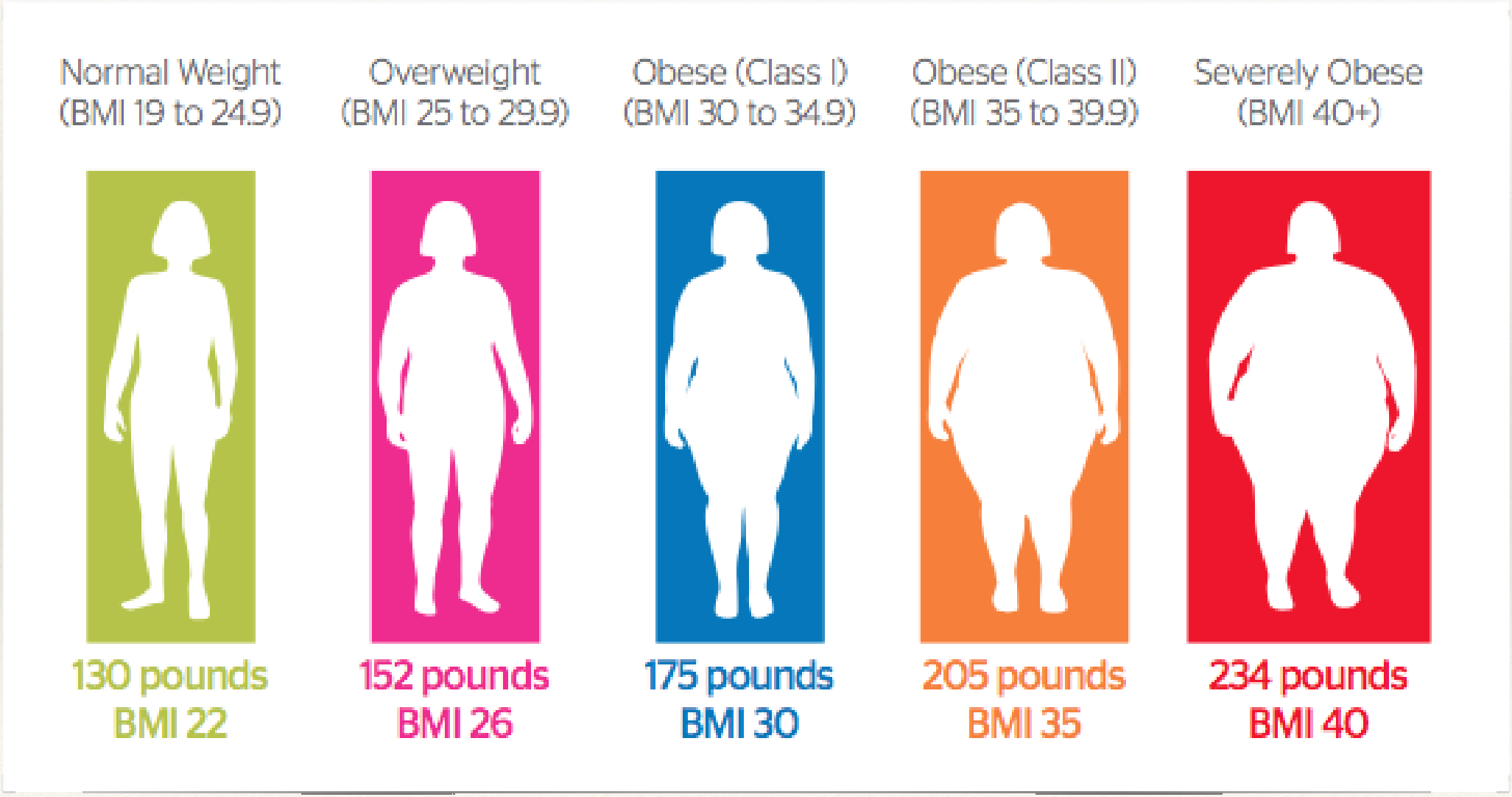
Classification of Obesity

BMI Classification

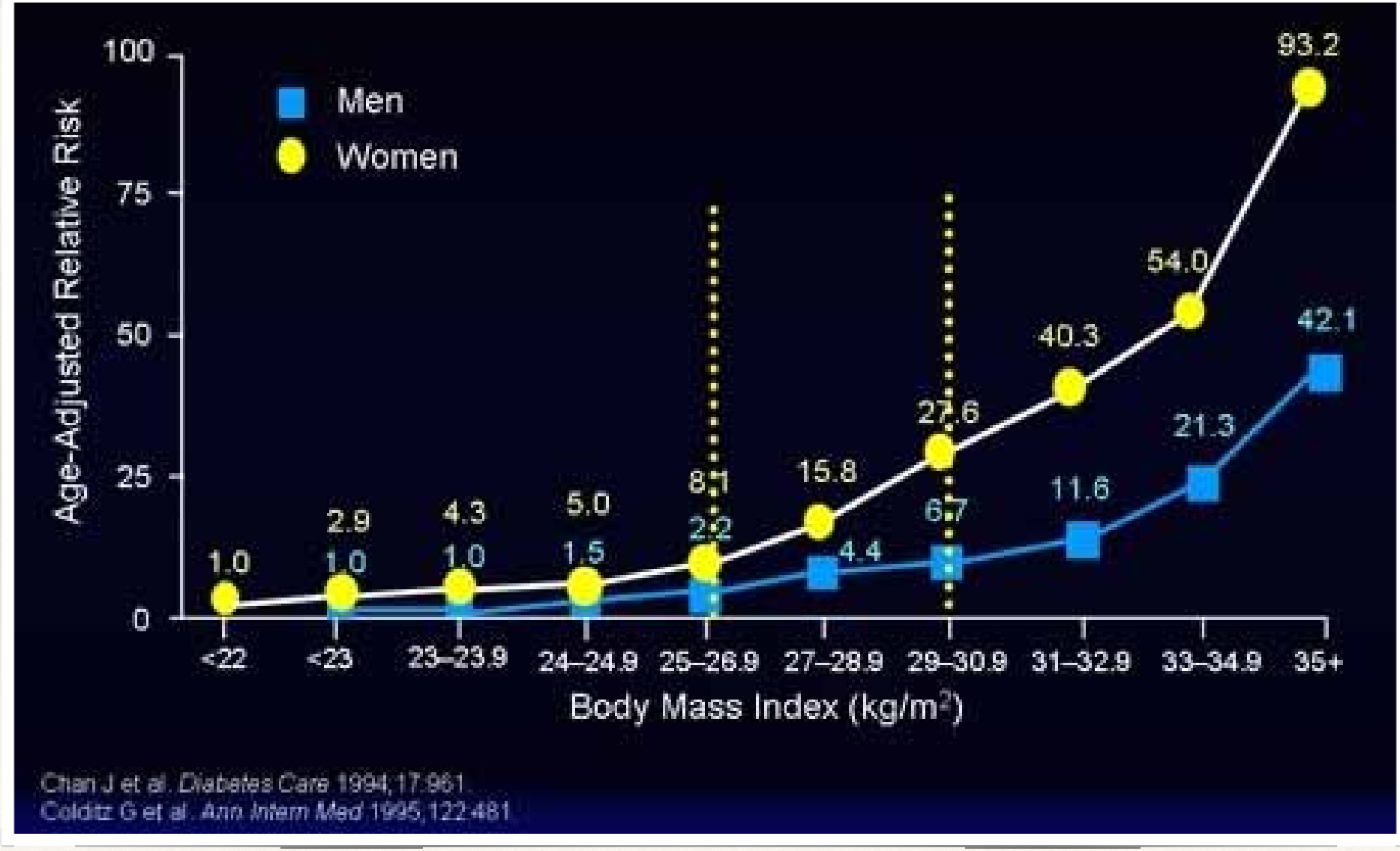
Classification	WHO	Asia-Pacific	Health Risk
Underweight	Under 18.5	Under 18.5	Low
Normal	18.5-24.9	18.5-22.9	Average
Overweight	25-29.9	23-24.9	Increased
Obese Class I	30-34.9	25-29.9	Moderate
Obese Class II	35-39.9 (Morbid >40)	≥30	Severe

