Medical Nutrition Therapy in DM and Pre-diabetes

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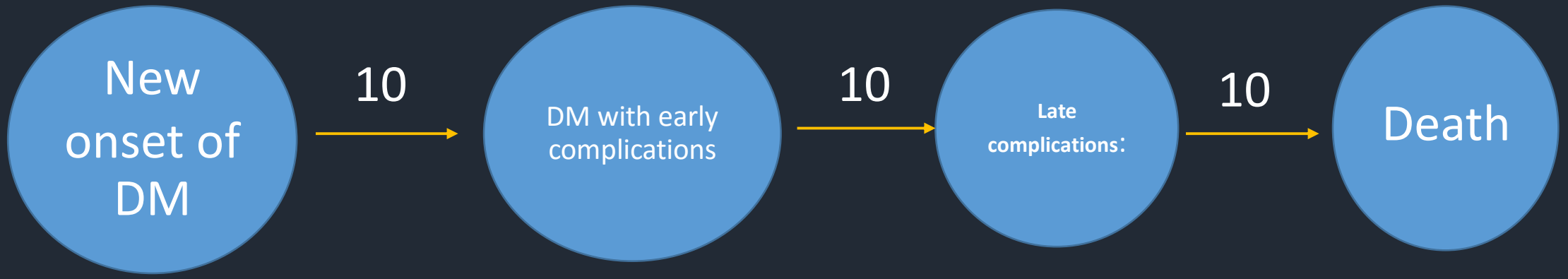
Diabetes across the lifespan



