

What You Need to Know to Help Your Patients with Diabetes Basics of Diabetes

Carol Greenlee MD

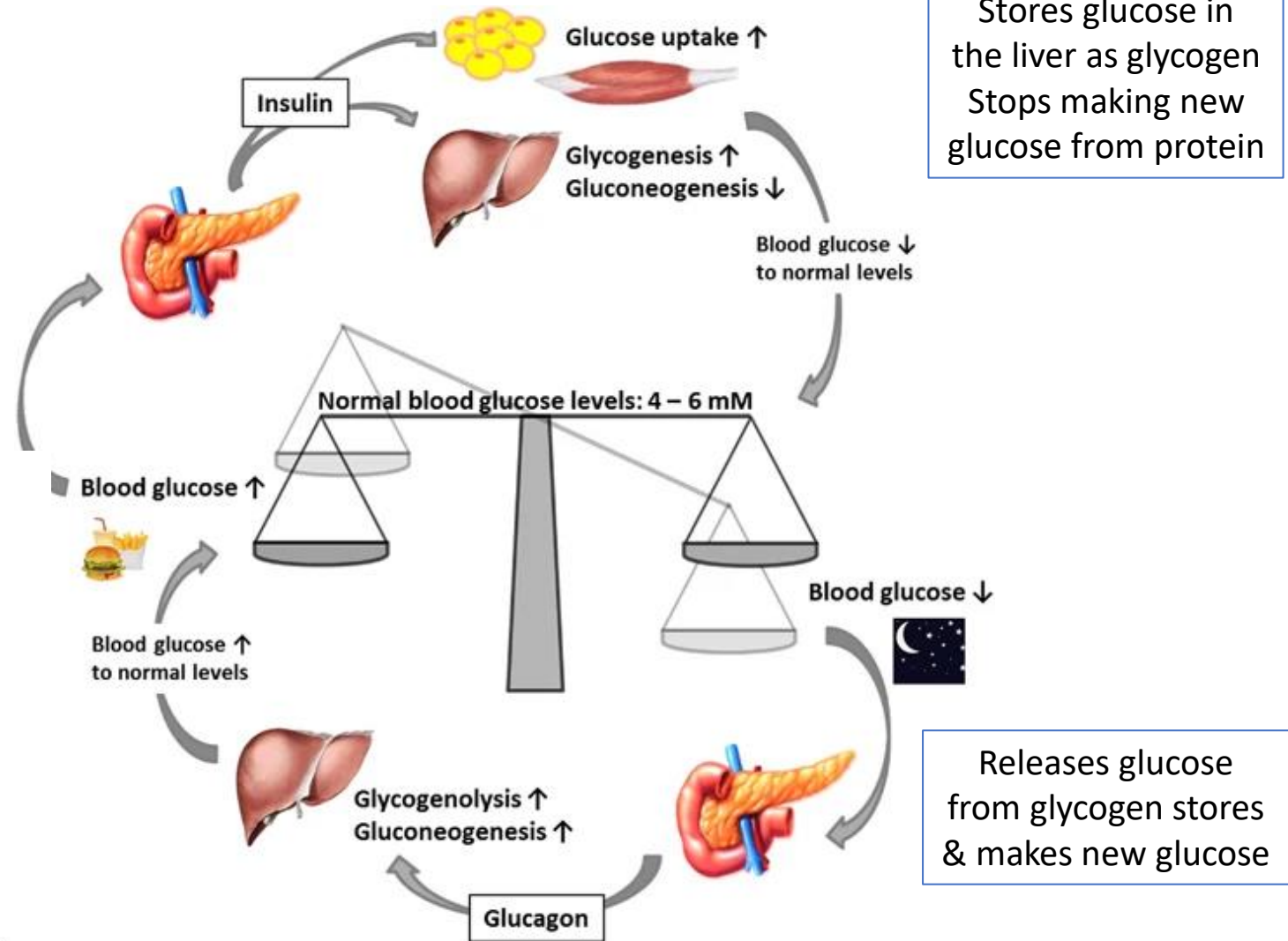
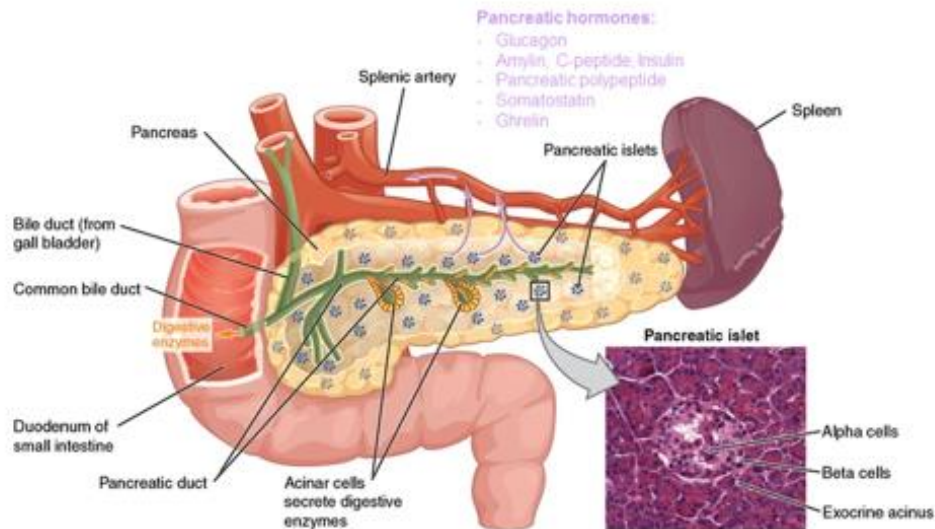
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To Begin with- What is your understanding about diabetes?

- Please share some of what you know or have heard about diabetes

What is normal?

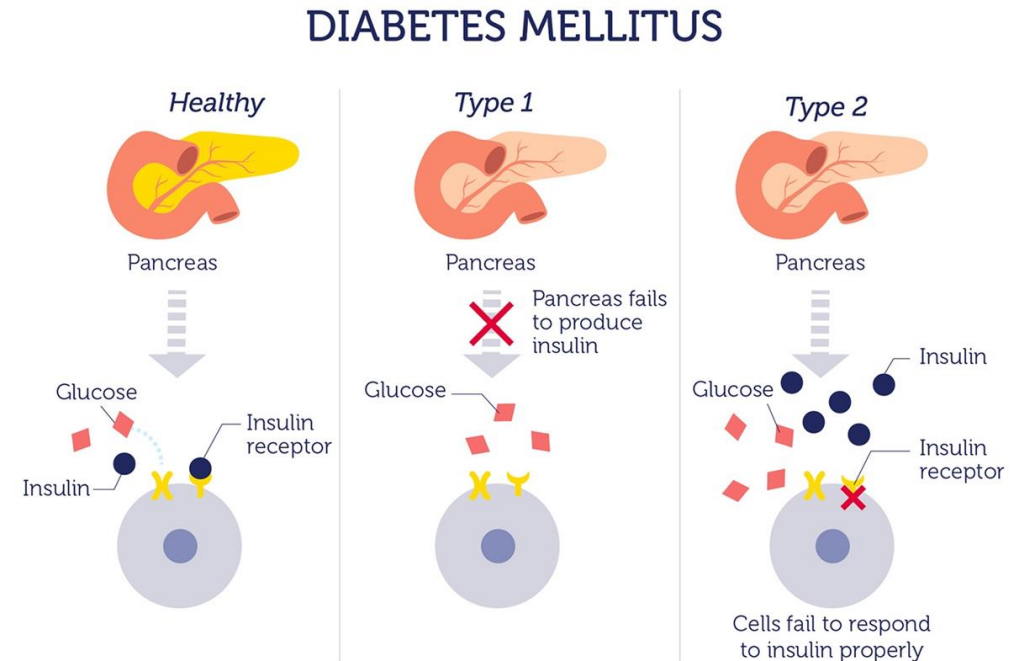
Insulin comes from the Beta cells in the Islets of the pancreas →
Key role in regulating blood glucose levels & how our body uses glucose



Your body breaks down most of the food you eat into sugar (glucose) and releases it into your bloodstream. When your blood sugar goes up, it signals your pancreas to release insulin. Insulin acts like a key to let the blood sugar into your body's cells for use as energy.