From the presentation of Dr. Gabriel Jasul

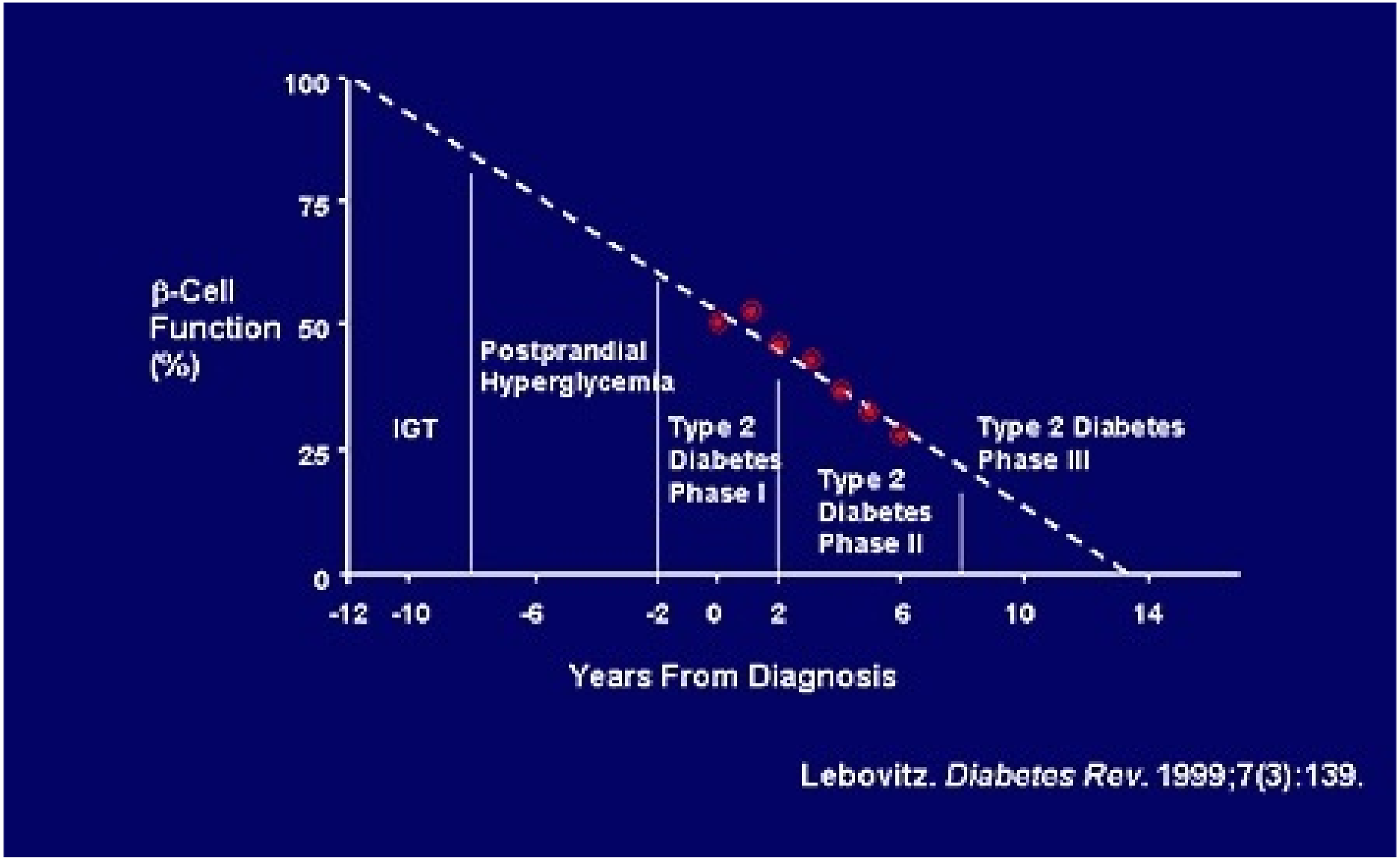
Classification of Obesity



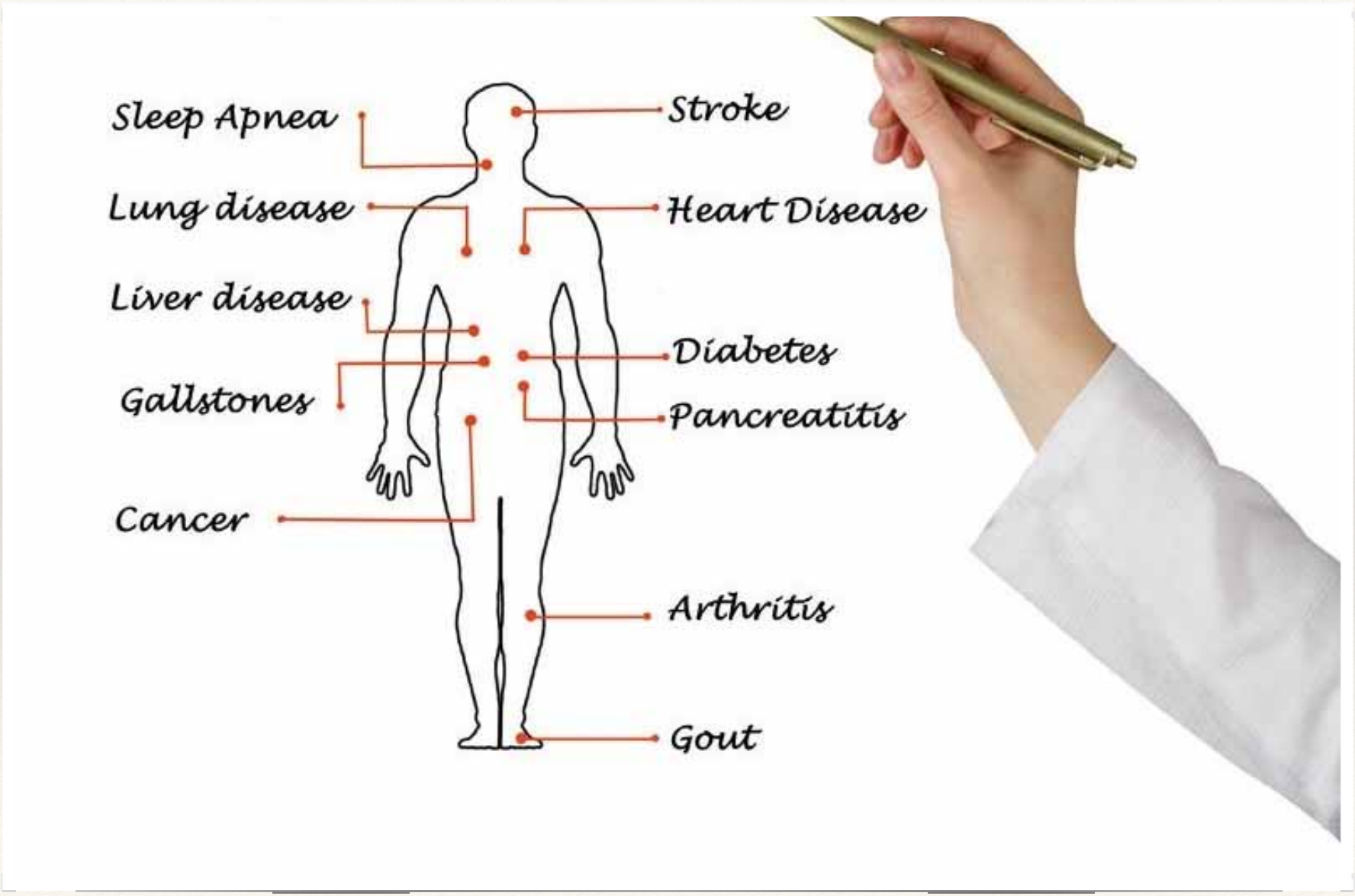
Relationship between BMI and T2DM



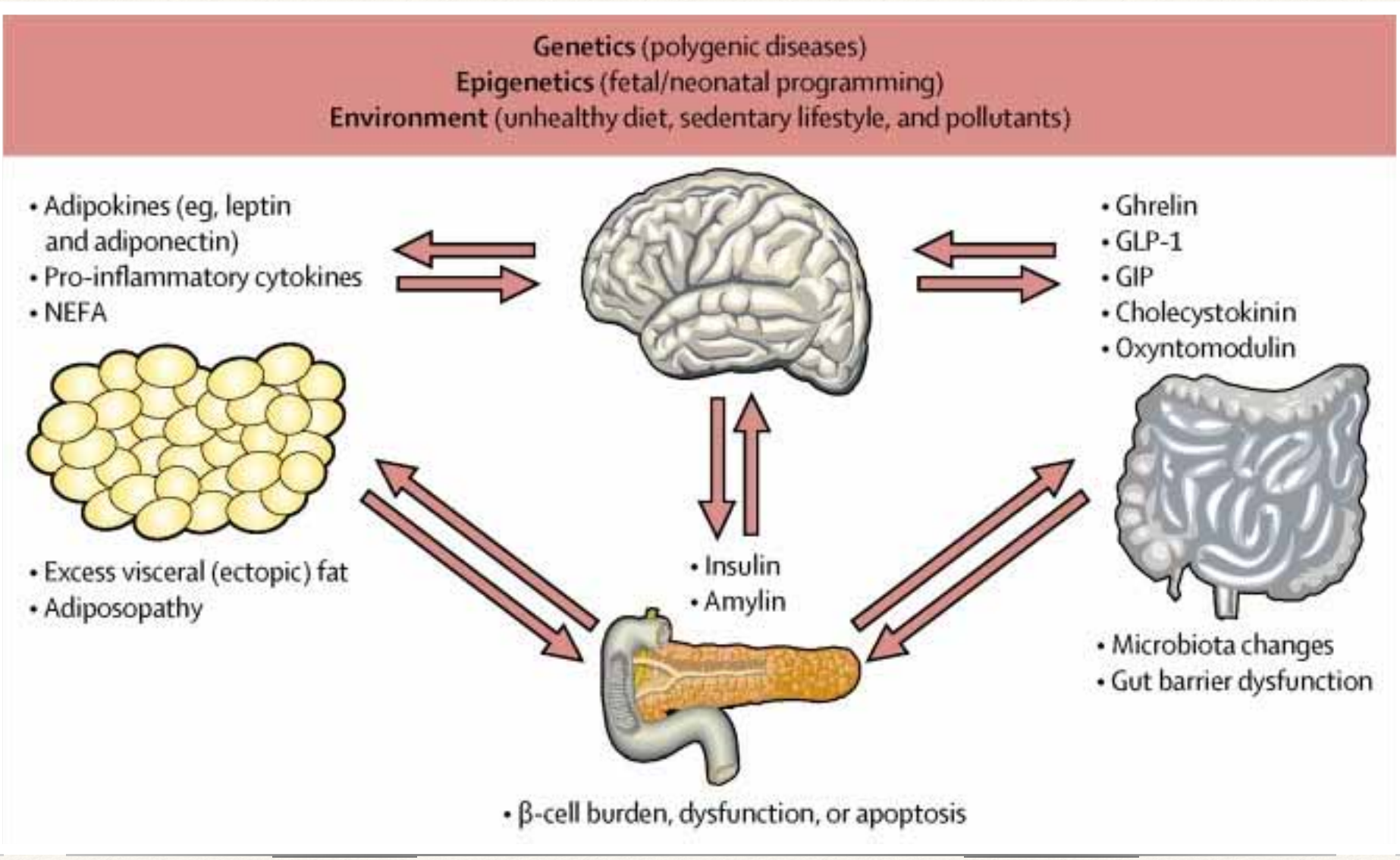
Stages of T2DM



Complications other than DM



Pathophysiology Obesity



Pathophysiology Obesity

Gut microbiota and obesity/type 2 diabetes mellitus

ARTICLE

doi:10.1038/nature11450

A metagenome-wide association study of gut microbiota in type 2 diabetes

Qin, Nature 2012

Junjie Qin[1]*, Yingrui Li[2]*, Zhiming Cai[2]*, Shenghui Li[1]*, Jianfeng Zhu[1]*, Fan Zhang[2]*, Suisha Liang[2], Wenwei Zhang[2], Yuanlin Guan[1], Dongqian Shen[1], Yangqing Peng[1], Dongya Zhang[2], Zhuye Jie[1], Wenxian Wu[1], Youwen Qin[1], Wenbin Xue[1], Junhua Li[1], Lingchuan Han[2], Donghui Lu[2], Peixian Wu[2], Yali Dai[2], Xiaojuan Sun[2], Zesong Li[2], Aifa Tang[2], Shilong Zhong[2], Xiaoping Li[2], Weineng Chen[1], Ran Xu[1], Mingbang Wang[1], Qiang Feng[1], Meihua Gong[1], Jing Yu[1], Yanyan Zhang[1], Ming Zhang[1], Torben Hansen[3], Gaston Sanchez[4], Jeroen Raes[5,6], Gwen Falony[5,6], Shujiro Okuda[7,8], Mathieu Almeida[9], Emmanuelle LeChatelier[9], Pierre Renault[9], Nicolas Pons[9], Jean-Michel Batto[9], Zhaoxi Zhang[1], Hua Chen[1], Ruifu Yang[1,10], Weimou Zheng[1], Songgang Li[1], Huanming Yang[2], Jian Wang[1], S. Dusko Ehrlich[9], Rasmus Nielsen[6], Oluf Pedersen[3,11,12], Karsten Kristiansen[1,13] & Jun Wang[1,2,13]