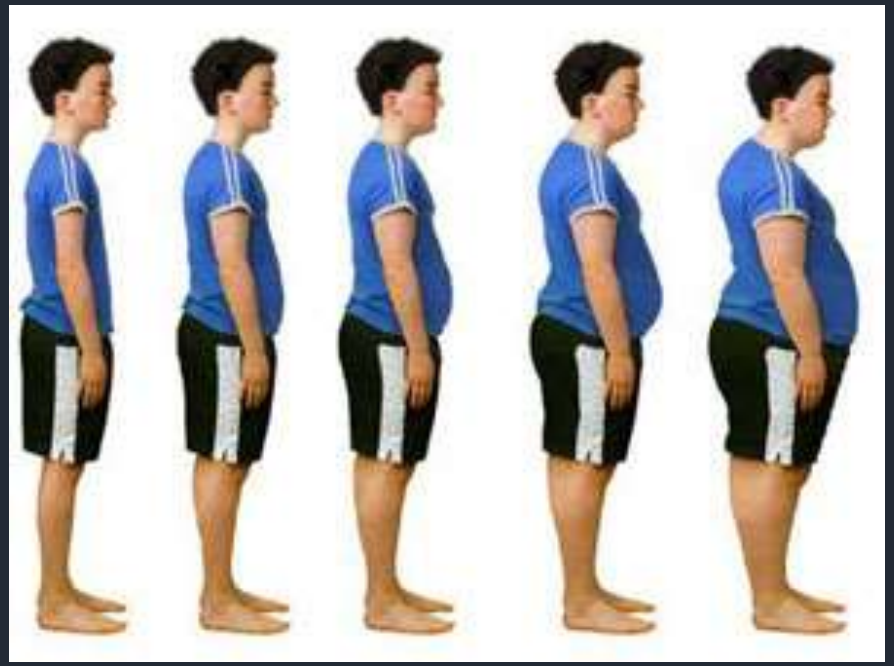
50 years 60 years 70 years 80 years

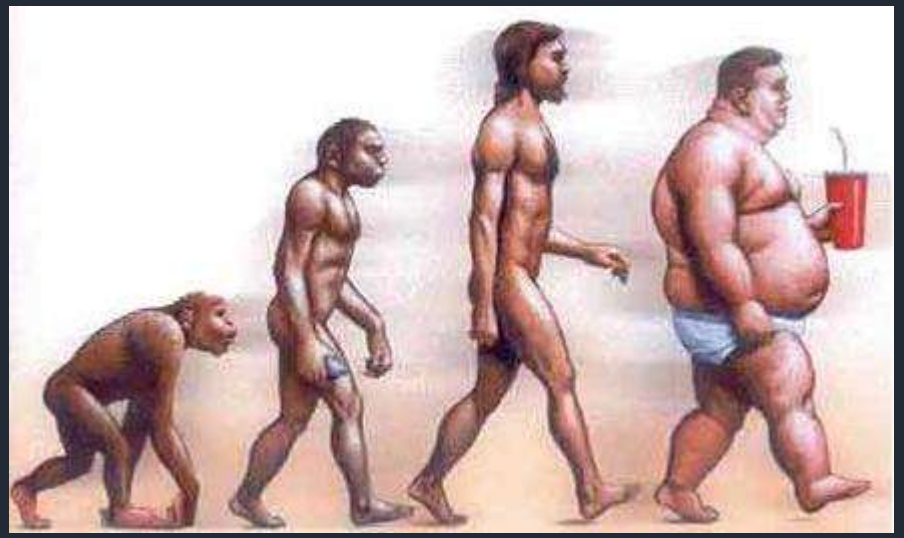
30 years 40 years 50 years 80 years

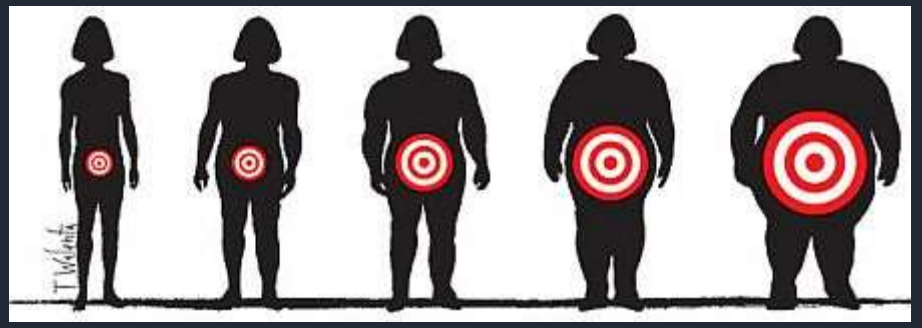
Classification of Diabetes Mellitus
1. Type 1 diabetes (Immune-mediated, Idiopathic)
2. Type 2 diabetes May range from predominantly insulin resistant to predominantly insulin deficient
3. Other specific types May caused by: Genetic defects of β-cell function, Genetic defects in insulin action, Diseases of endocrine pancreas, Endocrinopathies, Drug- or