* Diabetes mellitus – still challenge to modern medicine

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*What is diabetes mellitus?

Diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin production, insulin action, or both.

Diabetes – greek for "siphon" or "fountain" for the characteristic frequent urination

Mellitus – latin for "sweet as honey".

- Diabetes was considered a kidney disease until the 18th century.

- The modern era was heralded by the discovery of Oscar Minkowski that removal of the pancreas resulted in diabetes, followed by the discovery of insulin in 1921-22.
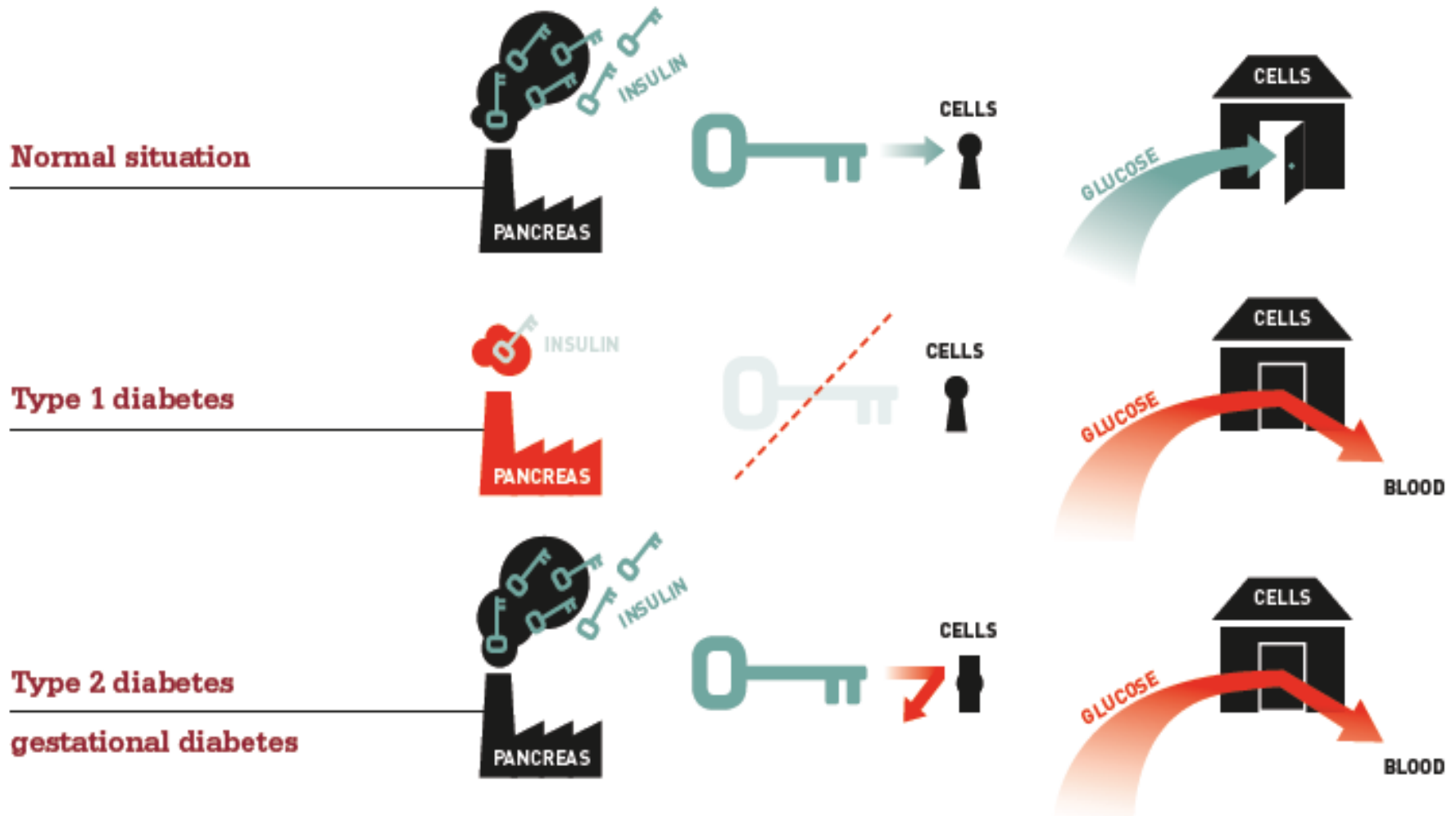
Illustration from Avicenna, Canon medicinae, trans. from Arabby Gerard of Cremona) France, 1283; decoration added c. 1350-1400 (The Hague, MMW, 10 B 24, fol. 8r, National Library of the Netherlands).