i:10.1038/nature12506

Richness of human gut microbiome correlates with metabolic markers

Le Chatelier, Nature 2013

Emmanuelle Le Chatelier[1]*, Trine Nielsen[2]*, Junjie Qin[3]*, Edi Prifti[1]*, Falk Hildebrand[4,5], Gwen Falony[4,5], Mathieu Almeida[1], Manimozhiyan Arumugam[2,3,6], Jean-Michel Batto[1], Sean Kennedy[1], Pierre Leonard[1], Junhua Li[3,7], Kristoffer Burgdorf[2], Niels Grarup[2], Torben Jørgensen[8,9,10], Ivan Brandslund[11,12], Henrik Bjørn Nielsen[13], Agnieszka S. Juncker[13], Marcelo Bertalan[13], Florence Levenez[1], Nicolas Pons[1], Simon Rasmussen[13], Shinichi Sunagawa[4], Julien Tap[1,4], Sebastian Tims[14], Erwin G. Zoetendal[14], Søren Brunak[13], Karine Clément[15,16,17], Joël Doré[1,18], Michiel Kleerebezem[14], Karsten Kristiansen[19], Pierre Renault[18], Thomas Sicheritz-Ponten[13], Willem M. de Vos[14,20], Jean-Daniel Zucker[15,16,21], Jeroen Raes[4,5], Torben Hansen[2,22], MetaHIT consortium†, Peer Bork[4], Jun Wang[3,19,23,24,25], S. Dusko Ehrlich[1] & Oluf Pedersen[2,26,27,28]

LETTER

Karlsson, Nature 2013

Gut metagenome in European women wit impaired and diabetic glucose control

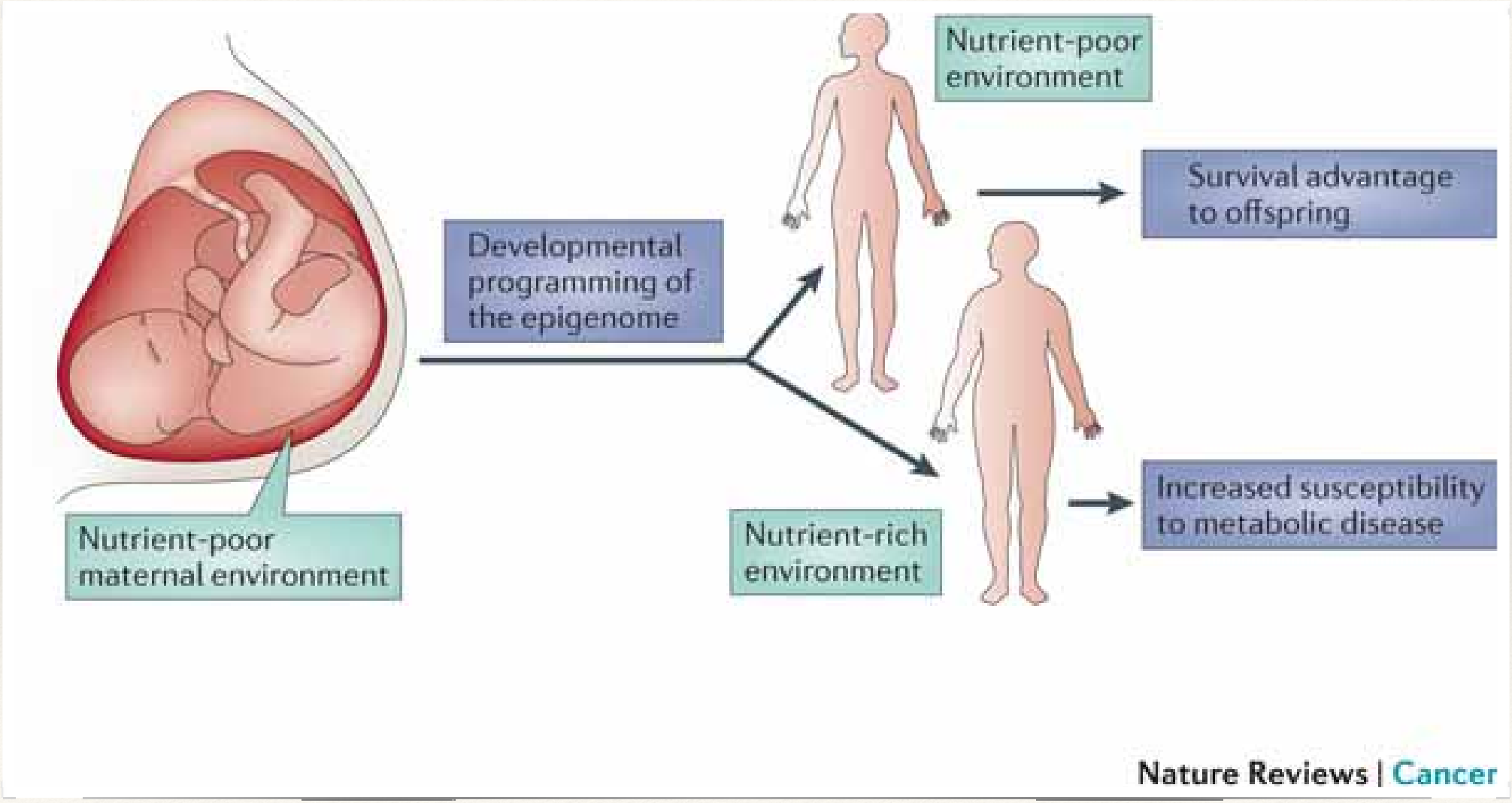
Fredrik H. Karlsson[1]*, Valentina Tremaroli[2]*, Intawat Nookaew[3], Göran Bergström[2], Carl Johan Behre[2], Jens Nielsen[1] & Fredrik Bäckhed[2,3]

Gut Microbiota from Twins Discorda for Obesity Modulate Metabolism in Mice

Ridaura, Science 2013

Vanessa K. Ridaura, Jeremiah J. Faith, Federico E. Rey, Jiye Cheng, Alexis E. Duncan, And L. Kau, Nicholas W. Griffin, Vincent Lombard, Bernard Henrissat, James R. Bain, Michael Muehlbauer, Olga Ilkayeva, Clay F. Semenkovich, Katsuhiko Funai, David K. Hayashi, Bar J. Lyle, Margaret C. Martini, Luke K. Ursell, Jose C. Clemente, William Van Treuren, Willia Walters, Rob Knight, Christopher B. Newgard, Andrew C. Heath, Jeffrey I. Gordon*