chemical-induced, Infections, Uncommon forms of immune-mediated diabetes, Other genetic syndromes sometimes associated with diabetes
4. Gestational diabetes

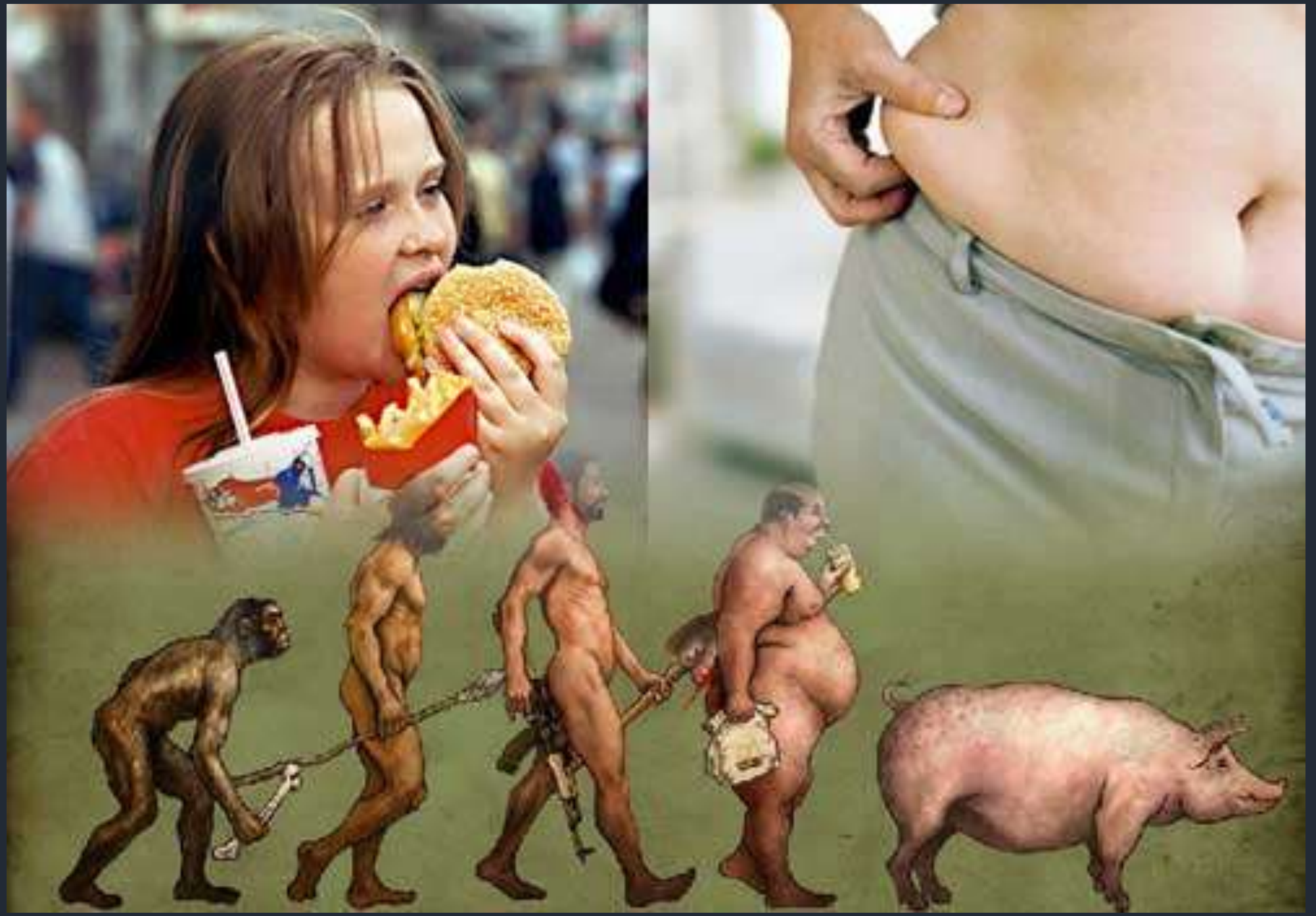
ลักษณะ	เบาหวานชนิดที่ 1	เบาหวานชนิดที่ 2
อายุ	<30 ปี	30 ปี
Onset	เฉียบพลัน	ช้า, บางรายไม่มีอาการ
ลักษณะที่พบ	ผอม น้ำหนักลด ปัสสาวะบ่อย หิวน้ำบ่อย	อ้วน ประวัติครอบครัวชัดเจน acanthosis nigrican PCOS
Autoimmune disease อื่น	พบร่วมได้	พบน้อย
Ketosis	มี	ไม่มี
C-peptide	ต่ำ	สูงในช่วงแรก
Antibodies (anti-GAD , ICA, IA-2)	ได้ผลบวก	ได้ผลลบ