*Classification of diabetes mellitus

Diabetes can be classified into the following general categories:

1. <u>Type 1 diabetes</u> (due to b-cell destruction, usually leading to absolute insulin deficiency)

2. <u>Type 2 diabetes</u> (due to a progressive insulin secretory defect on the background of insulin resistance)

3. <u>Gestational diabetes mellitus (GDM)</u> (diabetes diagnosed in the second or third trimester of pregnancy that is not clearly overt diabetes)

4. <u>Specific types of diabetes due to other causes</u>, e.g., monogenic diabetes syndromes (such as neonatal diabetes and maturity-onset diabetes of the young [MODY]), diseases of the exocrine pancreas (such as cystic fibrosis), and drug- or chemical-induced diabetes (such as in the treatment of HIV/AIDS or after organ transplantation)
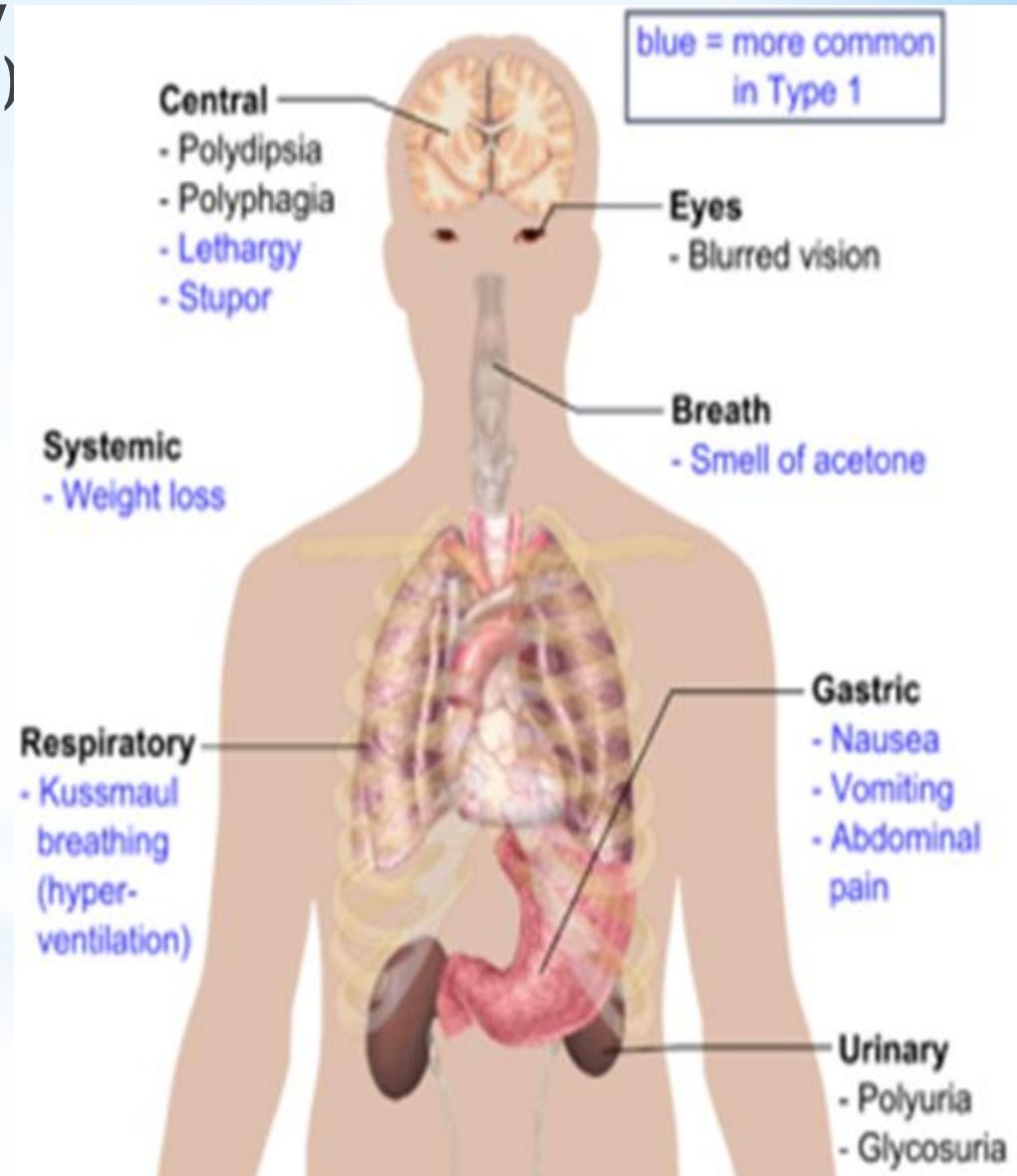
*Main types of diabetes mellitus