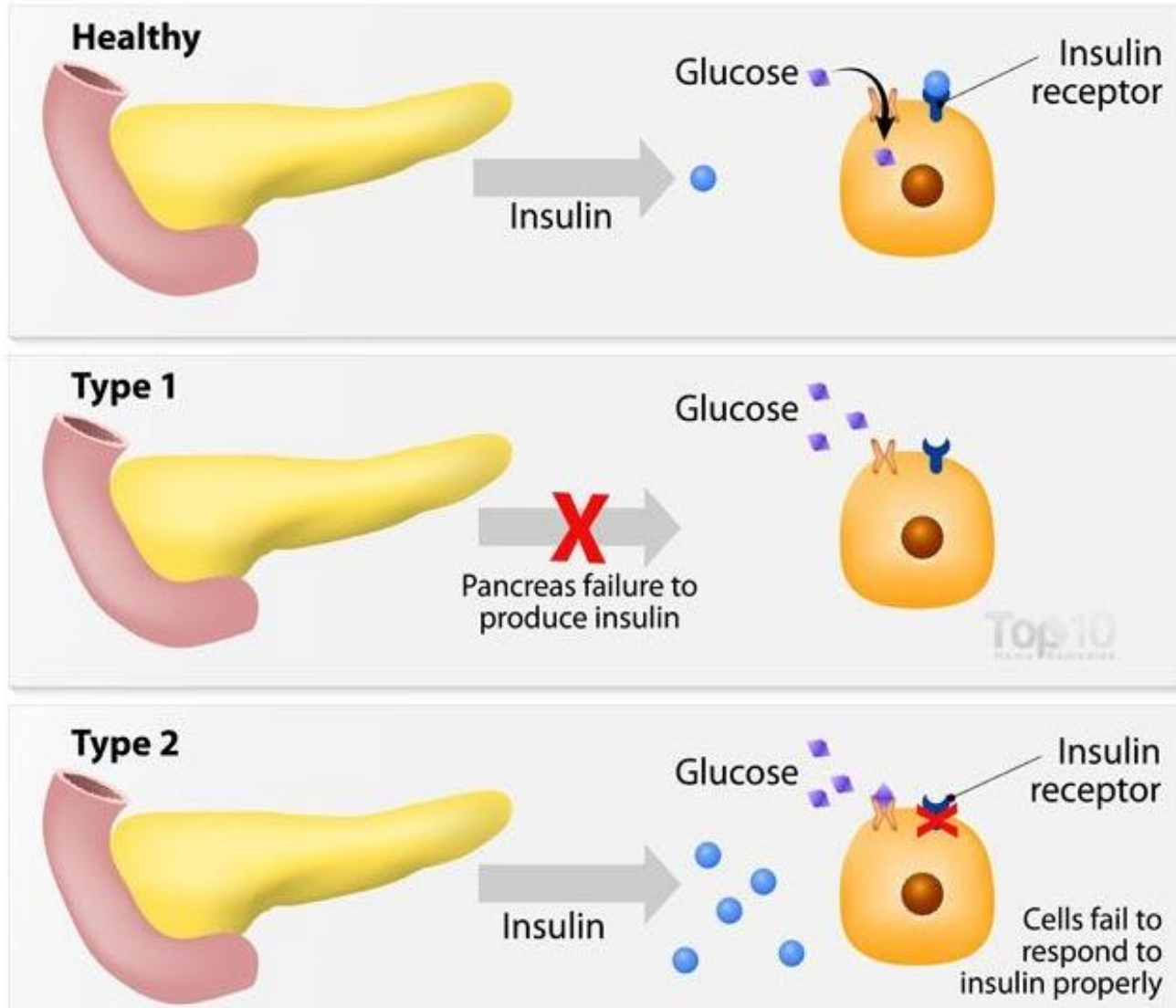
What is diabetes

- Diabetes mellitus refers to a group of diseases that affect how the body uses blood sugar (glucose).
 - It is a metabolic disorder in which the body has high sugar levels for prolonged periods of time
- From the CDC:
 - Diabetes is a chronic (long-lasting) health condition that affects how your body turns food into energy.
 - With diabetes, your body doesn't make enough insulin or can't use it as well as it should.
 - When there isn't enough insulin or cells stop responding to insulin, too much blood sugar stays in your bloodstream.
 - Over time, that can cause serious health problems, such as heart disease, vision loss, and kidney disease.



High blood sugar = hyperglycemia

DIABETES MELLITUS



Diagnosis

Normal blood glucose levels
 range of [50 -60]70-99 mg/dL while fasting
 up to 139 mg/dL about 2 hours after eating
 and/or A1c 5.6% or below

Prediabetes Diagnosis Criteria

Fasting PG
100-125 mg/dL

2hr PG 75 g
OGTT
140-199 mg/dL

A1c
5.7-6.4%

Diabetes Diagnosis Criteria

Fasting PG
≥ 126 mg/dL

2hr PG 75 g
OGTT
≥200 mg/dL

A1c
≥6.5%

Random PG ≥200 mg/dL + hyperglycemic symptoms

Definitions

PG =
Plasma
Glucose

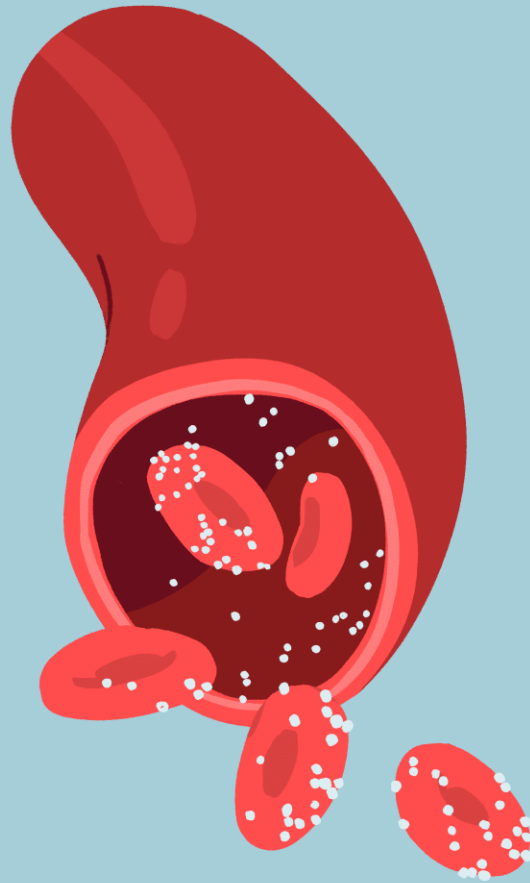
OGTT = Oral
Glucose
Tolerance Test

Hyperglycemic
Symptoms:
Polydipsia (↑ thirst),
Polyuria (↑ urination),
Polyphagia (↑ hunger)

How the A1C Test Works

1

Glucose in body sticks to hemoglobin A



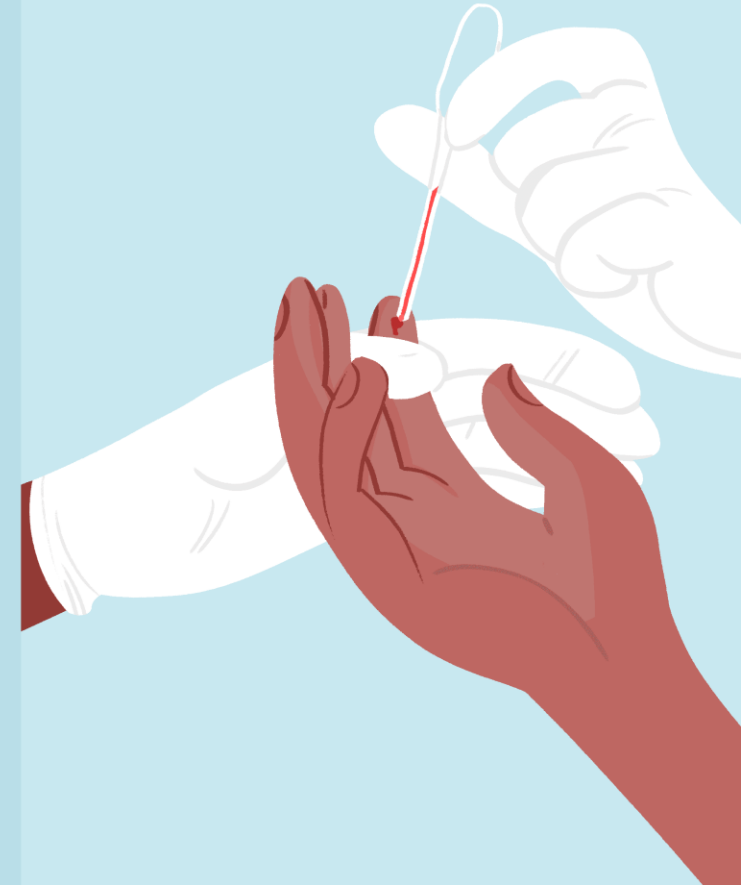
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Glucose remains stuck to hemoglobin for up to 120 days



3

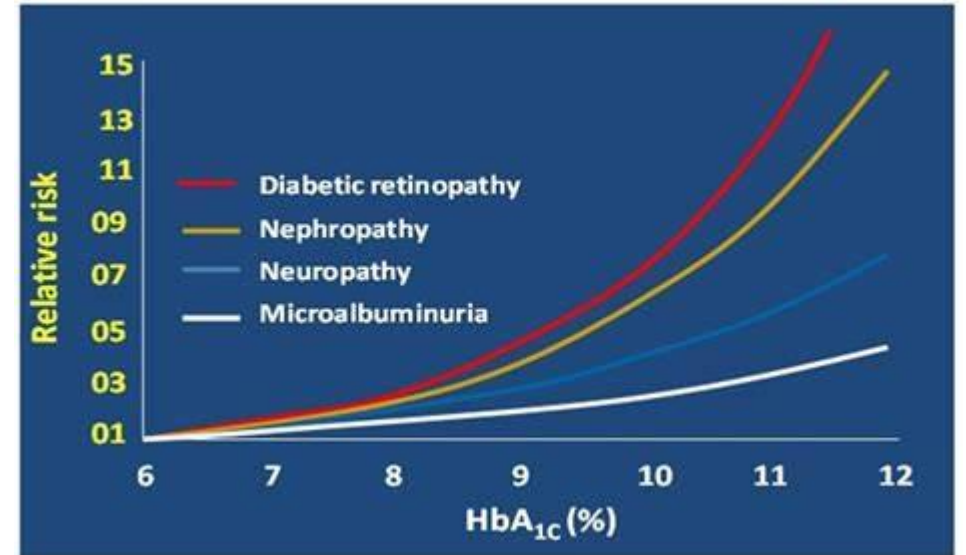
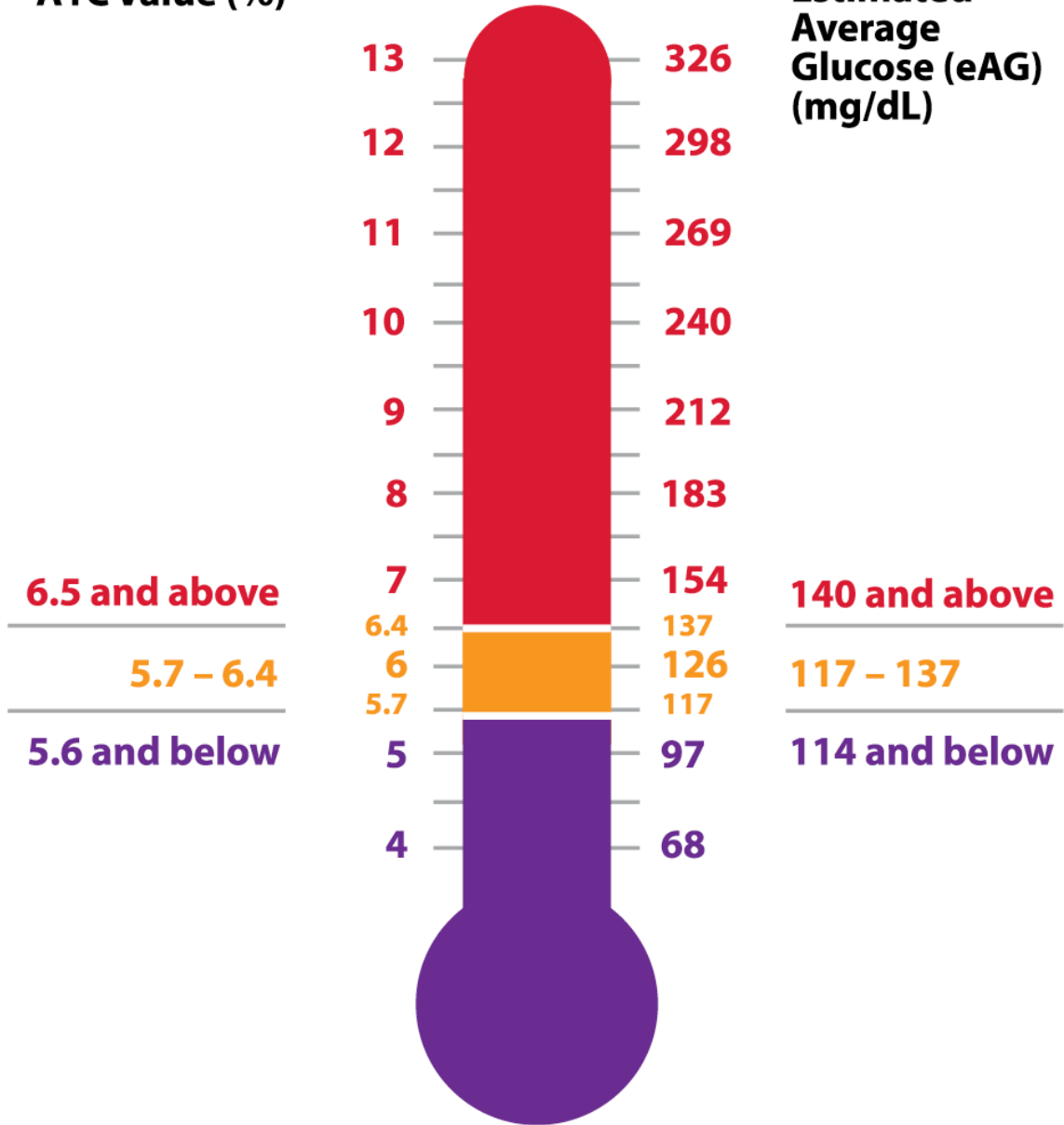
Test measures percent of hemoglobin A with glucose



