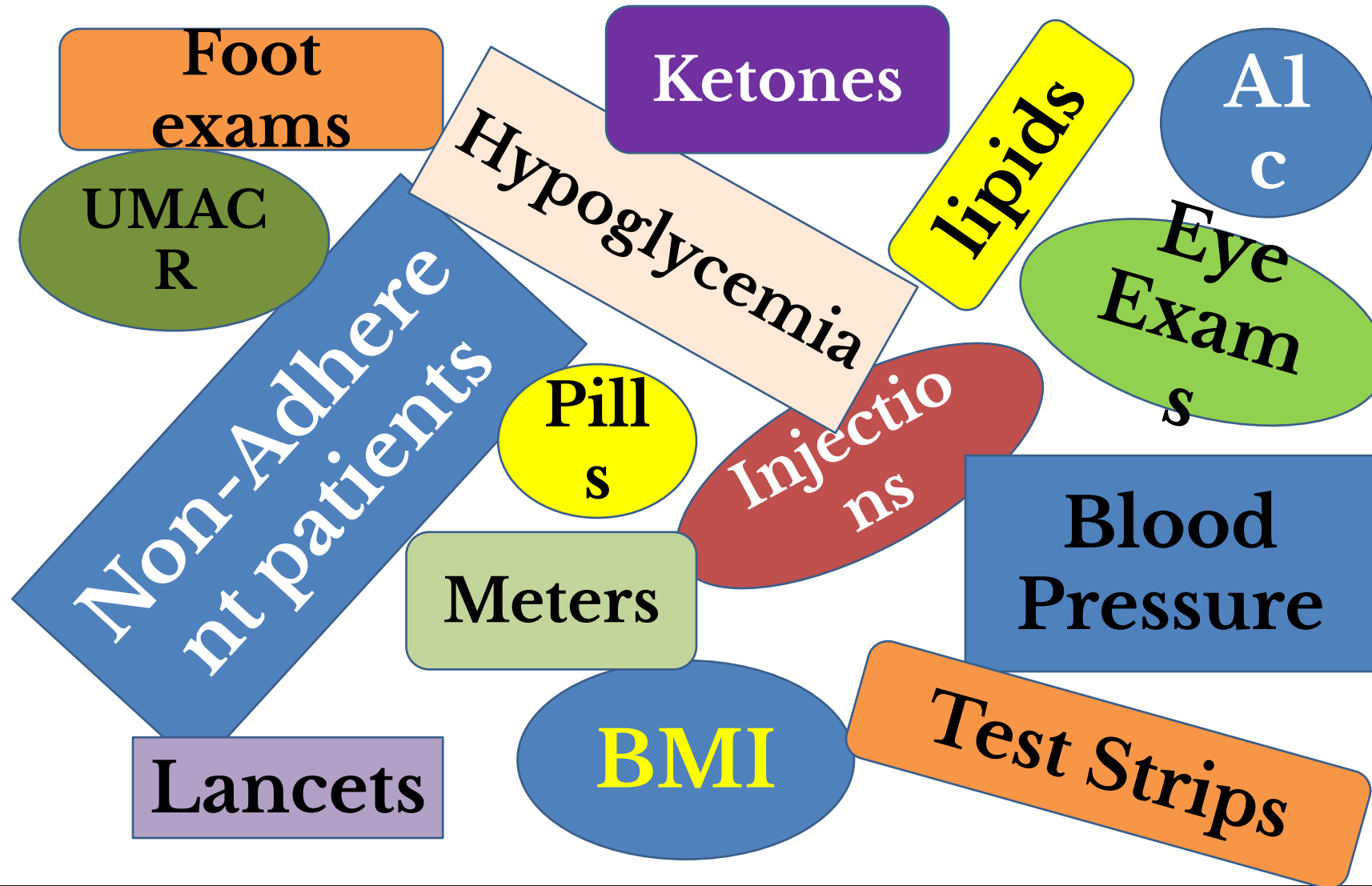


# Helping Your Patients with Diabetes: Optimizing Your Approach

October 23, 2020

Carol Greenlee MD FACP

# DIABETES OVERWHELMUS



# Expanding your Mental Model of Diabetes

## Some things to consider ...

Misperceptions about diabetes

Why won't your patients do what you tell them to do?