Pathophysiology Obesity



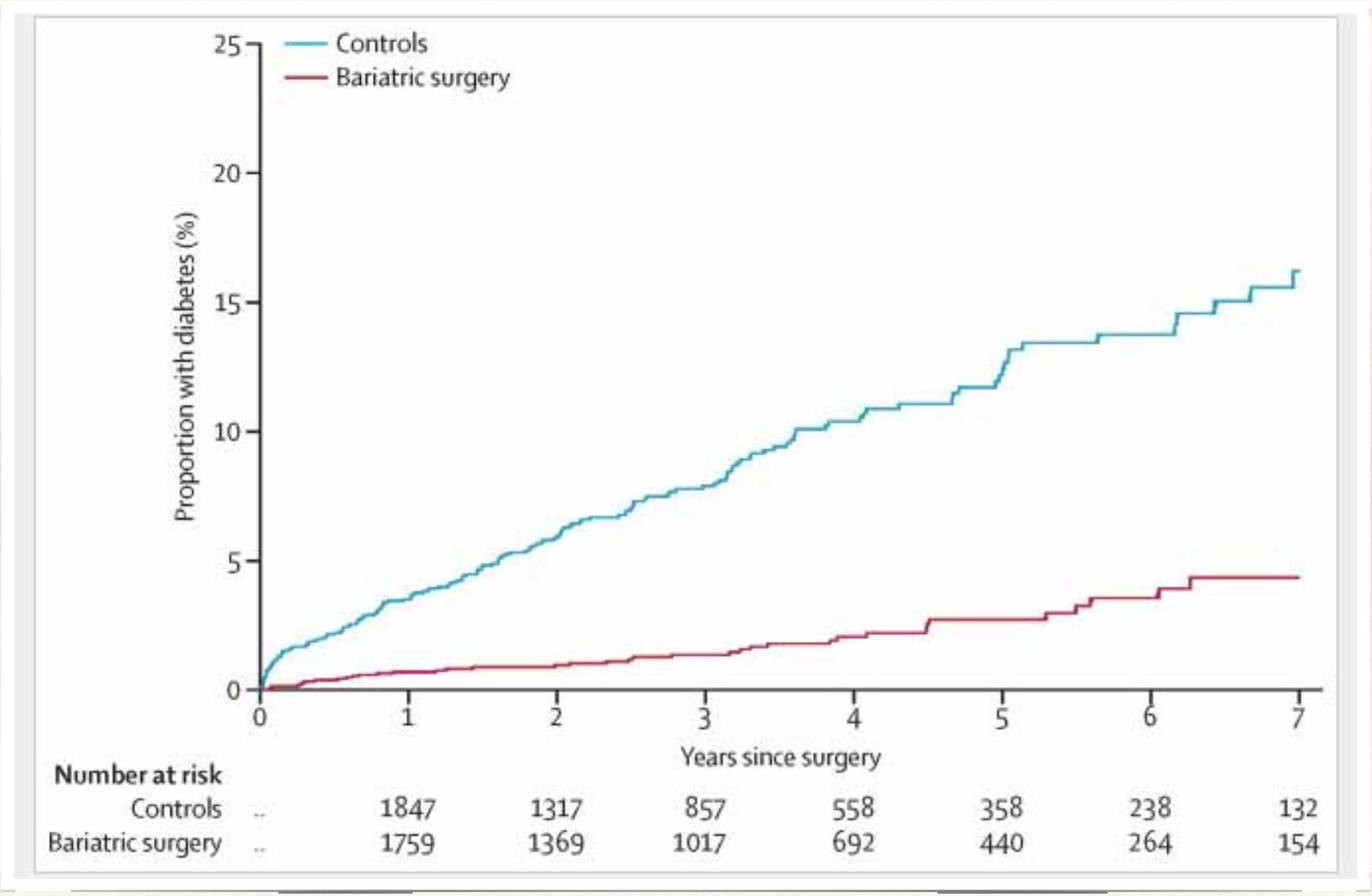
Overview of Surgery, DM/Pre-DM and obesity

Effects of bariatric surgery at the different stages of the clinical course of type 2 diabetes

Stage of type 2 diabetes	Effects of bariatric surgery
Prediabetes	Well documented, highly significant reduction of new cases of type 2 diabetes (5,6)
Recently onset type 2 diabetes	Well documented high potential for diabetes remission (7-10); documented reduction in the incidence of macro- and micro-vascular complications (11,12)
Type 2 diabetes with initial macro- and micro-vascular complications	Possible regression of macro- and micro-vascular complication suggested in some study (13,14)
Type 2 diabetes with established end-stage macro- or micro-vascular complications	No regression and in some cases progression of micro-vascular complications (diabetic nephropathy and retinopathy) (14,15); no gain in survival (16)

Annals of Translational Medicine, May 2014

Bariatric surgery as a preventive treatment for DM



Lancet Diabetes &Endocrinology, Dec 2014

Remission rates after Bariatric Surgery

Table 2. Two- and 10-year diabetes incidence and remission* rates from the Swedish Obese Subjects Study [7]

	Surgical	Control
2-year incident	1%	8%
10-year incident	8%	24%
2-year remission	72%	21%
10-year remission	36%	13%

* Remission based on fasting plasma glucose < 7.0 mmol/l and not on hypoglycaemic therapy [7].

Remission Prediction Score

Prediction factor		Score
Age (years)	If age <40, enter 0 →	2
	If age 40–49, enter 1 →	
	If age 50–59, enter 2 →	
	If age 60+, enter 3 →	
HbA1c (%)	If HbA1c <6.5, enter 0 →	4
	If HbA1c 6.5–6.9, enter 2 →	
	If HbA1c 7.0–8.9, enter 4 →	
	If HbA1c >9, enter 6 →	
Diabetes medication	If not sulfonylureas or ISA*, enter 0 →	3
	If sulfonylureas or ISA*, enter 3 →	
Insulin treatment	If not on insulin, enter 0 →	10
	If on insulin, enter 10 →	
***DiaRem* score (sum) →**		19

*Insulin sensitizing agent other than metformin

DiaRem score	Probability of remission
0–2	88%–99%
3–7	64%–88%
8–12	23%–49%
13–17	11%–33%
18–22	2%–16%

Indications for bariatric surgery

BMI ≥ 40 kg/m²

In any case, providing surgery risk acceptable (well established)