A1C Levels^{1,5}

A1C Value (%)

Estimated
Average
Glucose (eAG)
(mg/dL)

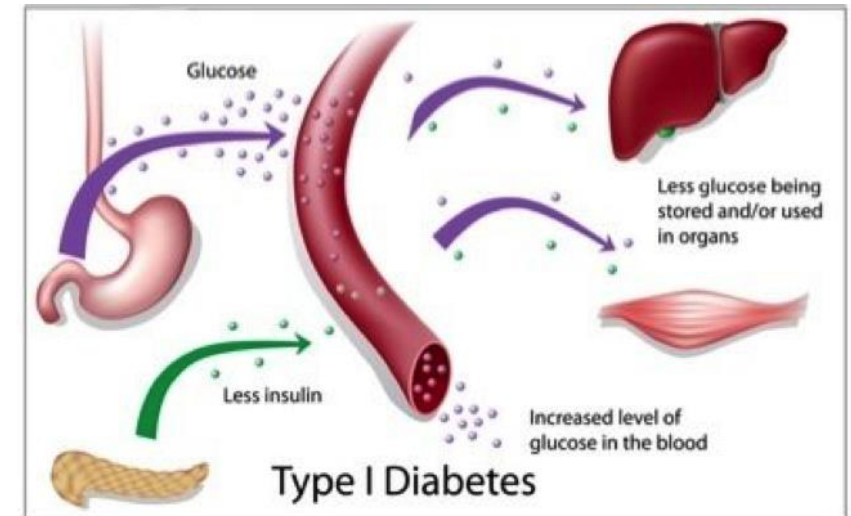
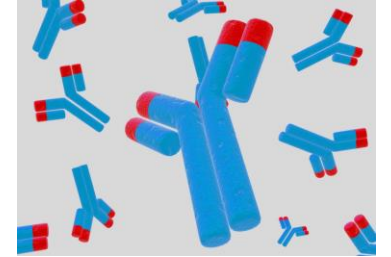


What Causes Diabetes? -Types of Diabetes

- There are two main types of diabetes –
 - Type 1 (“Insulin Dependent”)
 - Type 2 (“Non-insulin Dependent”)
- Many additional types of diabetes
 - Gestational (pregnancy hormones)
 - Monogenic (MODY) (gene mutation causes pancreas to not make enough insulin)
 - Pancreatogenic (type 3c)(diseases of the exocrine pancreas: pancreatitis, pancreatectomy, etc.)
 - Cystic Fibrosis-related
 - Hepatogenic (cirrhosis)
 - Steroid-induced (or other meds such as atypical antipsychotic meds)
 - Lipodystrophy
 - Various syndromes or endocrine disorders

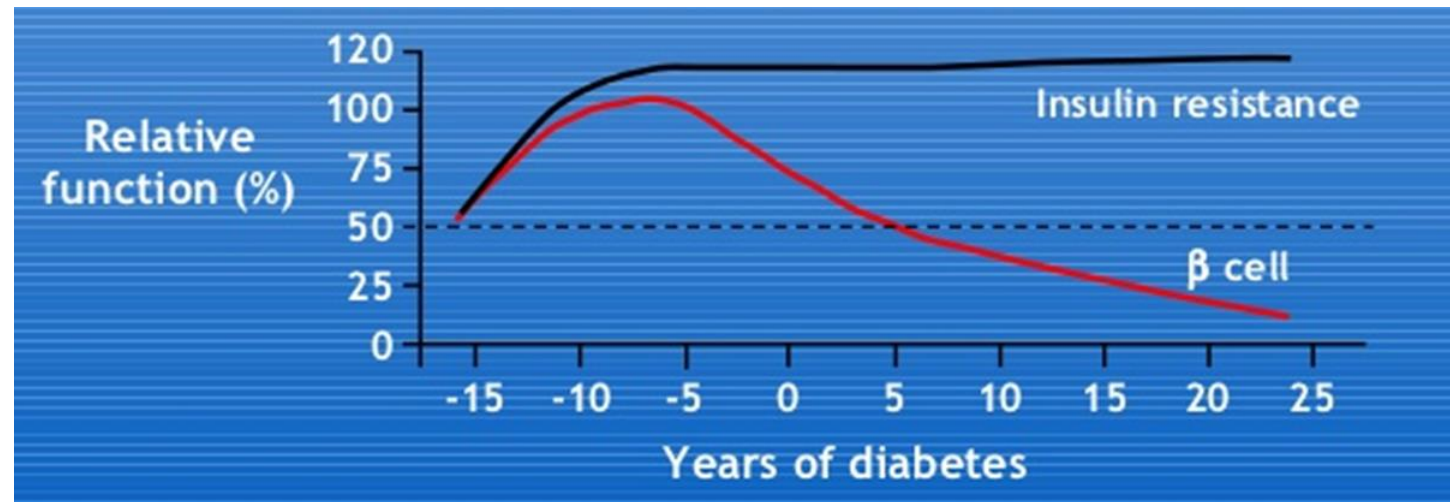
What Causes Diabetes

- Type 1 diabetes is an autoimmune disease
 - Diabetes Auto-Antibodies destroy the beta cells in the pancreas so that they can not make enough insulin → hyperglycemia
 - Common in children but can occur in adults, even in elderly
 - Often associated with other autoimmune conditions in patient &/or family
 - Autoimmune thyroid disease, Celiac disease, Addison's disease
 - Can occur at any body weight
 - Requires treatment with insulin for survival – basal-bolus
 - Without insulin will develop Ketoacidosis



What Causes Diabetes

- Type 2 diabetes involves **Insulin Resistance (IR)**
 - IR makes cells *less responsive* to an established amount of insulin, *necessitating larger amounts of insulin* to produce the same cellular response
 - If the pancreas can't make enough extra insulin → hyperglycemia



The Cause of T2D is COMPLEX

- T2D is much more complex than diet & exercise
 - *“you just need to eat better and get more active”*
- And more complex than genetics
- It is usually a combination of factors for any individual....

Assumptions About Type 2 Diabetes: Genetics and Environment

People are born with the genetic risk for type 2 diabetes

Caused by:

1. A genetic inability of the tissues to respond normally to insulin (or insulin resistance); and
2. A genetic inability of the insulin producing cells to secrete enough insulin to overcome the insulin resistance.