Why do your patients always seem to get worse?

What does the Alc tell you?

What's so bad about low blood sugar?

# What is your mental model of diabetes?

## What are Mental Models?

What are Mental Models made of?



*“Mental models are deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting. Very often, we are not consciously aware of our mental models or the effects they have on our behavior.”*

- Peter Senge

“...mental models determine what we see...” Senge

- A mental model
  - provides the filters through which the user see the world
  - is based in belief as opposed to being a factual concept
  - is an explanation of someone's thought process about how something works in the world – how they perceive the world

# What is your mental model of people with diabetes?

- Are any of these familiar?
  - *“Many of those who have diabetes are noncompliant and don’t take care of themselves.”*
  - *“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”*
  - *“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?”*
- These are often “taught” or passed on to us in our training or practice.
- What do you think the effects or impacts are of these mental models?

# 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

# Why won't your patients with diabetes do what you tell them to do?

- Starting point: *No one wants poor control, no one wants diabetes complications* – so you can rule that out as the reason
- Other reasons
  - Perceived Worthlessness
    - *Pointlessness/futility (what good does it do?)*
    - *Hopelessness*
  - Too Many Personal Obstacles
    - *Diabetes Distress*
    - Depression
    - Medication Misperceptions/Fears
    - Lack of education and Self management skills
    - Environmental(“Life”) – time, costs, competing priorities
      - Patient Context /“Needs & Circumstances”
  - The Absence of Support & Resources
    - Diabetes slips to the background (serious but not urgent)
    - Infrequent supportive interaction with HC team (“touches”)

## Patient Capacity for Self-Care



Over 2 hours per day is required for diabetes self-care

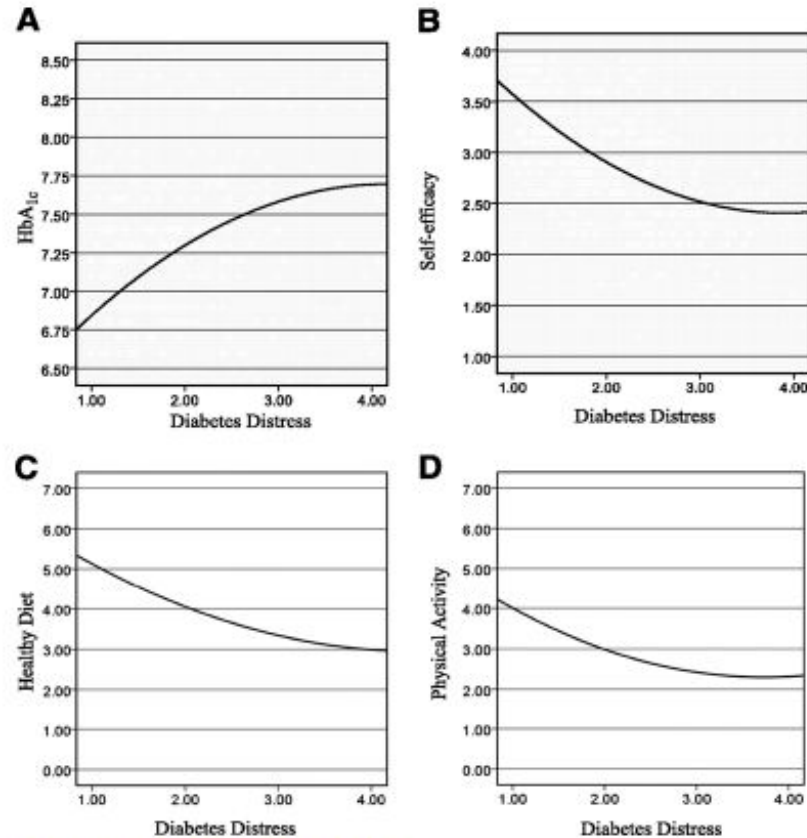
Diabetes is hard ...