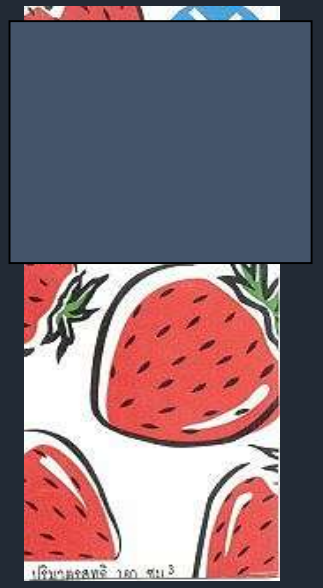
2

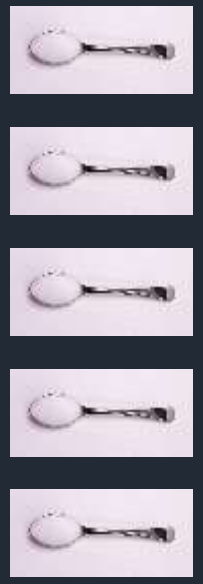




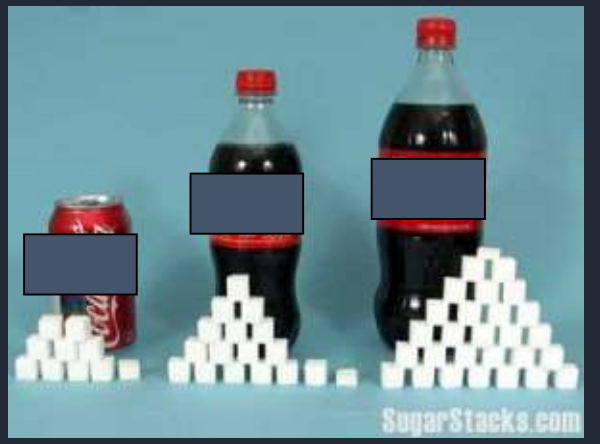









SugarStacks.com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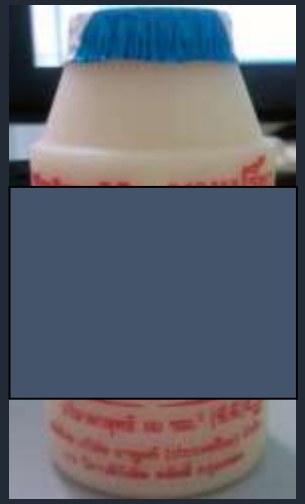
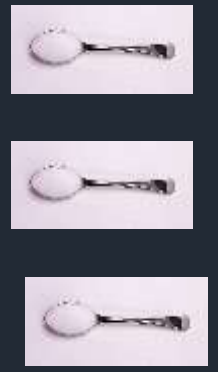
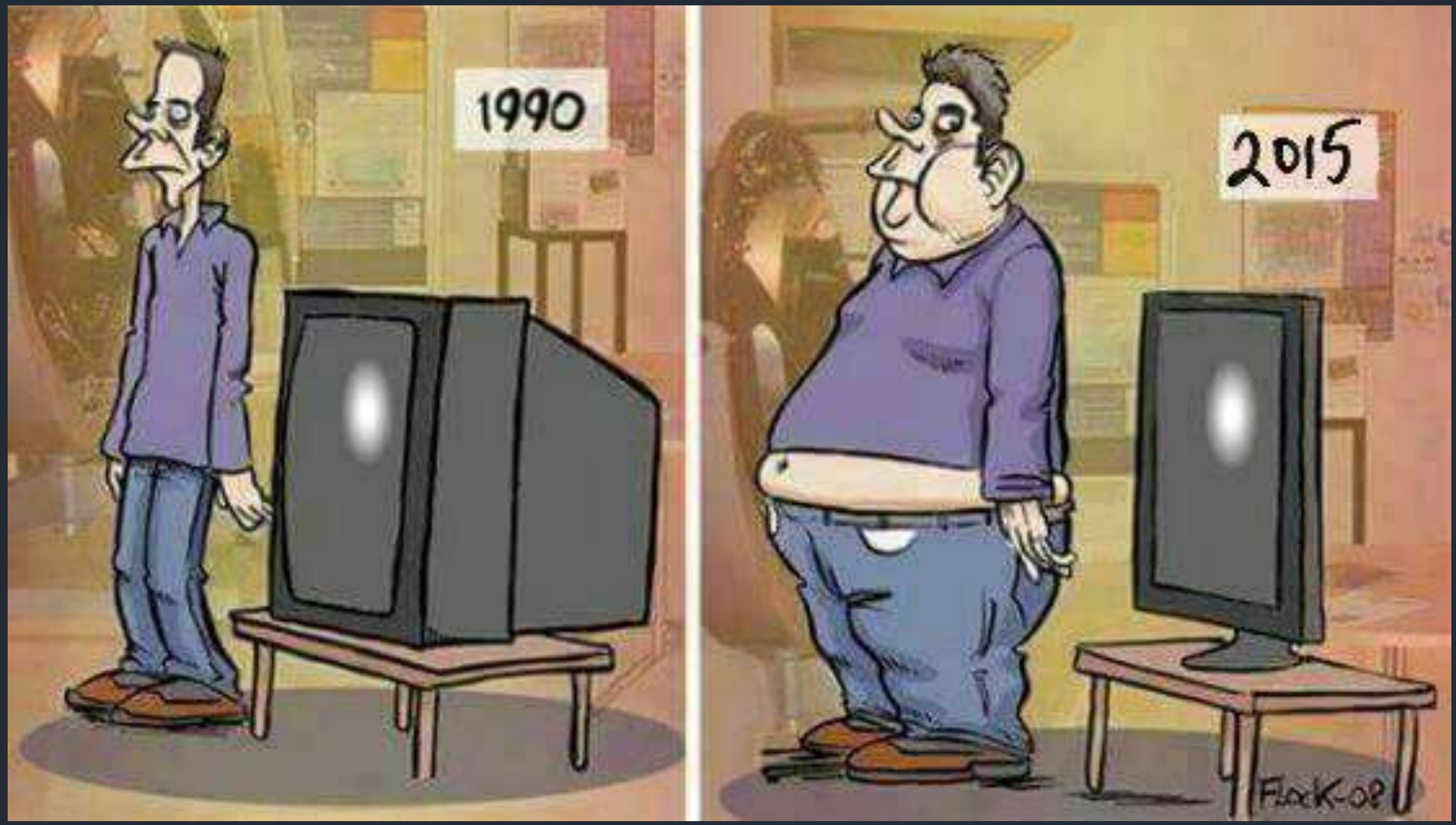