Type 2 diabetes has many genetic causes

There is NO single genetic test to identify type 2 diabetes or individuals “at risk” for type 2 diabetes

The genetic risk for diabetes can be modified by environmental factors

Pro-Diabetes Factors:

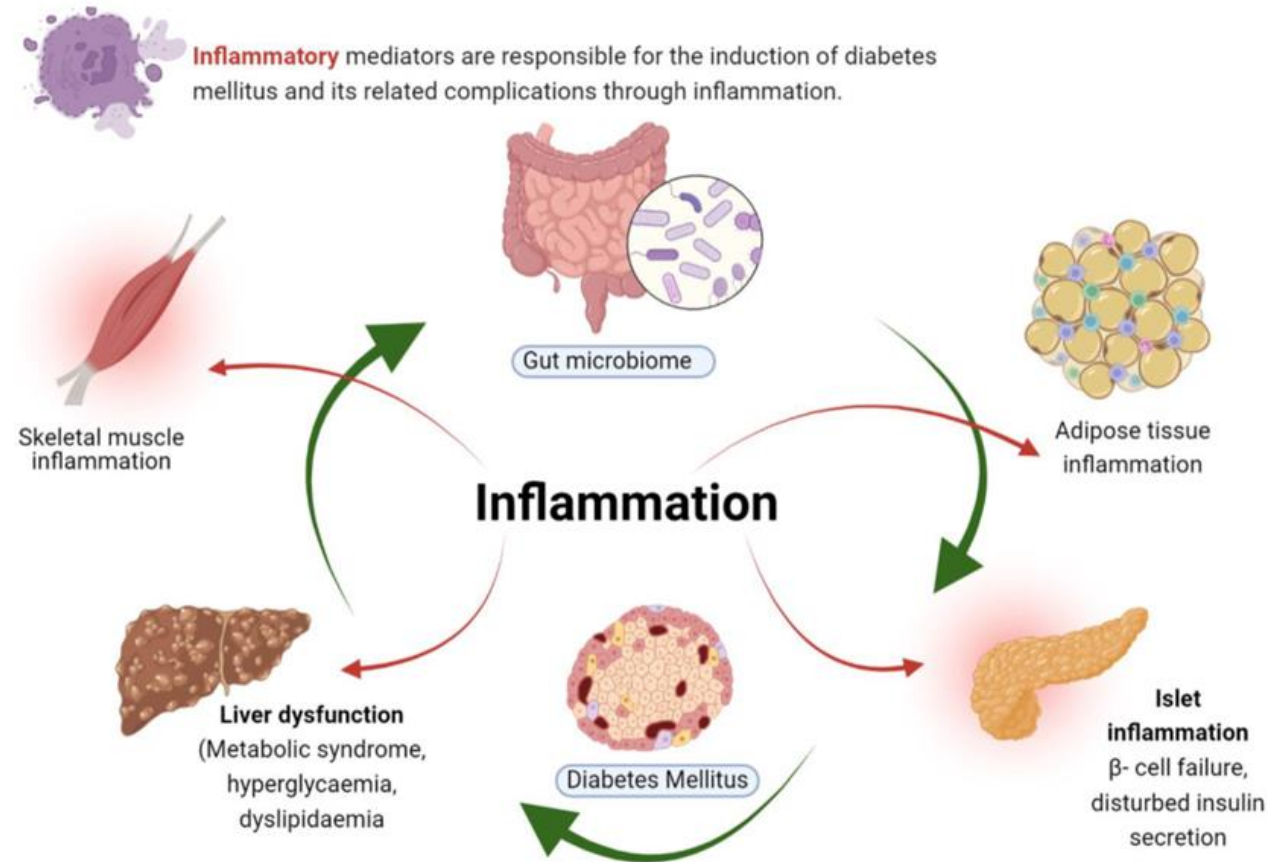
- Obesity
- Sedentary life style
- Pro-diabetes medications
- Aging
- Other medical diagnoses

Anti-Diabetes Factors:

- Balanced diet
- Lean
- Active
- Anti-diabetes Rx

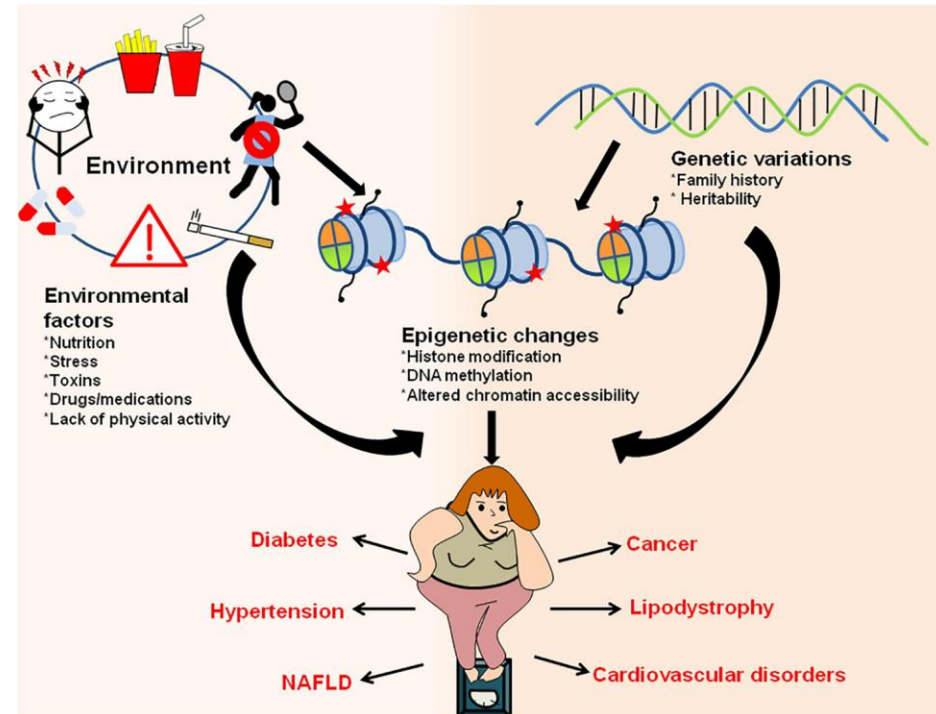
Role of Inflammation

- **Obesity** is a major trigger for **insulin resistance (IR)**
 - Obesity, especially **visceral obesity**, creates a **Pro-Inflammatory** state
 - **Inflammation** from any source can trigger or increase **insulin resistance** by increasing harmful cytokines like TNF α and IL-6 and reducing beneficial cytokines such as adiponectin
 - E.g., chronic Hepatitis C infection
 - On the other hand, **IR** can increase **inflammation** – “vicious cycle”
 - Inflammation interferes with normal body processes & damages the body



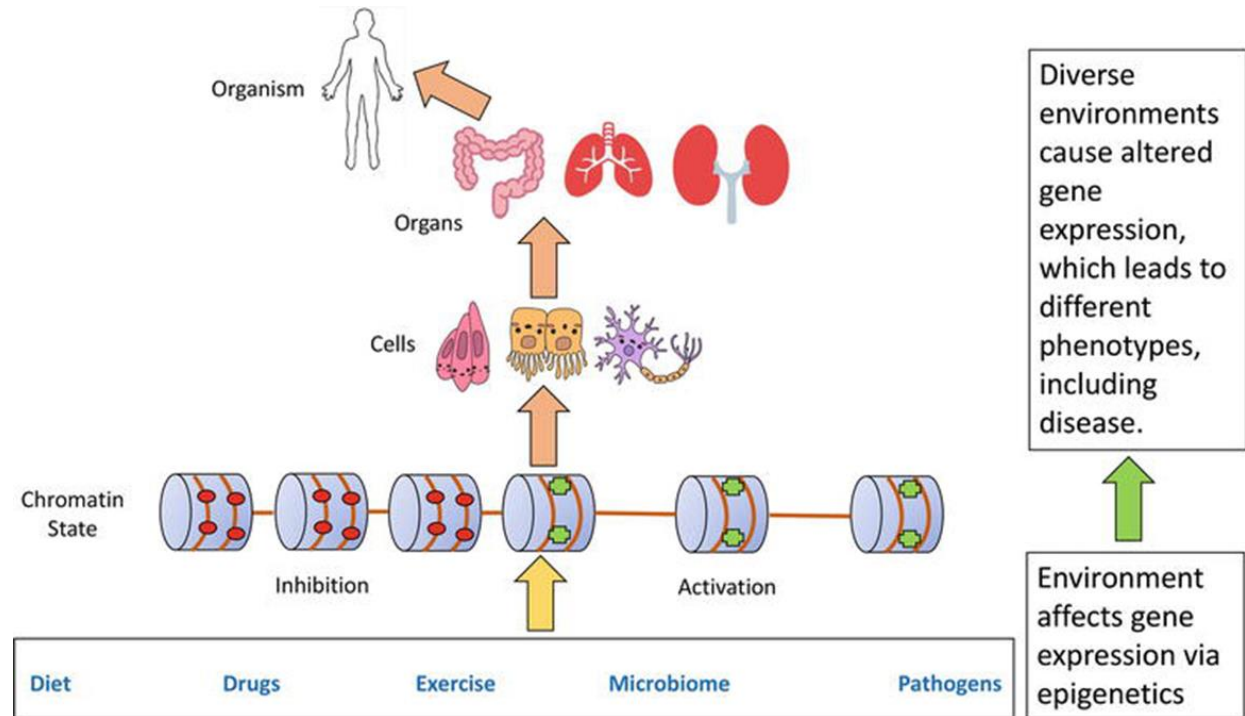
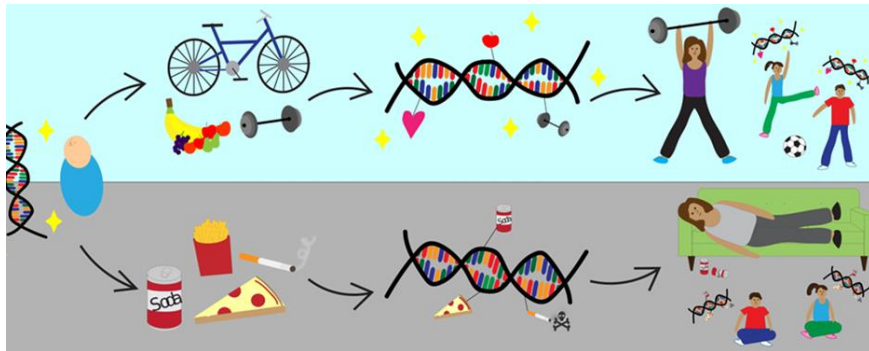
Role of Epigenetics (“on-top-of genes”)

- Changes in diet and physical activity levels have led to an increased worldwide prevalence of T2D over the past several decades.
 - It is not just “the calories” – there are *epigenetic* changes that occur
- There are many “non-voluntary” factors that contribute to T2D
 - Genetics (>100 genetic variants identified that are associated with T2D risk)
 - Intrauterine or fetal malnutrition
 - Being born small or large for gestational age
 - Childhood under-nutrition
 - Adverse Childhood Events (ACEs)
 - Trauma/stress
 - Age



Not all T2D is the Same – many factors involved

- Epigenetics can alter the genes controlling:
 - Beta cells – insulin production
 - Insulin receptor function & IR
 - Weight regulation pathways
 - Cells (muscle, fat, etc.)
 - Organs



What can Diabetes Cause?