Insulin acts as a key that lets the body's cells take in glucose and use it as energy.

*Main Symptoms of diabetes mellitus

- increased urinary frequency (polyuria), thirst (polydipsia), hunger (polyphagia), and unexplained weight loss.

- numbness in extremities, pain in feet-disesthesias, fatigue, and blurred vision.

- recurrent or severe infections.

- Gestational diabetes is characterized by hyperglycemia of varying severity diagnosed during pregnancy (without previously known diabetes) and usually (but not always) resolving within 6 weeks of delivery.

blue = more common in Type 1

Central
- Polydipsia
- Polyphagia
- Lethargy
- Stupor

Eyes
- Blurred vision

Breath
- Smell of acetone

Systemic
- Weight loss

Respiratory
- Kussmaul breathing (hyper-ventilation)

Gastric
- Nausea
- Vomiting
- Abdominal pain

Urinary
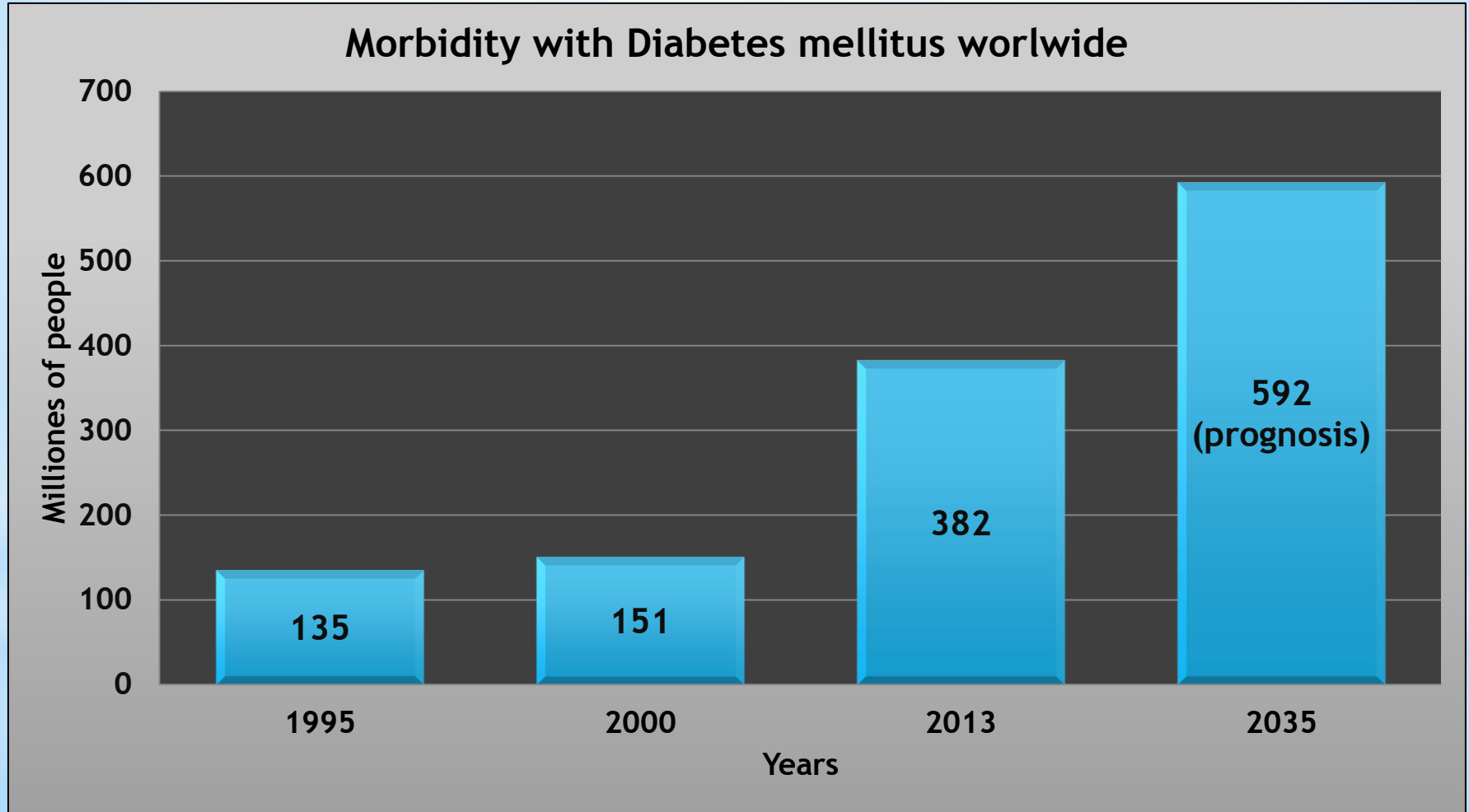- Polyuria
- Glycosuria

*Some facts about diabetes

* **Without insulin, a person with type 1 diabetes will die.**

* **People with type 2 diabetes mellitus can stay undiagnosed for many years unaware of the long term damage being caused by the disease.**

* **Poorly controlled diabetes leads to serious complications and early death.**

* **Gestational diabetes can result in birth complications that can affect both mother and child and increase the risk for developing type 2 diabetes later in life.**

IDF Diabetes Atlas I Sixth edition
trialx.com, independent.co.uk

What are common consequences of diabetes?

* Diabetes increases the risk of heart disease and stroke. In a multinational study, 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).

* Combined with reduced blood flow, neuropathy (nerve damage) in the feet increases the chance of foot ulcers, infection and eventual need for limb amputation.

* Diabetic retinopathy is an important cause of blindness, and occurs as a result of long-term accumulated damage to the small blood vessels in the retina. One percent of global blindness can be attributed to diabetes.

* Diabetes is among the leading causes of kidney failure.

* The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes.

http://www.who.int/diabetes/action_online/basics/en/index1.html

*Threat of diabetes mellitus

Morbidity with Diabetes mellitus worlwide

Milliones of people / Years

Year	Value
1995	135
2000	151
2013	382
2035	592 (prognosis)

Based on analysis of IDF Diabetes Atlas

*Criteria for diagnosis of diabetes:

A1C≥6,5% *;

OR

FPG ≥ 126 mg/dL (7.0 mmol/L).

Fasting is defined as no caloric intake for at least 8 h *;

OR

2-h PG ≥ 200 mg/dL (11.1 mmol/L) during an OGTT.

The test should be performed as described by the WHO, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water *;

OR

In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥ 200 mg/dL (11.1 mmol/L).