1990
2015
FLOCK-OF

Distinguishing clinical characteristics of MODY and type 2 diabetes*		
Characteristic	MODY	Type 2 diabetes
Mode of inheritance	Monogenic, autosomal dominant	Polygenic (gene–gene and gene–environment interactions)
Age at onset	Childhood, adolescence, or young adulthood (usually <25 yr)	Adulthood (usually 40–60 yr), occasionally adolescence (if person is obese)
Pedigree	Usually multigenerational	Rarely multigenerational
Penetrance	80–95%	Variable (possibly 10–40%)
Body habitus	Non obese	Usually obese
Metabolic syndrome (diabetes, insulin resistance, hypertension, hypertriglyceridemia)	Absent	Usually present

MNT is different depend on type of DM, complications. BW
(one size does not fit all)

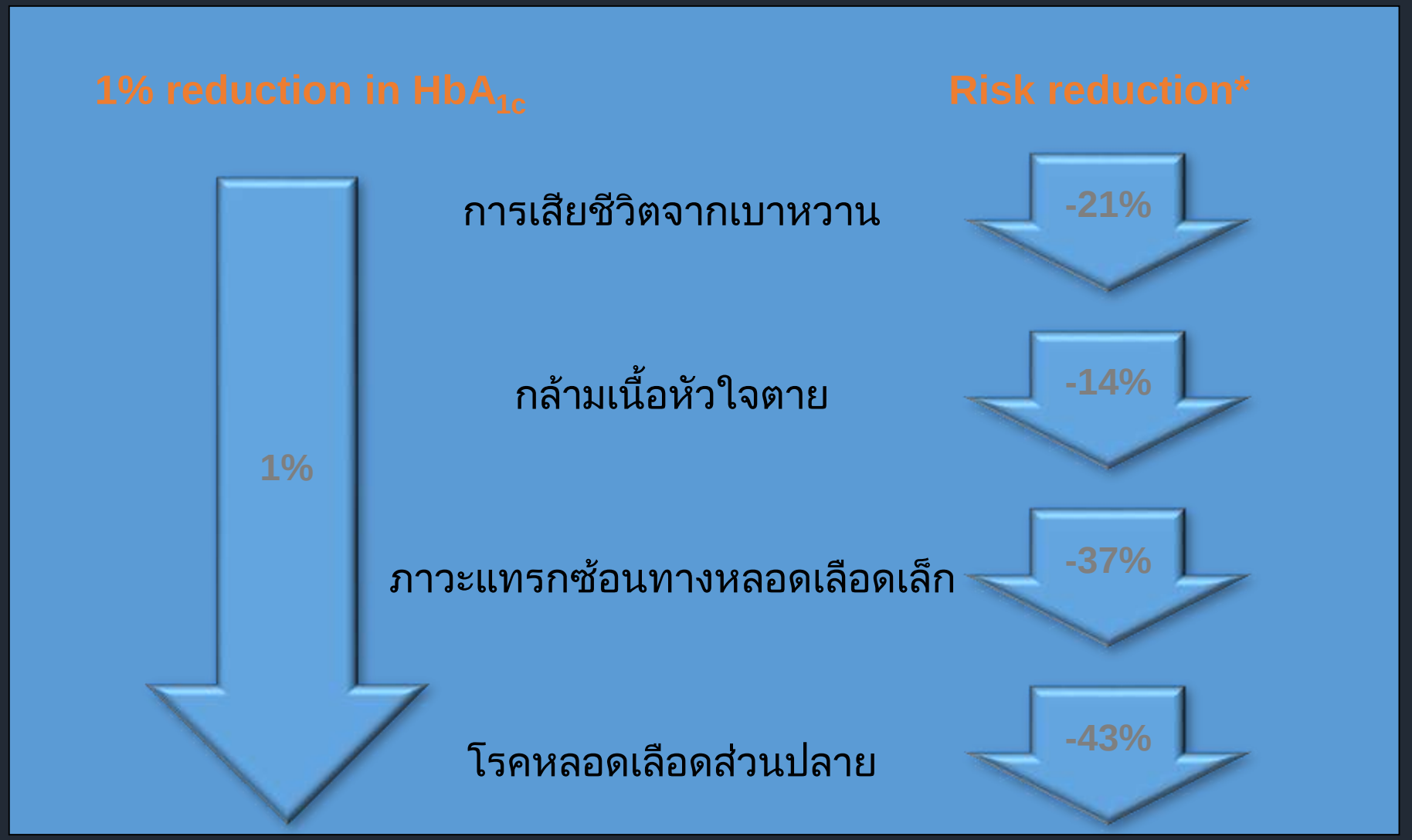
MNT in diabetes depends on type of DM

Type of DM	Ewcommendation
Type 1	Need exogenous insulin Diet must be correlate with insulin dose and action. Diet must be changed with insulin and exercise. Carbohydrate count is important. Must know symptoms of hypoglycemia and correction. Adjust insulin according CHO count.
Type 2	Most of T2DM are obese and insulin resistance So recommend for weight reduction 5-7% By reduction of calories about 500-1000 kcal / day But in female patients not less than1000-1200 kcal /d and not less than 1200-1600 kcal /d in male patients Exercise 150 min/ week Suggest healthy diet and not so much

Adolescent and puberty	Depend on the age Plan depend on health and emotion Normal growth development Healthy diet: brown rice, vegetable , fruit Use term plan for diet than diet control Suggest healthy eating in family members <u>Type 1</u> Avoid hypoglycemia Hyperglycemia during puberty from hormonal change: growth hormone <u>Type 2</u> Appropriate of plate Slow eating Avoid eating during watching television Exercise at least 60 min/ day Limit duration of watching TN, internet,

•Evidence-based medicine

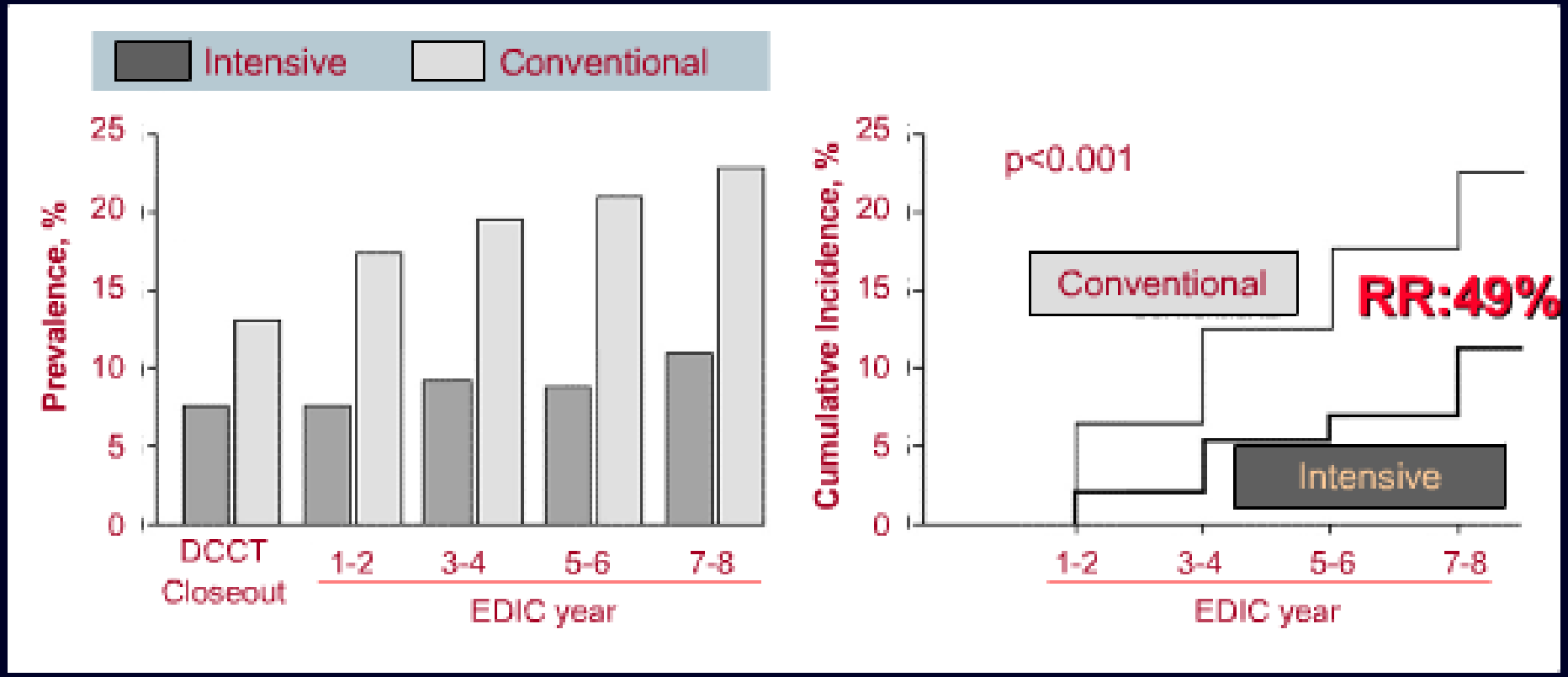
จากการศึกษา UKPDS การลดน้ำตาลสะสม 1%



*p<0.0001 n=3,642 type 2 diabetes patients
1. Stratton IM *et al*. *BMJ* 2000;321:405–412

Sustained effect of Intensive Treatment of Type 1 Diabetes on Development of Microalbuminuria