Symptoms of Diabetes



Increased thirst.



Slow-healing cuts and sores.



Fatigue.



Blurred vision.



Frequent urination.



Unexplained weight loss.

Some symptoms are due to *the high sugar levels* in your bloodstream

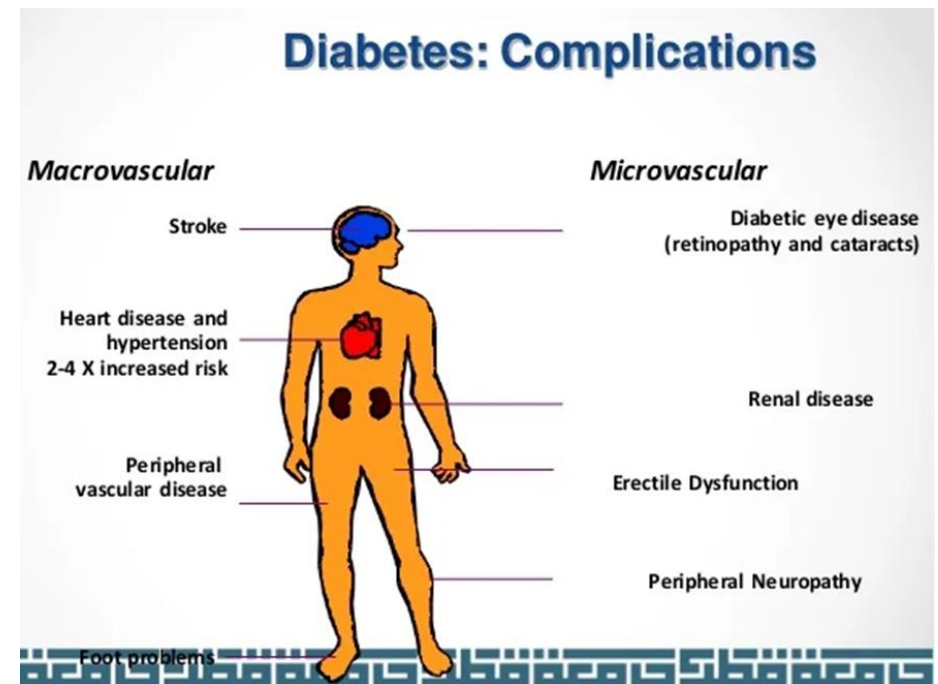
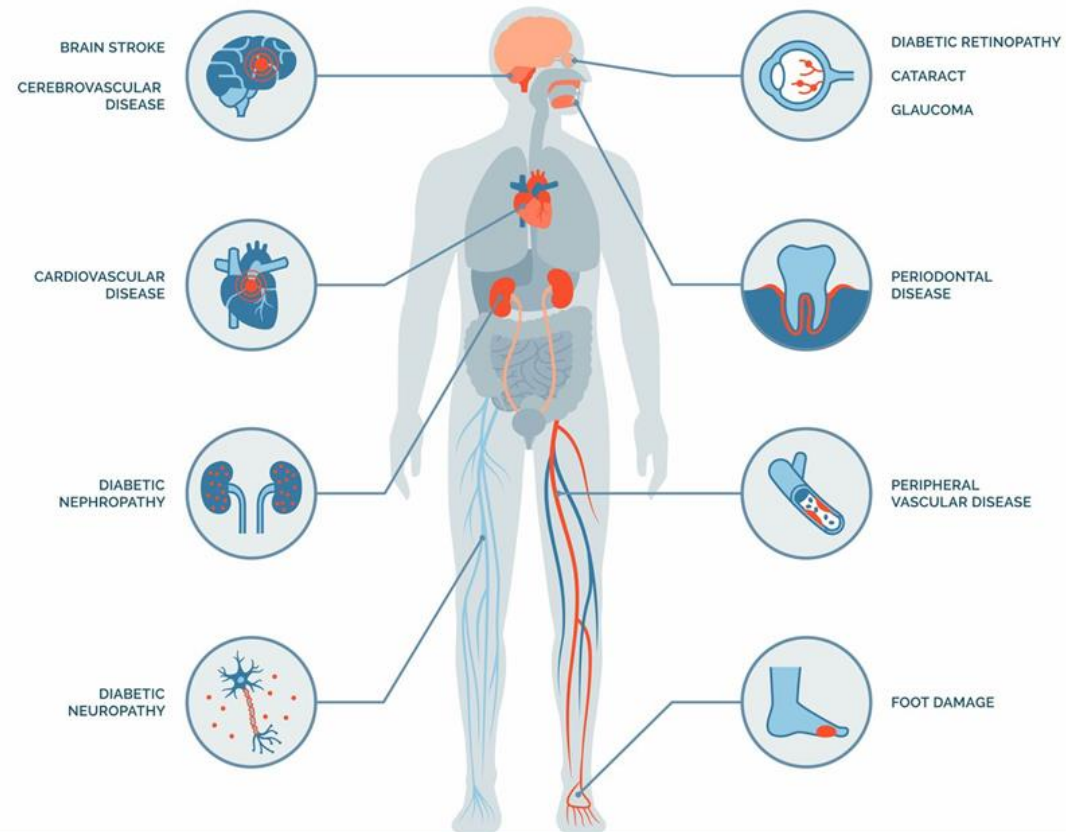
- excess thirst
- excess urination
- slow healing
- blurry vision
- vaginal yeast infections

Some symptoms are due to *not enough sugar inside your cells*

- fatigue
- weight loss
- increased hunger

What can Diabetes Cause?

LONG-TERM COMPLICATIONS OF DIABETES

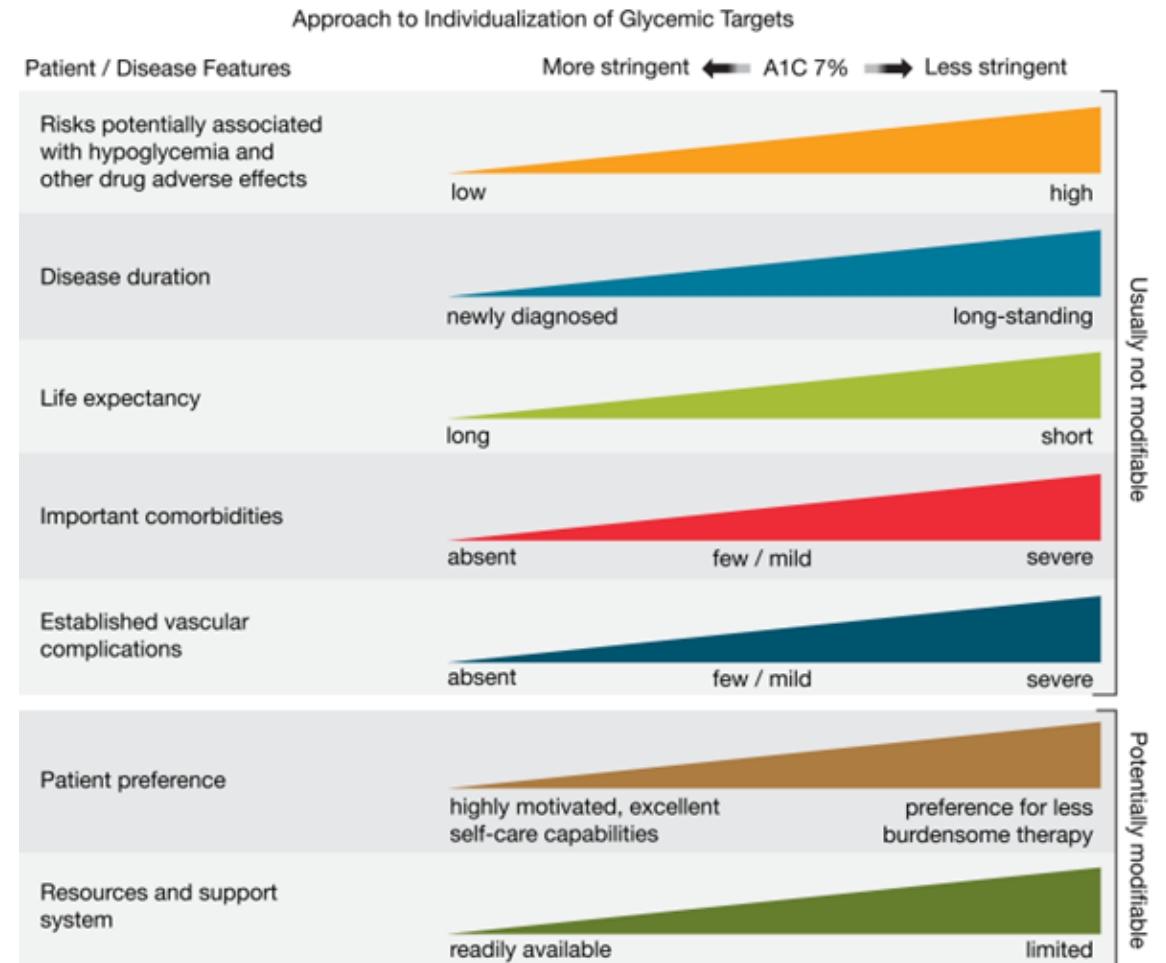


- The goal of diabetes care is to help our patients with diabetes stay healthy
- Reduce complications & improve outcomes

Diabetes – Goal of Therapy

A1c Glucose sticking to RBC	Fasting Blood Glucose (not eat for 8 hrs)	Postprandial Blood Glucose (after eating a meal)
< 7 %	90 – 130 mg/dl	< 180 mg/dl