# 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 associated with Worse Engagement and Outcomes for Patients

~45% of patients report DD  
Only 24% report that their HC team asked them how Diabetes affected their lives



From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2797978/>



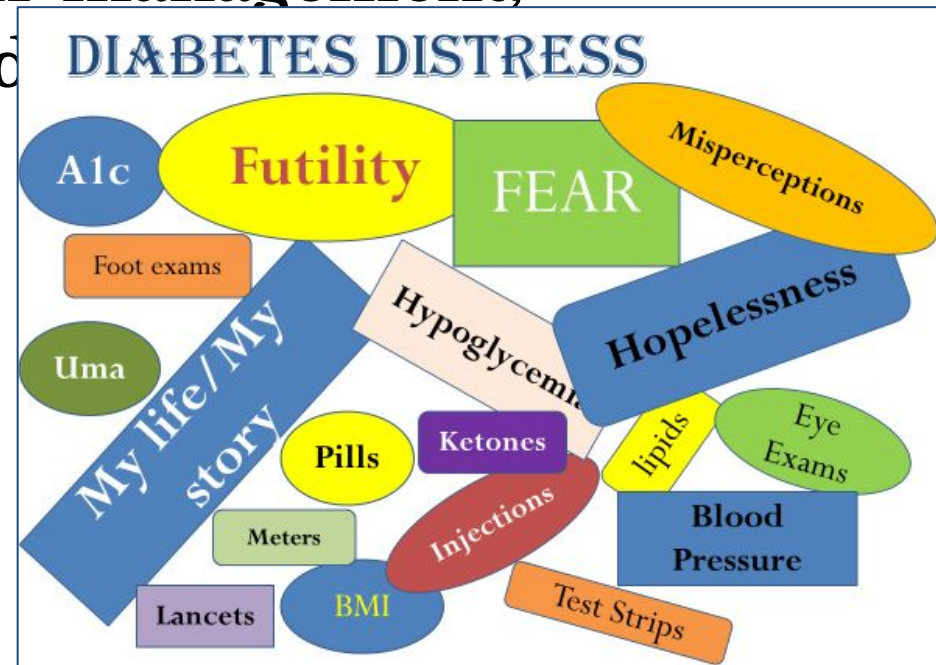
# Diabetes Distress (DD)

- 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,

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

Implications and



g

# 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:

## Study 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** for diabetes patients
  - Stereotypes or 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
  - Researchers recommend using more appropriate 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**" ... and **strategies**

# How to Help Overcome Futility & Hopelessness

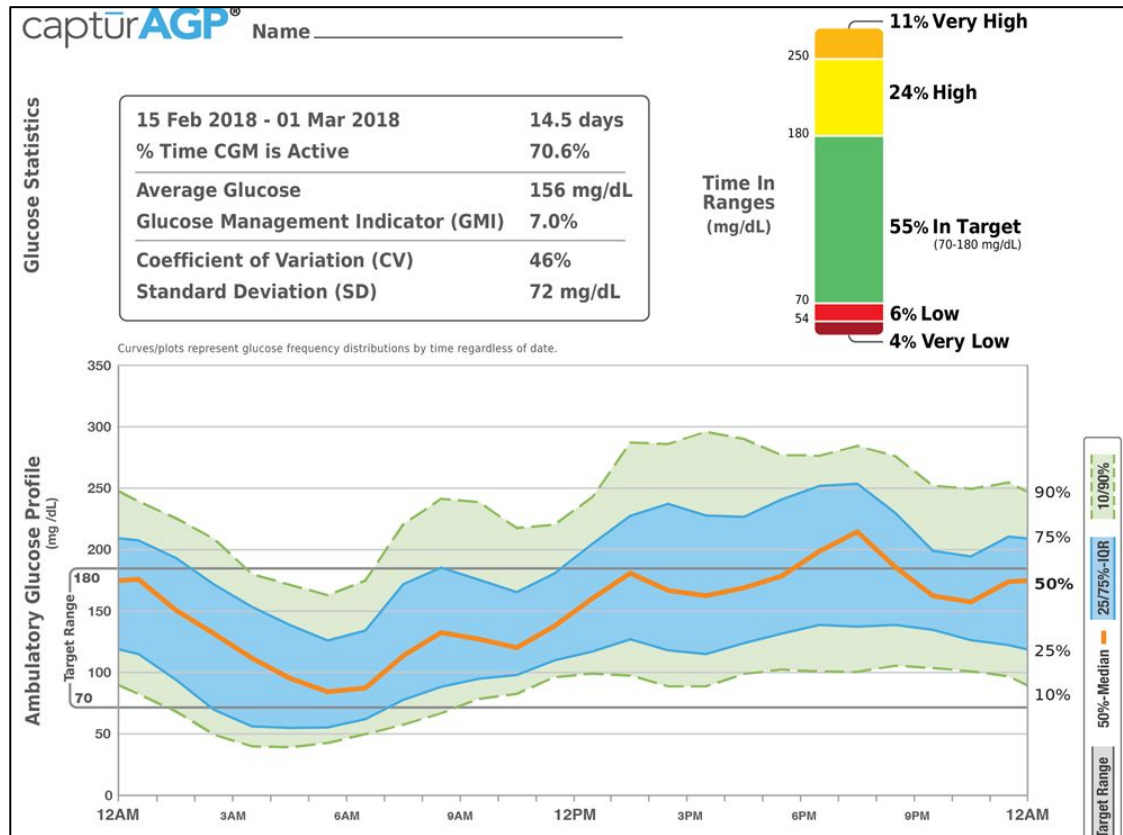
- Motivational Interviewing won't work well, if at all, unless the patient moves out of the sense of hopelessness, futility, worthlessness
  - *if they believe that no matter what they do, bad things are going to happen; that they are doomed and nothing they do makes a difference, then why even try... it is all futile*
- **Be curious, not furious** (ask instead of tell...listen ...seek first to understand)
- You may need to invest in providing that “evidence-based hope” - Help them discover that their efforts make a difference
  - Patients often have “**Perceived Treatment Inefficacy**”
  - Establish Treatment Efficacy
    - Discovery Learning (e.g. structured BG testing or professional CGM study) – (“let's see what happens when you take a walk”; “see what happens if you eat XX vs YY”)