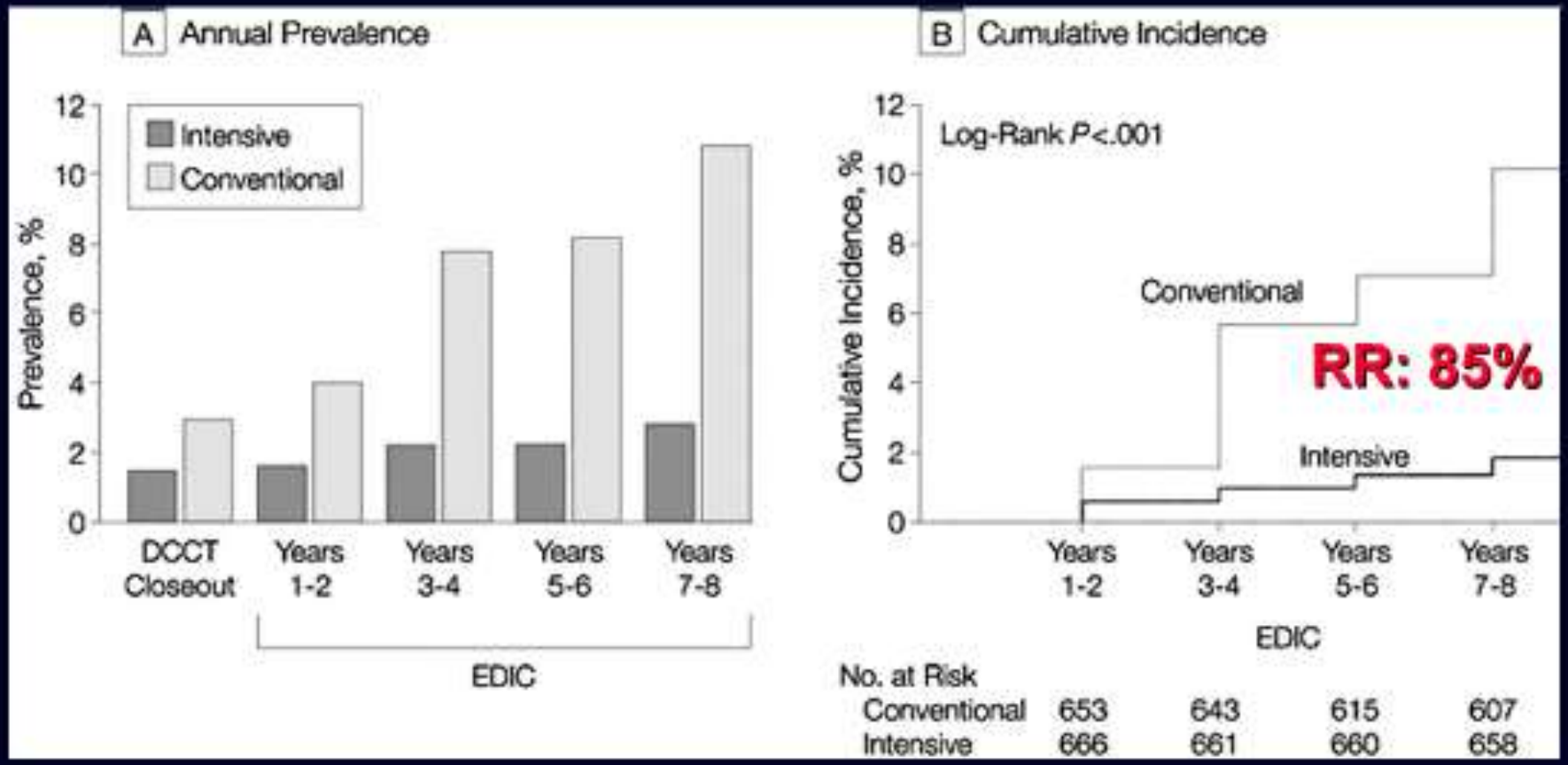
Prevalence and Cumulative Incidence of Microalbuminuria



EDIC Study, JAMA, 2003

Sustained effect of Intensive Treatment of Type 1 Diabetes on Progression of Diabetic Nephropathy

Prevalence and Incidence of Macroalbuminuria



EDIC Study, JAMA, 2003

1 ควบคุมเต็มที่ ไม่ควบคุม

เริ่มวินิจฉัย
โรคเบาหวาน

5 ปีแรก 5 ปีหลัง

2 ไม่ควบคุม ควบคุมเต็มที่

5 ปี 10 ปี

Carbohydrate Counting

- Insulin dosing (bolus) is based on CHO intake
- Permits more exact dosing of insulin
- Carbohydrate content can be easily determined
- Requires familiarity with CHO vs. proteins or fats
- Requires familiarity with portion sizes
- Requires ability to do simple calculations
- Consider referral to CDE
- Direct patient to materials on CHO counting

Carbohydrate counting recommendations

Recommendation per meal

-Female : 3 to 4 choices (45-60 gms)

-Meal : 4 to 5 choices (60-75 gms)

-1-2 choices at snack time, if desired

Emphasize day to day consistency

Test blood glucose pre and post meal to assess impact

How do you count carbohydrate?