- Diet
- Exercise
- Medication



Many Things can affect the blood glucose level

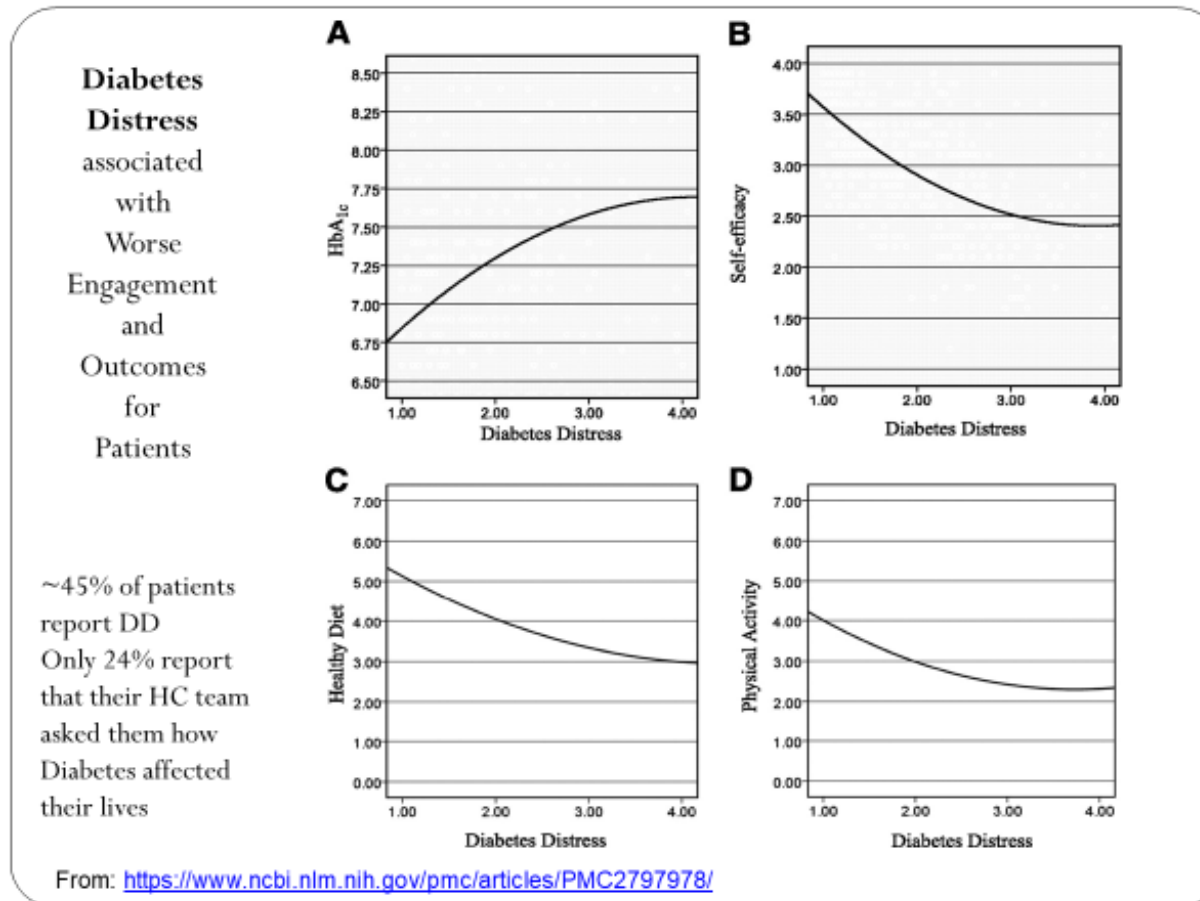
- Absorption of food
 - How food is cooked
 - Combo of carb, protein & fat
 - Gastroparesis
 - Missing meals
- Activity or lack of activity
- Sleep patterns – poor sleep, short sleep, long sleep
- Coffee, tea, energy drinks, sodas, alcohol
- Season changes
- Hormonal fluctuations
- Medications – glucocorticoids, antipsychotics, diuretics, etc.
- STRESS
 - Competition (tennis, etc.)
 - Emotions
 - Injury/ trauma
 - Surgery
 - Illness
- Inflammation



It is a lot to juggle
Adds hours of work to each day
Doesn't always make sense

Diabetes Distress

- Diabetes Distress is part of the experience of diabetes for many patients;
 - 48% in the 3D Study met criteria for high distress over 18 months
 - Even at low levels, diabetes distress is significantly related to glycemic control and behavioral management - but DD also occurs in people with “good control”

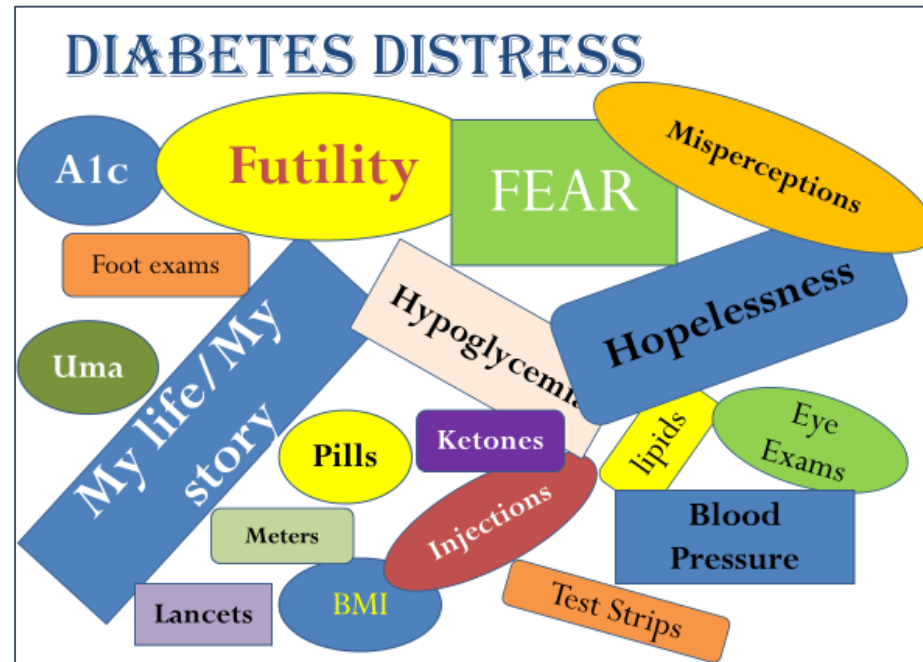


Diabetes Distress (DD)

- Diabetes distress is ***not*** clinical depression - It is **emotional distress** that captures
 - the worries, concerns and fears among individuals struggling with a progressive and demanding chronic disease such as diabetes including
 - the emotional burden of self-management,
 - threats of complications and potential loss of functioning

The 7 major sources of DD

- 1. Powerlessness
(*hopelessness- pointless*)
- 2. Negative Social Perceptions
(*negative judgments of others*)
- 3. Physician Distress
(*don't get help I really need*)
- 4. Friend/Family Distress
- 5. Hypoglycemia Distress
- 6. Management Distress
- 7. Eating Distress



What is Stigma?

- A set of negative and often unfair beliefs that a society or group of people have about something – a negative stereotype
 - Something that takes away from one's character or reputation.
- Stigma is a mark of disgrace which results from the judgment by others.
 - When an individual is labelled by their illness, they experience **judgment and prejudice**.
 - Stigma brings experiences and feelings of **shame, embarrassment, distress, hopelessness and reluctance to seek or accept help**.
- Patients are influenced by stigma (*expectations impact behavior*) → Guilt, shame, blame, embarrassment, futility, isolation
 - Higher BMI
 - Higher A1C
 - Higher self-reported blood glucose variability (more fluctuations up and down)
 - *Biologic effects of stigma, shame & isolation → stress hormones & epigenetics*

Diabetes Stigma

- Assumptions/beliefs that
 - people with diabetes are “non-compliant” - don’t do as told
 - they don’t care, they aren’t trying
 - the diabetes, hyperglycemia & complications are their fault
 - treating diabetes is easy, if they would only do it
 - they would be fine if they ate right
- Many people with diabetes get *weight stigma* along with diabetes stigma

Some Mental Models of Diabetes from HC workers

- *“Many of those who have diabetes are noncompliant and don’t take care of themselves.”*
- *“That patient is so undisciplined.”*
- *“People with diabetes cause themselves to become ill, lose limbs, and disregard their medication/diet regimen.”*
- *“Diabetes is a disease of gluttony and sloth – they bring it on themselves.”*
- *“If she wasn’t so lazy....”*
- *“Well, it is kind of his fault, right?”*
- *“They don’t do what they are supposed to – they are not even trying to get better.”*
- *“They just don’t care...their noncompliance, nonadherence, whatever it is, is so frustrating, why don’t they just do what I tell them to do?”*

Weight Stigma in the Healthcare Setting

- Misconceptions → dismissive medical care & blame
 - most HCPs still view obesity as a lifestyle choice — something that happens because patients are 'lazy' and haven't 'tried hard enough'
 - HCPs can place blame on people for not losing weight to take charge of their health
 - automatically assume a patient with obesity is engaging in overeating behaviors
 - believe that pressuring patients about their weight is simply a way of trying to motivate them to be healthier
 - believe that weight stigma/discrimination is beneficial in encouraging weight loss



“Put simply, weight stigma is a form of discrimination based on a person’s body weight”