BMI ≥ 35 kg/m²

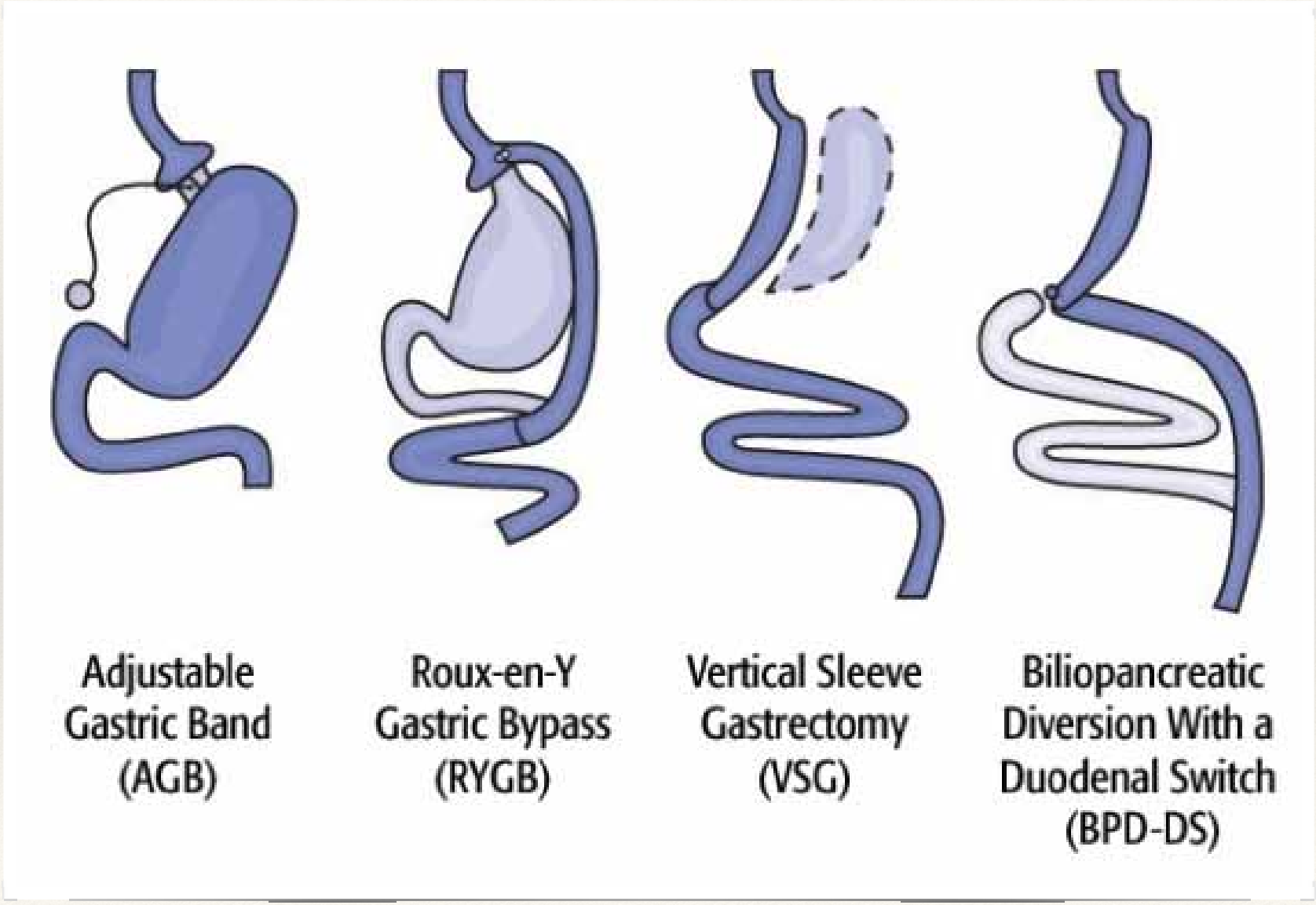
If there are ≥ 1 obesity-related morbidities (well established)

- -Type 2 diabetes, hypertension, dyslipidemia, CV disease
- -Sleep apnea, obesity-hypoventilation, Pickwick's syndrome
- -Fatty liver disease
- -Idiopathic intracraneal hypertension (*pseudotumor cerebri*)
- -Gastro-esophagic reflux
- -Asthma
- -Lower extremities venous insufficiency
- -Severe urinary incontinence
- -Disabling osteoarthtritis

BMI between 30 and 34,9 kg/m²

If type 2 diabetes or metabolic syndrome ("metabolic surgery")
(Under scrutiny; less established indication)