Exchange system

1 starch = 18 gms carbohydrate = 1 carb

1 fruit = 15 gms carbohydrate = 1 carb

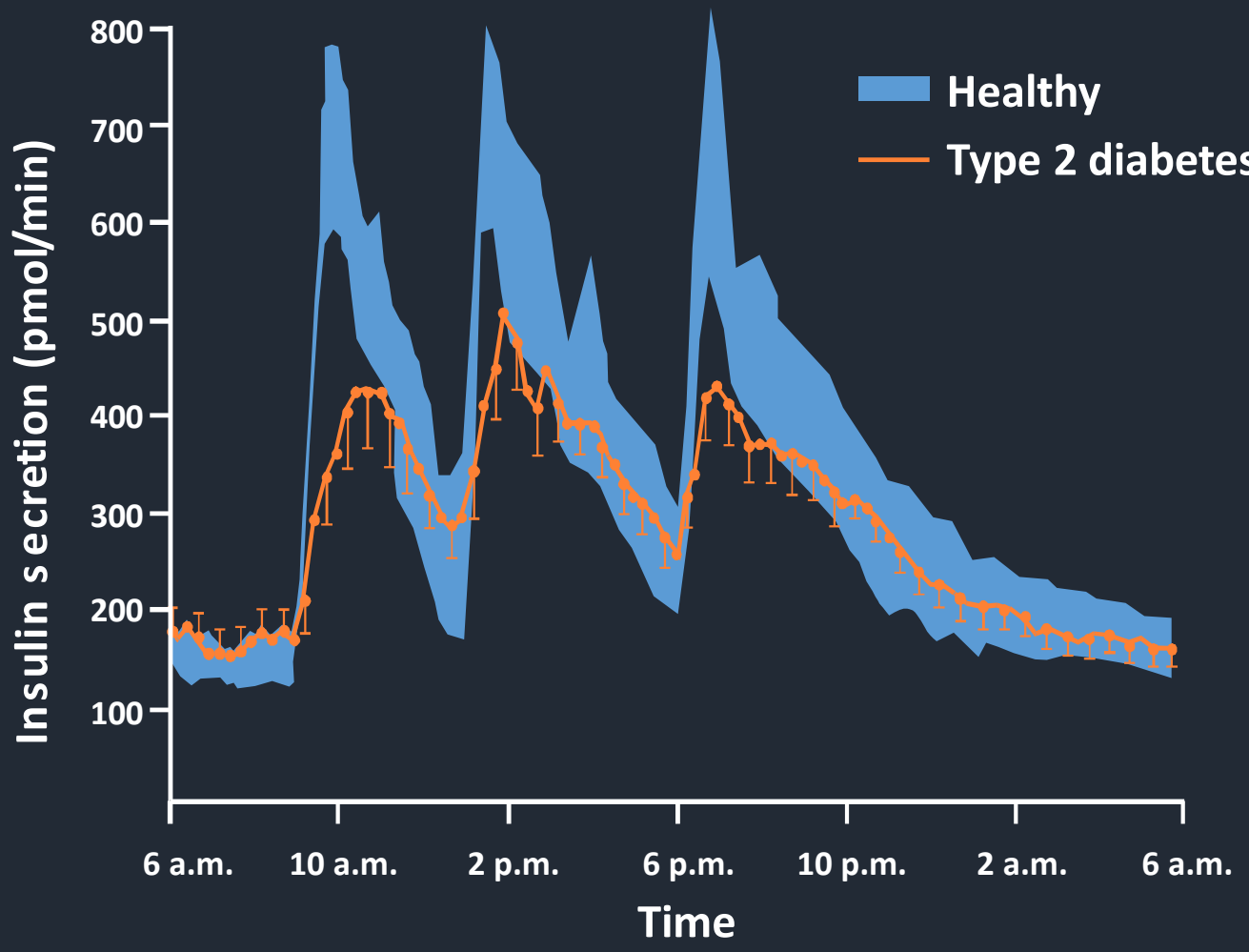
1 milk = 12 gms carbohydrate = 1 carb

1 vegetable = 5 gms carbohydrate = 1/3 carb

1 Carb

15 gms carbohydrate (also known as a carbo choice, carb unit, or carbo)

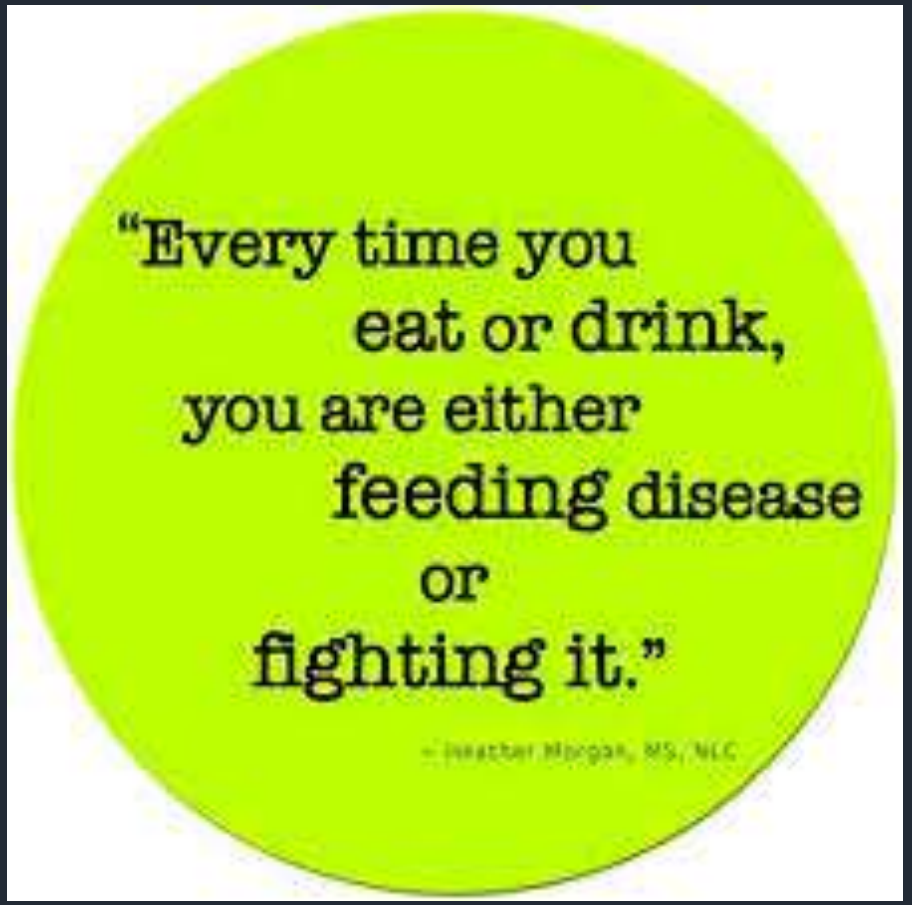
Insulin secretion profiles in Type 2 diabetic patients and healthy persons