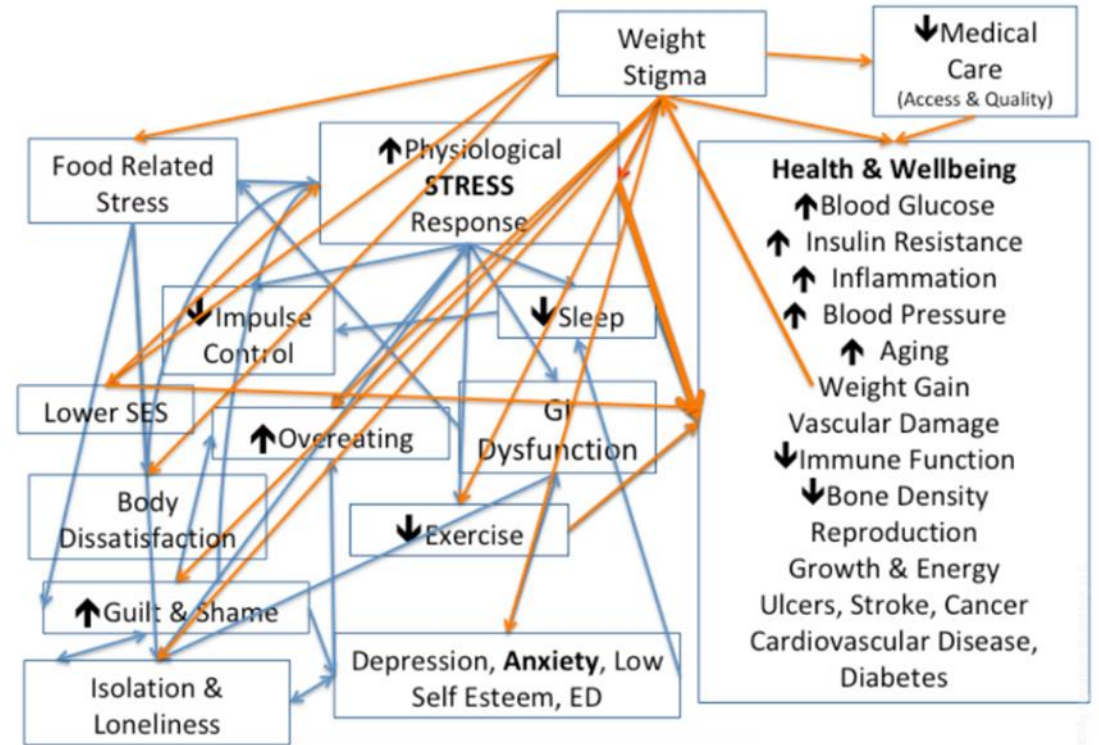
- Weight-based discrimination in the HC setting:

- Seating, gowns & examination tables
- Lower health care quality
 - Often provided with less health information
 - Less time spent with them
 - View them as undisciplined, annoying, and noncompliant with treatment.
 - Reluctance to perform pelvic & other exams
 - Attribute everything to obesity/focus only on their weight & overlook other health issues - missed diagnoses & treatments



Effects of Diabetes & Weight Stigma

- **Physiologic reactivity**/stress (increased SNS [BP], cortisol, CRP, A1c etc.)
- **Body-related shame and guilt**, along with a **reluctance to pursue adequate healthcare** measures → Psychologic & physical health **distress** (→ “comfort” → self-destructive)
 - body dissatisfaction or shame and low self-esteem, feelings of low self-worth, loss of self-efficacy
 - disordered eating, which may include yo-yo dieting, binge eating, or eating disorders (increased calorie intake)
 - may delay seeking medical treatment and distrust doctors – avoid f/u care, delay preventive care
 - depression and/or anxiety/impaired cognitive function
 - exercise avoidance (reduced physical activity)
 - higher triglycerides, increased risk of metabolic syndrome
 - reduced adherence to treatments



What we have attributed to the effects of obesity &/or diabetes might actually be due to or exacerbated by the effects of stigma and shame.

Suggested Approaches - Healthcare

- There is a need to improve communication between healthcare professionals and people with obesity – empathy
 - Language: Person-centered, non-judgmental, foster collaboration, avoid labelling, use person first language (“person with obesity” vs “obese person”) [higher-weight individuals, bigger-body]
 - Don’t focus on weight – focus on behaviors for wellness & health
 - Reframe; e.g., Hyperlipidemia as the problem – weight loss as one Rx option
 - Offer “you could” instead of “you should” or “you need to”....
 - Remember SDoH – what resources available
- Education & understanding regarding the complexity of weight regulation (many factors we have no control over [“non-voluntary”]) - empathy
 - E.g., being born SGA &/or childhood under-nutrition and/or experiencing ACEs (trauma) increase obesity risk (epigenetic changes)
 - Multiple factors drive *weight regain*
 - BMI not a reliable indicator of risk or even adiposity



Suggested Approaches – Patients (PLWO)

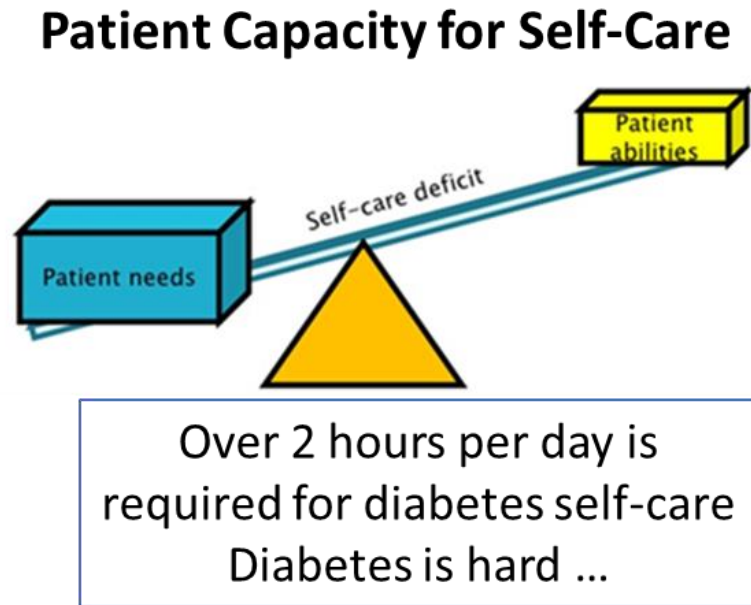
Internalized Weight Stigma

- Empathy & Support & Connection - *“The fire of shame is fed by silence, judgment, and secrecy; left to burn, it can damage all aspects of our lives. And yet, it doesn’t have to be this way; empathy has the potential to put out the flames, turn down the heat, and stop throwing fuel on the fire (Brown, 2021).”*
 - Group sessions with CBT seem to be beneficial for many people with internalized stigma
 - Addressing shame in therapy can help with multiple psychological difficulties
 - Empathy [& connection vs isolation] is central; need to hear and feel someone saying:
 - I get it; I’ve felt the same way.
 - What you are feeling is normal. It’s OK
 - I understand what you are going through.
 - Or just saying “I believe you” – listening
 - Pushback – “Okay at any weight” [but excess weight can cause harms]
 - “Both-and” (love yourself & mitigate the harms)



Antidepressants are Not the Answer for DD

- The **demands of self-management might exceed their capacity**
 - diabetes adds several hours per day of an unasked-for “job” per day –
 - no pay, no vacation – this ***adds a lot*** extra to balance with life, especially when there are additional life demands (competing priorities)
 - they ***might not know or understand why or how*** to do some of the expected self-management
 - not everyone has the same capacity for self-management and the necessary skills



Addressing Diabetes Distress

- Diabetes Education can help (...but it is not the not entire story)
 - Ensure necessary skills (how to xxx) – teach back (*“show me how you...”*)
 - Assess numeracy skills
 - *“Many people tell me they aren’t good at math, how comfortable are you with math? – how are you with adding, dividing...?”*
 - *“Do you have any questions about what all the numbers mean?”*
 - Explain what is normal
 - Normal blood glucose range, fluctuations
 - Normal pancreas adjusts the amount of insulin for what we eat, for stress, illness, etc. – we want to mimic the normal pancreas (*“think like a pancreas”*)
 - Stress hormones make everyone need more insulin/more insulin needed to help fight infection
- Explain expectations
 - *“Diabetes gets worse even if you do everything right”* – beta cells “wear out” over time and make less insulin [from inside] (key message – *“it is not your fault”*)
 - Therapeutic heterogeneity – not every treatment works the same for every person – need to find what works for any individual (*precision* medicine)
 - For safety need to start with small dose and gradually increase – the starting dose is not the “right” dose that was expected to do the job

Help with Diabetes-related Numeracy

Nearly 36% of adults in the U.S. have *low health literacy*

~ 50% have poor *numeracy* skills

We need better ways to help people with numeracy issues – diabetes is full of numbers:

- A1c numbers (%)
- Blood glucose numbers (mg%)
- Carbohydrate counting numbers (grams)
- Insulin dose numbers (units)
- Formulas for calculating meal-time insulin or correction-dose insulin or both
- Titration algorithms for adjusting basal insulin (e.g., if FBS is 120-140 add 1 unit to bedtime dose of insulin glargine, if FBS is 141-160 add 2 units)
- Dosing instructions (e.g., take one time daily, take 3 times per day, take twice daily, etc.)
- Ranges: e.g., goal blood glucose is 70-120 before breakfast (how many people understand range?)

Reality Checking & Support (“Anchoring”)

- Teach back method (want it in the patient’s own words – not a “playback”)
 - *“I want to be sure I explained it clearly, using your own words can you tell me what you are supposed to do”*
 - *“How will you explain this to your family/significant other?”*
- Show Me (normalize this in your practice, *“I ask everyone to show me ...”*)
 - *“Can you show me how you would draw up [and give injection of] 15 units on your insulin pen/syringe”* or other pen (such as GLP-1 RA medication)
- Practice together
 - *“Here is the scale you can use at home – let’s be sure you understand how it works - if your BG was 243 how much insulin would you take?”*

Addressing Diabetes Distress

- Attention to this emotional distress should be **included as part of ongoing comprehensive care for all patients with diabetes**
 - *not addressed as a separate co-morbid 'condition'*
- Even **minimal, inexpensive interventions** can lower levels of distress and improve disease management
 - Can take place *as part of traditional diabetes education* and/or as *part of a standard clinical encounter*
 - Doesn't require Behavioral Health referral (but in severe cases, this might help)
 - Antidepressants aren't the answer to DD but if coexisting clinical depression – then needs appropriate level of treatment (use of depression assessment tool)
 - Does require awareness, sorting out, addressing

Addressing Diabetes Distress

- Even minimal, inexpensive interventions can lower levels of distress and improve disease management - Approaches can include:
 - **normalizing** the experience of **diabetes-related distress as part of the spectrum of diabetes** (*“most people with diabetes experience DD at some time – often more DD when other things going on, but just dealing diabetes is enough – diabetes is not easy”*)
 - **recognizing** how **other life stressors can affect diabetes management** (life demands/priorities/time, other illnesses, etc.) (stress increases BG, also increases DD)
 - **anticipating and acknowledging diabetes stressors** over time—including unrealistic expectations & judgement/blame
 - acknowledge that caring for diabetes does take a lot of extra time & effort *vs not recognizing the demand on their time, energy, skill-set*
 - ensure that the demands/load don't exceed the patient's capacity (*“do you have time to do this?; how are you going to be able to work --- in to your schedule?”*)
 - avoid “bad-good” – use **“safe” range/level** BG, BP, LDL, etc.