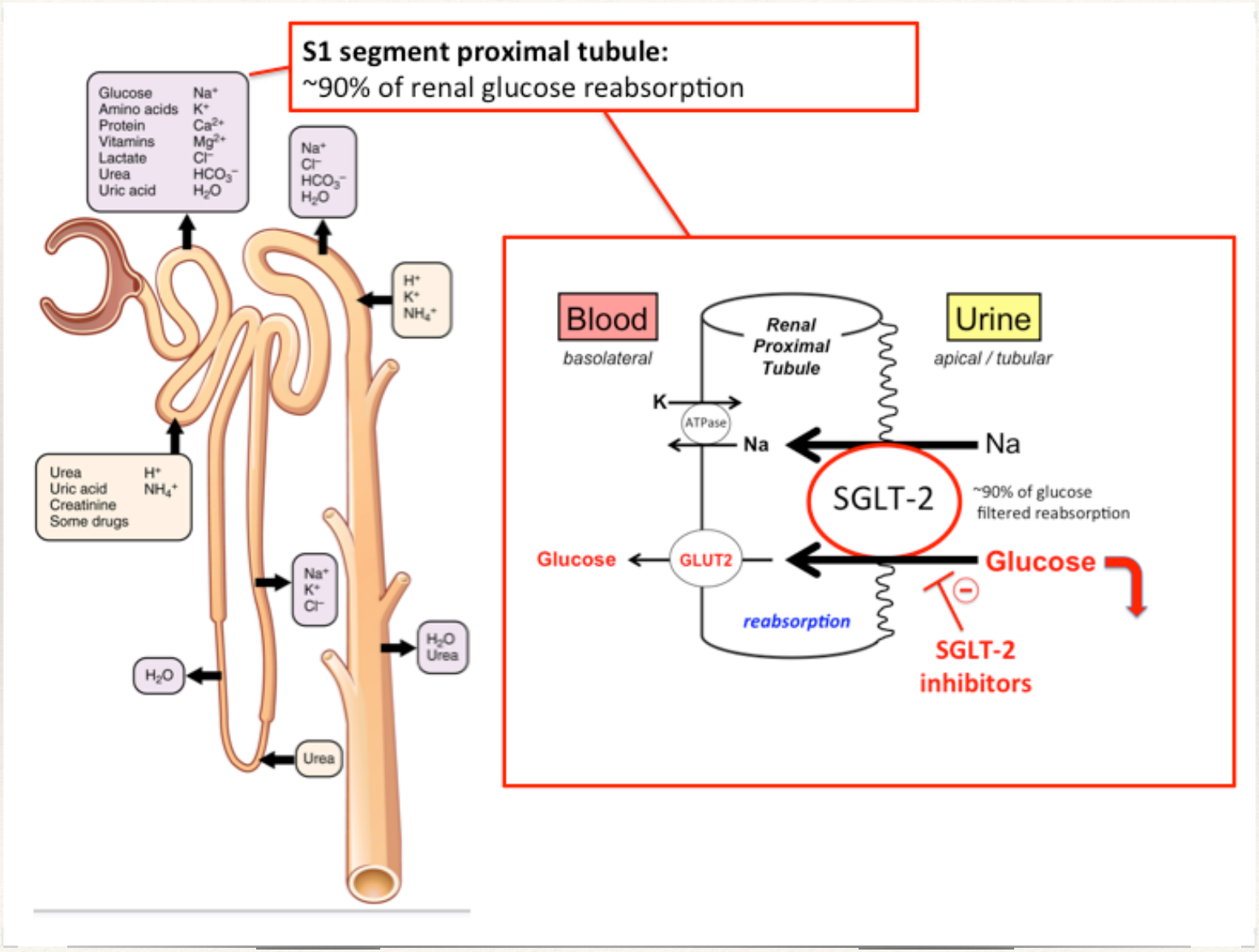
Bariatric surgery options



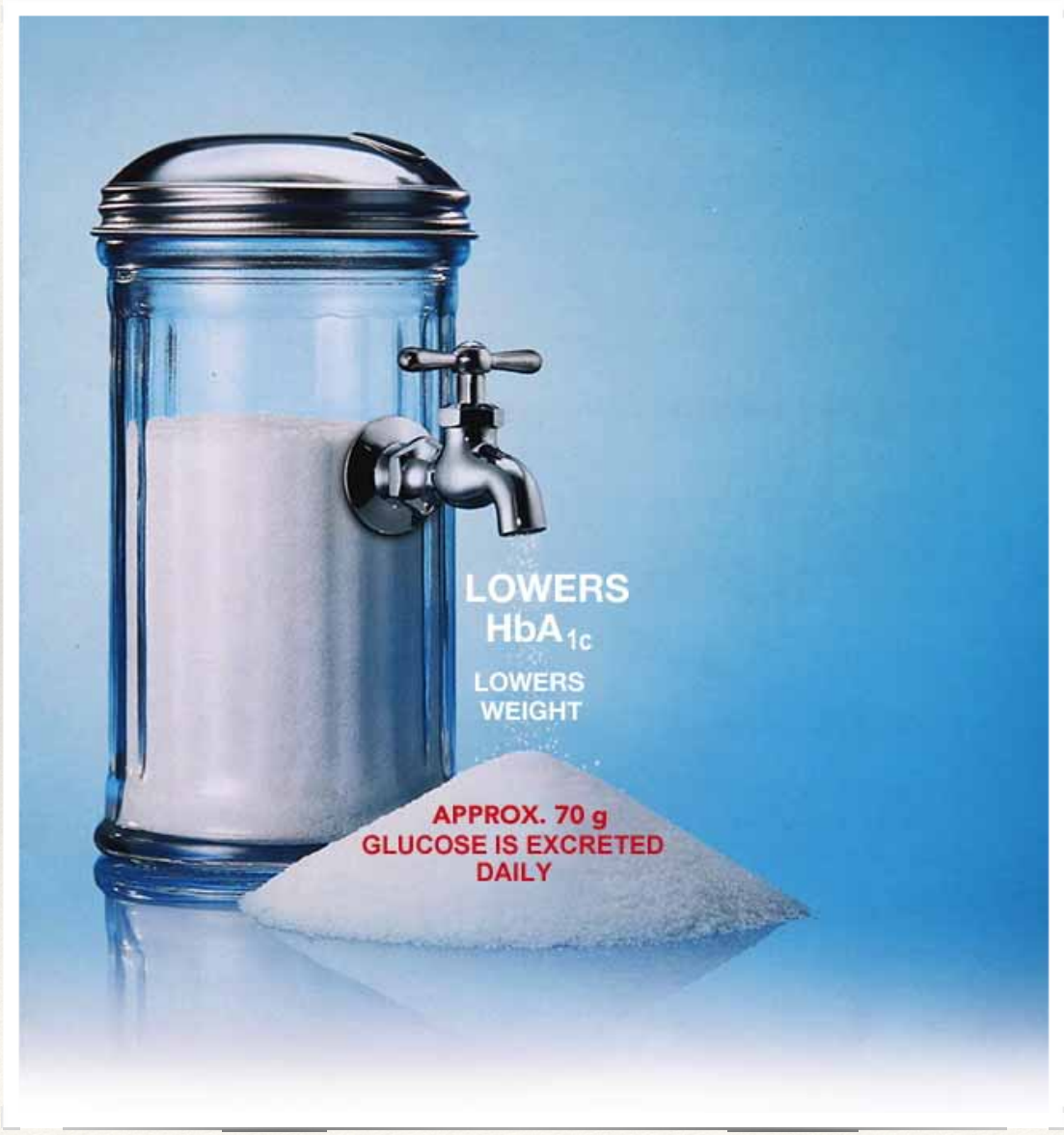
Available Medical Treatment

- Orlistat
- Topiramate
- Lorcaserin
- GLP-1 Receptor Agonists
- SGLT-2 Inhibitors