# Ownership vs Buy-in

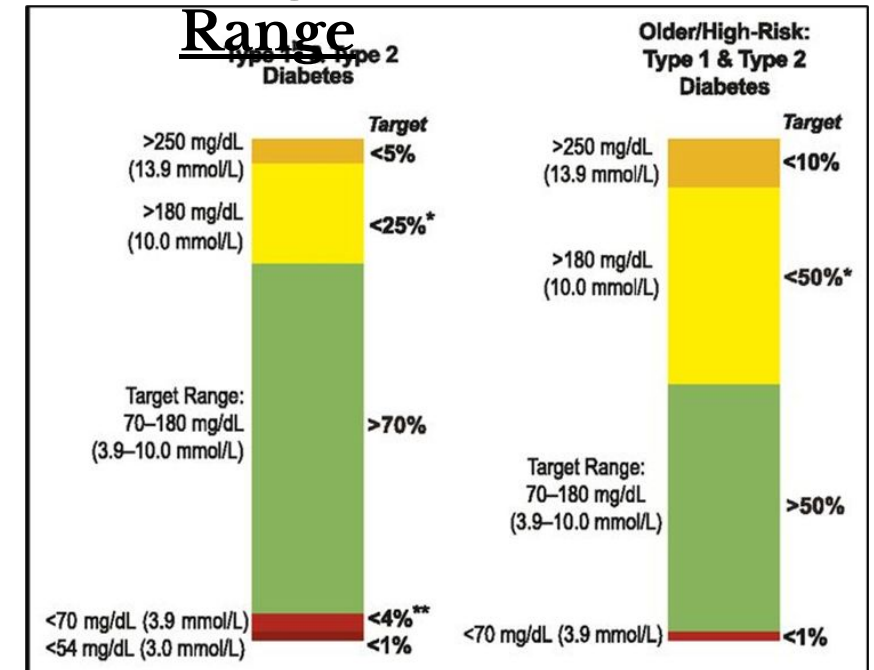
- “Ownership” is when you own or share the ownership of an idea, a decision, or an action plan; it means that you have participated in its development, that you chose on your own accord to endorse it. It means that you understand it and believe in it. It means that you are both willing and ready to implement 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.