Putting it All Together

- GH is about to eat lunch. His BG is 183. He is planning to eat a salad, a six inch Subway club sandwich, a small bag of Sunchips and a diet soda.
- How many CHO in this meal?
  - How much insulin to cover the CHO?
    - (Imagine a 1:15 insulin to CHO ratio)
- What is target pre-meal BG?
  - How much insulin to correct for 183?
- How much total insulin for this meal?

Food is Medicine



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ผลไม้ 1 ส่วน = แป้ง 1 ส่วน

ส้ม 1 ผล

แอปเปิ้ล 1 ผลเล็ก

สาลี่ 1 ผลเล็ก

ฝรั่ง 1 ผลกลาง

กระท้อน 1 ผลเล็ก

กล้วยน้ำหว้า 1 ผล กล้วยหอม ½ ผล

มะม่วงดิบ 1 ผลเล็ก

มะม่วงสุก ½ ผล

มะขามหวาน 2 ฝัก

มะละกอ 1 ถ้วยตวง

แคนตาลูป 1 ถ้วยตวง

สับปะรด ¾ ถ้วยตวง

สรอเบอรี่ 12 ผลเล็ก

เงาะ 6 ผล

ผัก 1 ส่วน = 1/3 CHO

ผัก 1 ส่วน= ผักสุก 1/2 ถ้วยตวง

=ผักดิบ 1 ถ้วยตวง

Quick-carb Counting

- Dosage of insulin is based on total grams of carbohydrates
  - Insulin: CHO ratio of 1:15
    - If the total grams of carbohydrate is 60, then 4.0 units of insulin would be administered.
  - Insulin: CHO ratio of 1:10
    - If the total grams of CHO is 60, then 6.0 units of insulin would be administered.
    - T2DM patients may require 1 unit for each 3-5 grams of CHO
      - Ex: 60 g ÷ 3 units/g = 20 units or 60 g ÷ 5 units/g = 12 units
- How do you know?
  - Test the blood glucose 2 hours post prandial

Correction Factor

- Generally 1 unit of insulin will drop blood glucose by 30-50 points
- To determine if this is true for your patient – ask them to test
- Use either the 1500 or 1800 rule
  - 1500 rule for short-acting insulin (Regular)
  - 1800 rule for rapid-acting insulin
- It is an art – not an exact science

Insulin Sensitivity Factor

- $\frac{1800}{TDD}$ = Insulin Sensitivity Factor

- Example:

$$\frac{1800}{36 \text{ units}} = 50$$

One unit of rapid-acting insulin will affect glucose by 50 mg/dL

- TDD = Total Daily Dose of Insulin

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- What is target pre-meal BG?
  - How much insulin to correct for 183?
- How much total insulin for this meal?

1. Diet

2.Exercise

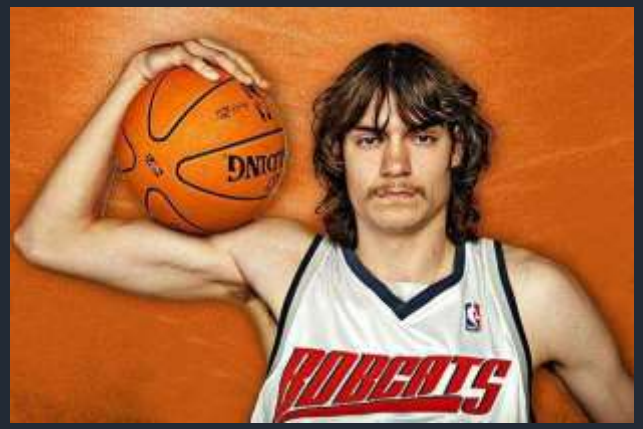
3.Insulin

ขั้นตอบการฉีดอินซูลินในผู้ป่วยโรคเบาหวานชนิดที่ 1

1. เจาะ
2. นับ
3. ฉีด
4. กิน
5. ประเมินผลมื้อต่อไป

Nicole Johnson

Kris Freeman



Adam Morrison

Gary Hall Jr.

Thank you for your attention

ในผู้ป่วยโรคเบาหวานชนิดที่ 1
การเจาะเลือดและฉีดยาวันละ 4 ครั้ง
ไม่ใช่เป็นเพียงการรักษาโรคเบาหวานเท่านั้น
แต่เป็นส่วนสำคัญที่ทำให้ความฝันของเขาหรือเธอสำเร็จ