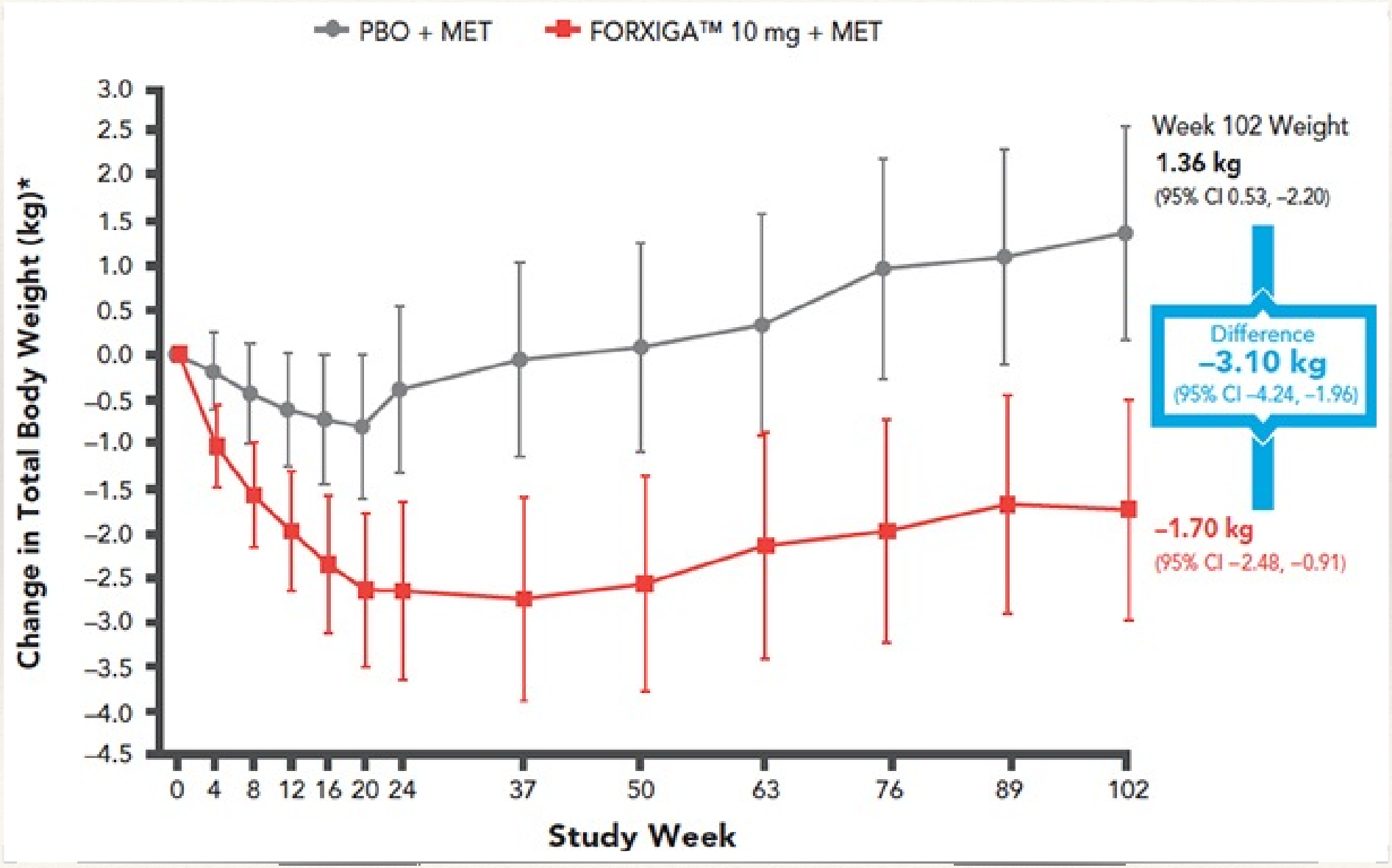
SGLT2 Inhibitors and weight loss



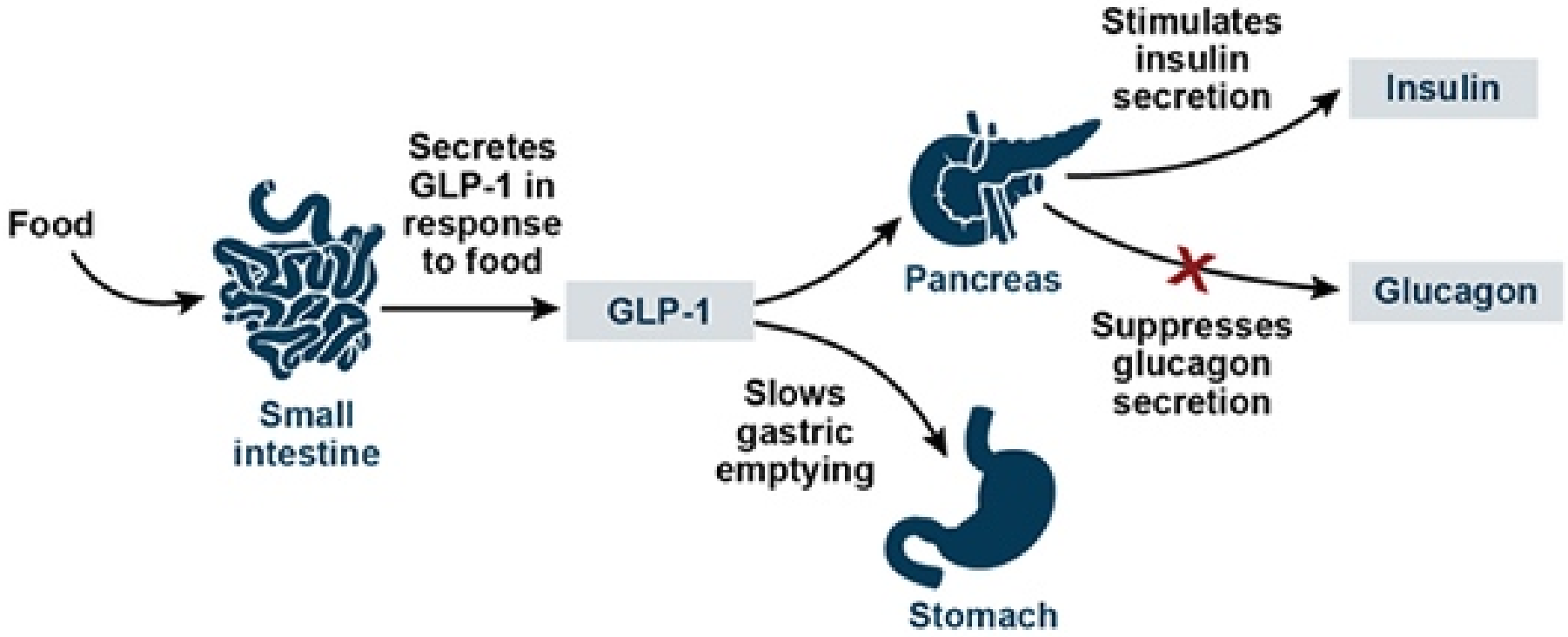
SGLT2 Inhibitors and weight loss



SGLT2 Inhibitors and weight loss

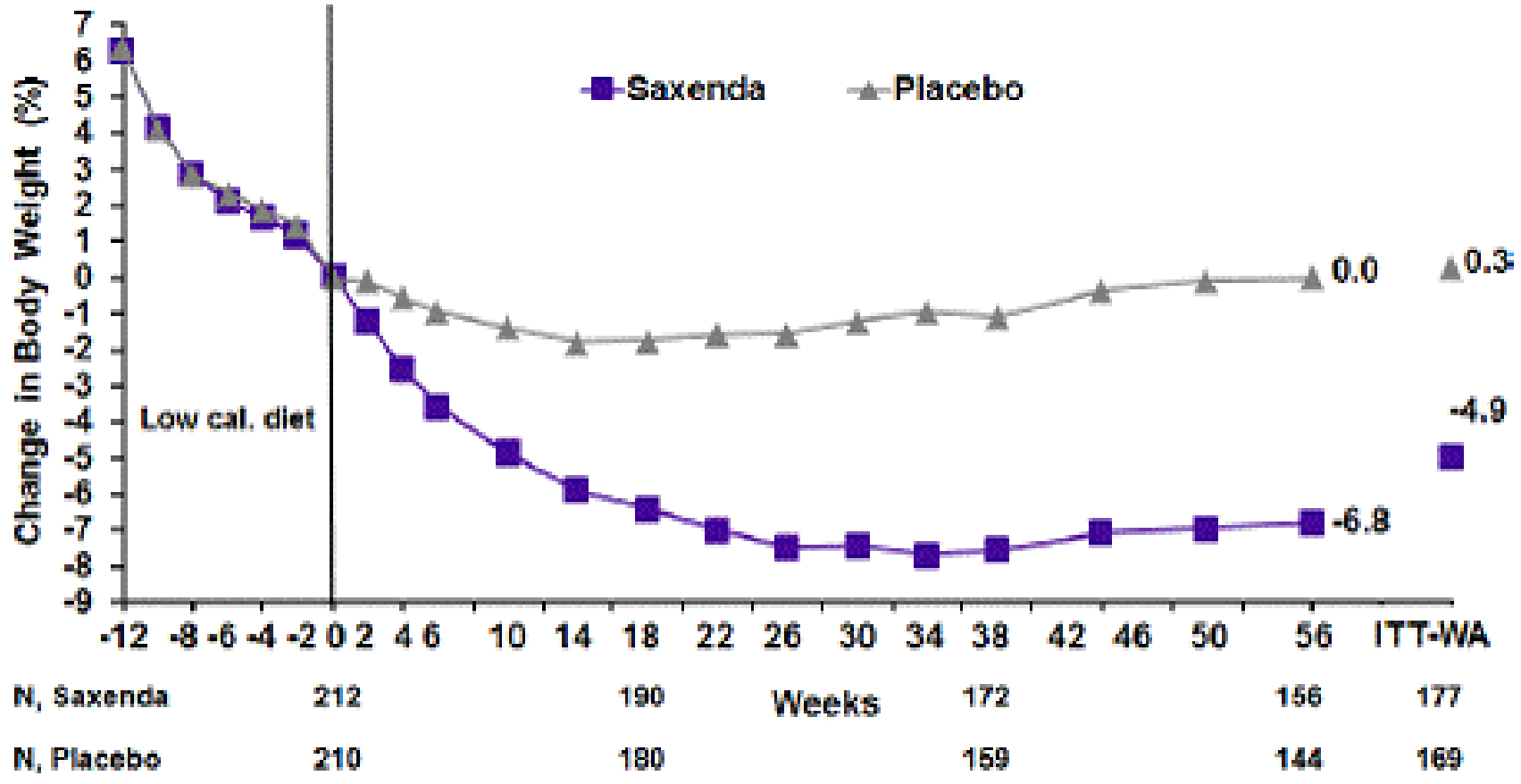


GLP-1 Receptor Agonists



Holst JJ. *Physiol Rev*. 2007;87:1409-1439.

Liraglutide licensed for weight loss



Observed values for patients on study drug completing each scheduled visit, and ITT with weighted average (ITT-WA)

Thank you