*In the absence of unequivocal hyperglycemia, results should be confirmed by repeat testing.

*Additional tests

C-peptide is a peptide composed of 31 amino acids. It is released from the pancreatic beta-cells during cleavage of insulin from proinsulin.

The reference range of C-peptide is 0.8-3.1 ng/mL (conventional units), or 0.26-1.03 nmol/L (SI).

Is decreased in 1 type DM, increased in insulin resistance;

Islet autoantibodies: presence of ICA (islet cell antibodies), IAA (antibodies to insulin) and GADA (antibodies against the enzyme glutamic acid decarboxylase) can confirm 1type diabetes mellitus or LADA (Latent autoimmune diabetes in adults)

*LADA is characterized by slower beta cell destruction as compared to type 1 DM. The manifestation of LADA is later than type 1 DM and is often misdiagnosed as type 2 DM. Initially, glycemic control is achieved with oral hypoglycemics but eventually there is marked autoimmune destruction of the pancreatic beta cells and insulin dependency is seen within 3-5 years after diagnosis.

What about asymptomatic patients?

1. Testing should be considered in all adults who are overweight (BMI ≥ 25 kg/m2 or ≥ 23 kg/m2 in Asian Americans) and have additional risk factors:

* physical inactivity

* first-degree relative with diabetes

* high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)

* women who delivered a baby weighing >9 lb or were diagnosed with GDM

* hypertension (≥ 140/90 mmHg or on therapy for hypertension)

* HDL cholesterol level <35 mg/dL (0.90mmol/L) and/or a triglyceride level > 250 mg/dL (2.82 mmol/L)

* women with polycystic ovary syndrome

Criteria for testing for diabetes or prediabetes in asymptomatic adults- cont.

*A1C ≥ 5.7%, IGT, or IFG on previous testing

*other clinical conditions associated with insulin resistance (e.g., severe obesity)

*history of CVD

2. For all patients, particularly those who are overweight or obese, testing should begin at age 45 years.

3. If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results (e.g., those with prediabetes should be tested yearly) and risk status.

Criteria for increased risk for diabetes (prediabetes)

* FPG 100 mg/dL (5.6mmol/L) to 125 mg/dL (6.9 mmol/L) (IFG)