Fear of Complications → large contributor to Diabetes Distress

The Language of Diabetes Complications: Communication and Framing of Risk

Reviewed messaging in magazines for people with diabetes (such as Diabetes Forecast) from American, Canadian, Australian Diabetes Associations

- Majority had **loss-framing** (*e.g., "having diabetes is the leading cause of blindness"*) with few if any **risk reduction strategies** offered (often scare tactics) → **hopelessness**
- vs
- Many fewer had **gain-framing** (*"early diagnosis & treatment of diabetic retinopathy can prevent up to 98% of severe vision loss"*) plus **strategies** (*"get annual eye exam"*) → **more effective** (evidence-based hope – how to stay healthy)



Words Matter:



Studies shows importance of language choices in diabetes care

- Health care providers who use "**negative terms**," such as "*nonadherent*" or "*noncompliant*" may create a disconnect leading to **negative health outcomes**
 - Language choices that place **blame** can cause patients to **disengage** with health services and develop **diabetes-related distress** and **sub-optimal diabetes self-management**
 - The effects of being referred to as "*a diabetic*" vs "*a person with diabetes (PWD)*"
- Carefully chosen language can have a positive effect
 - Use language to **support** patients' diabetes self-management and psychosocial well-being – **on the same side - fighting for, not against**
 - Avoid "bad-good" – use "**safe**" or "**healthy**" range/level BG, BP, LDL, etc.
 - Focus on helping PWD stay healthy-provide "**evidence-based hope**" & **strategies**
 - "*Research shows that with good care, odds are pretty good you can live a long and healthy life with diabetes*"
 - "*There are things we can do together to help you stay healthy/prevent complications with diabetes*" [or prevent from getting worse]

<https://www.youtube.com/watch?v=6qtuO7Hq9WE>

Examples of Common Jargon or Confusing Wording

Problematic	More useful – preferable
Diabetic	Person with (who has, living with) diabetes (PWD)
Control (verb)	Manage – what they are doing
Control (noun)	Define what is meant (BG or A1c or TIR)
Test (blood glucose)	Check or monitor your blood glucose
Good/bad/poor	Safe/unsafe; at, above or below target – numbers, data
Compliant/adherent	Takes meds about half the time (neutral – numbers, facts)
“transfer to the floor”	Transfer to the ward (from ICU or CCU, etc.)
You need to be NPO	You will need to have an empty stomach so stop eating at ...
Failed treatment	The treatment was not effective, didn’t improve things

Ownership vs Buy-in

- **“Ownership”** is when you own or share the ownership of an idea, a decision, or an action plan; it means that you have participated in its development, that you chose on your own accord to endorse it. It means that you understand it and believe in it. It means that you are both willing and ready to implement it.
- **“Buy-in” is the opposite**: someone else or some group of people has done the development, the thinking, the cooking and now they have to convince you to come along and implement their ideas/plans.

“What do you think you want to do to improve your life and your health?”

Generate & Engender Ownership

Sharing the Decision Making

Definition: Shared decision making occurs when a health care provider and a patient work together to make a health care decision that is *best for the patient*.

- The optimal decision takes into account:
 - evidence-based information about available options
 - the provider's knowledge and experience
 - the patient's values and preferences
- With diabetes and the high dependence on self-management – utilizing **motivational interviewing techniques*** and considering **patient capacity and burden** (*"How will you work this into your day?, With your arthritis do you think you can do ----"*) as part of shared decision making is even more beneficial & critical ^{cg}
 - Ambiguity – want to change but doesn't want to give up or take on something
 - * For MI to be effective, the patient needs to be out of hopelessness/futility mindset



Important Points



- Diabetes is not a moral problem – it is a metabolic problem with many different causes and contributing factors.
- Having, living with and managing diabetes can be overwhelming, even frightening, and can result in Diabetes Distress.
- Approach your patients with empathy - help your patients by being on their side – working with & supporting them and avoiding tug-of-war approaches or scare tactics
 - Words matter
 - Reduce/ avoid stigmatization
 - Encourage/engage in Shared Decision Making

Video on HCP empathy and all cause mortality:
<https://www.youtube.com/watch?v=WwtUBPEV6fY>

Diabetes Care is Preventive Care

- Primary Prevention – preventing diabetes
- Secondary Prevention – preventing the complications of diabetes
- Tertiary Prevention – preventing disability or harm from the complications

The goal of diabetes care is to help our patients with diabetes stay healthy – To prevent or delay complications, improve outcomes & optimize quality of life

Set the Stage

- Explain that the recommendations for treating diabetes
 - are *not* “*punishments*” for them being bad
 - are *not* *rules* they must follow
 - do provide *tools* to help them live a healthy, enjoyable life
 - Some of those tools involve lifestyle
 - Some are medications and/or devices to help regulate their blood sugars, BP, lipids, etc.

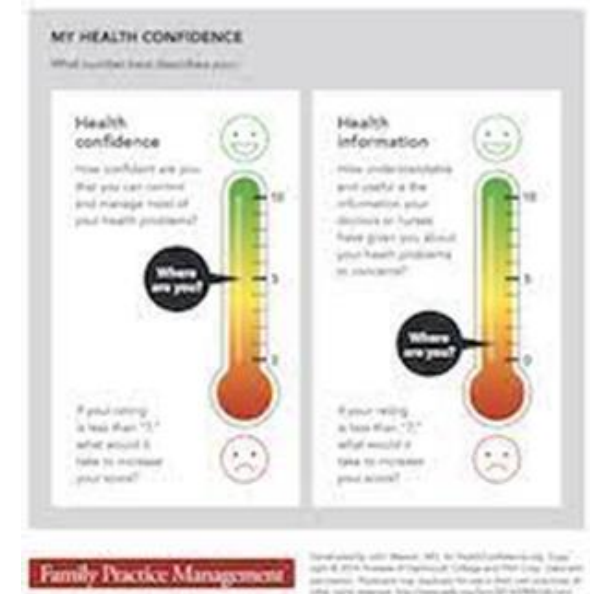


Set the Stage

- Consider assessing & explaining patient activation / health confidence / self-efficacy
 - Where do they rate themselves on the scale?
 - 7-10 = good health confidence
 - Less than 7 = not health confident
 - Ask what they need to feel more confident in managing their health
 - Provide education, demonstration, resources, etc.

“Who is responsible for your health?”

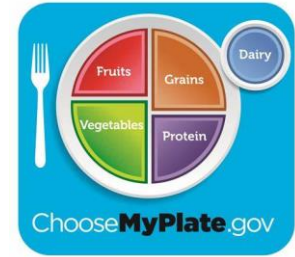
- You
- Your doctor (“I don’t know anything”)
- You & your doctor



[My Health Confidence \(aafp.org\)](http://aafp.org)

Epigenetic Effects can be Reversed – Lifestyle tools

- Healthy diet
 - fewer foods that are ultra processed, high sat fat, have added sugar, salty
 - Avoid suggesting the impossible: “just don’t eat any packaged foods” or “avoid all processed foods”
 - more vegetables, fruits, whole grains (fiber), lean and/or plant proteins
 - “My Plate” is a good start
- Movement/ physical activity/ exercise
 - Aerobic
 - Strength
 - Flexibility and balance
- Stress reduction/regulation – calming activities (breathe work, etc.)
 - Avoid scare tactics / threats (increases fear, toxic stress)
 - Acknowledge & support them around Diabetes Distress
- Reduce stigma/discrimination in their health care
 - Chairs, gowns, language, etc.
 - Empathy (lots of demands, scary or overwhelming at times) / education / explanations / shared- decision making
 - Connections – group work (toxic shame hides & grows in isolation)



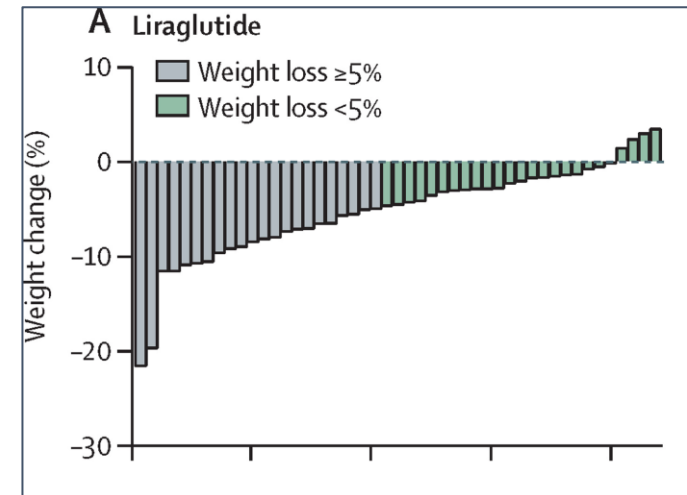
Immediate effect on glucose levels along with effects on weight & effects on epigenetics

Also, reduction in inflammation

Therapeutic Heterogeneity

(not everyone responds the same)

- Based on our individual make-up, some things work better or not as well for some of us- this includes:
 - Type of foods/meal plan (low fat, low carb, low glycemic index, intermittent fasting, etc.)
 - Glucose lowering
 - Weight loss
 - Exercise (aerobic, strength training)
 - Glucose lowering
 - Weight loss
 - Fitness
 - Medications
 - for example, the research reports the average A1c lowering or weight loss with a medication but in the test group of patients, some had a greater than average response and some had less than average or worsening



Video on Evidence Based Hope

<https://www.youtube.com/watch?v=6qtuO7Hq9WE>

- Video on using CGM as diabetes education tool

<https://www.youtube.com/watch?v=7ZETF0bWg6E>