OR

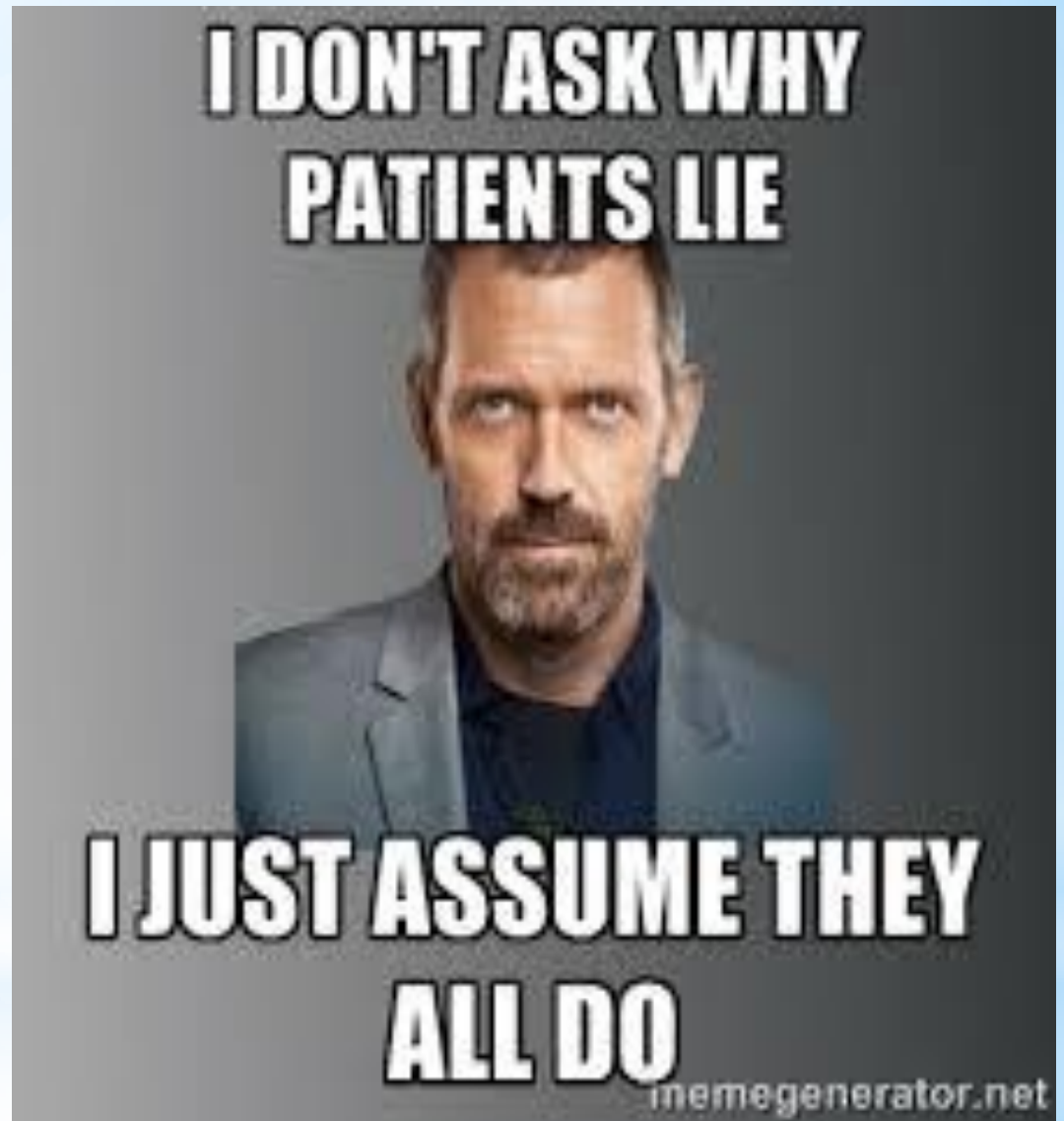* 2-h PG in the 75-g OGTT 140 mg/dL (7.8mmol/L) to 199 mg/dL (11.0 mmol/L) (IGT)

OR

* A1C 5.7–6.4%

*For all three tests, risk is continuous, extending below the lower limit of the range and becoming disproportionately greater at higher ends of the range.

Goals of treatment of diabetes mellitus

* symptom relief and prevention or delay of complications by targeting normal blood glucose levels

* drug therapy (oral medications or/and insulin)

* early detection and treatment of complications (at intervals recommended by national and international guidelines): eye exam, urine test, foot care, and specialist referral as needed.

* self-monitoring for level of glucose ability to recognize signs/symptoms of hypoglycemia and hyperglycemia.

* patient education about diet, exercise, and foot care.

* The aim of doctor is to persuade the patient that he should change his life and to accept these changes!

* **Practical aspects of successful management of patients with diabetes mellitus**

Examples of Recommendation plan
Doctor   vs   Patient

mom.girlstalkingsmack.com   www.boldsky.com

https://www.youtube.com/watch?v=lBkHxJazRV4

*She didn't accept her disease

Pet Switzer was diagnosed with type 2 diabetes in her late 40s.

Now at 81 she has lost both legs, uses a pacemaker, uses dialysis 3 times a week and is legally blind due to diabetes.

"I wasn't as careful as I could have been, no.. So I am to blame myself for that…"-says Pet – "I never thought of what was going to happen… I don't think anyone does when they are first diagnosed."

ydr.com/diabetes

*They both have diabetes mellitus type2

www.pininterest.com

http://www.myfittribe.com/articles/20101007/halle-berry-diabetes-scare.html

*Diabetes mellitus is a new lifestyle!