# Diabetes Challenges - Help from Technology

- Continuous Glucose Monitoring (Ser...
- Professional CGM or Personal CGM



## Targets for Time in Range



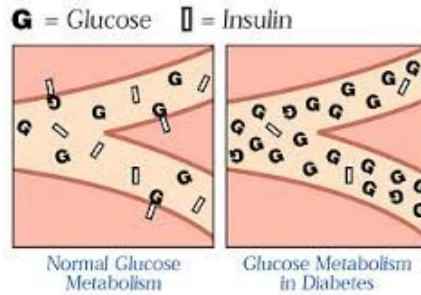


# What is Diabetes?

- Not a “*moral*” disease (not a condition of “bad” people)
  - much “judgement” surrounds diabetes (stigma)
- Diabetes is a *metabolic* disease
  - Diabetes is **very complex** in what causes it & how to manage it
    - Multiple different genetic influences
      - Fat distribution; effect of fat accumulation on cell function and insulin resistance
      - Pancreas (Beta cell) capacity (ability to make extra insulin); risk for complications
    - Multiple different environmental influences
      - Including the microbiome, sleep, type of food, activity, adverse childhood events, pollutants
  - There is significant *Response Heterogeneity* (*not every patient responds the same to medication, diet or activity*)
  - *Multiple body systems affected*
  - Most forms of diabetes *progress over time (get worse)* (due to pancreas making less & less insulin)

“Diabetes is hard”

# What is Diabetes



The simple version –  
all diabetes is due to *not enough insulin*

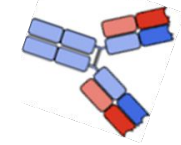
- Diabetes is a disease that occurs when *blood glucose (blood sugar) is too high*. (Glucose is the body's main source of energy.)
  - Insulin, a hormone made by the islets in the pancreas, helps glucose get into cells to be used for energy.
  - If the **pancreas doesn't make enough—or any—insulin**, then glucose stays in (& builds up in) the blood and doesn't get into cells.
  - Having too much glucose in the blood

There are many types (causes) of Diabetes

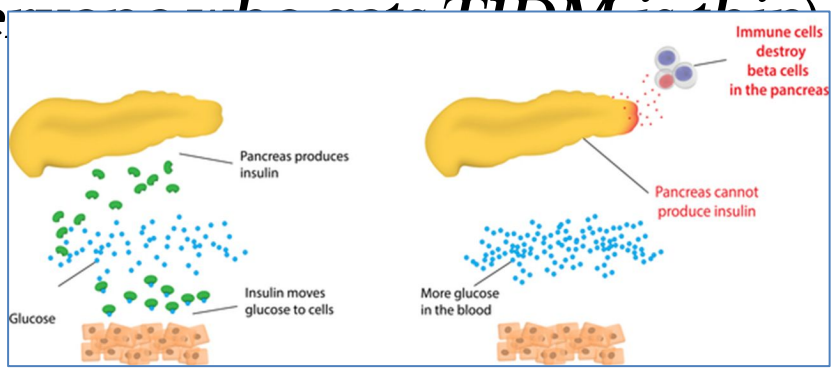
- Type 1
- Type 2
- Monogenic
  - MODY
  - Neonatal
- Pancreatogenic
- Hepatogenic
- Secondary
  - Hormonal disorders (Cushing's, Acromegaly, etc.)
  - Medications (steroids, anti-psychotic meds (atypical))
- Other
  - Important to Know:  
Almost every form of diabetes progresses (gets worse) over time – usually due to making less & less insulin (it is not the patient's failure)



# Type 1 Diabetes - "Immune-mediated diabetes"



- Previously called "Juvenile" & Insulin-Dependent Diabetes
  - Not just in children or thin individuals
    - Increasing "adult onset" T1DM – as late as the 9<sup>th</sup> decade (*not everyone with T1DM is childhood onset*)
    - BMI at time of diagnosis (*not everyone with T1DM is thin*)
      - 20% BMI >30
      - 45% BMI 25-29.9
      - 30% BMI 20-24.9
      - 5% BMI <20

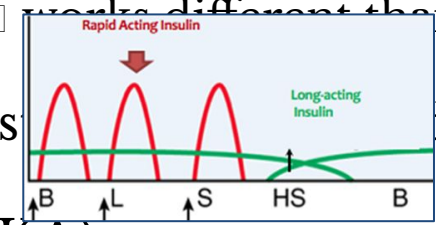


## ● Auto-Immune Disorder

- Many different genes + environment
- Immune system attacks the Beta cells in pancreas (the "islets") & destroys them
- Absolute Insulin deficiency □ need to replace insulin

● Replacing Insulin is complex (Insulin from outside □ works different than Insulin from pancreas)

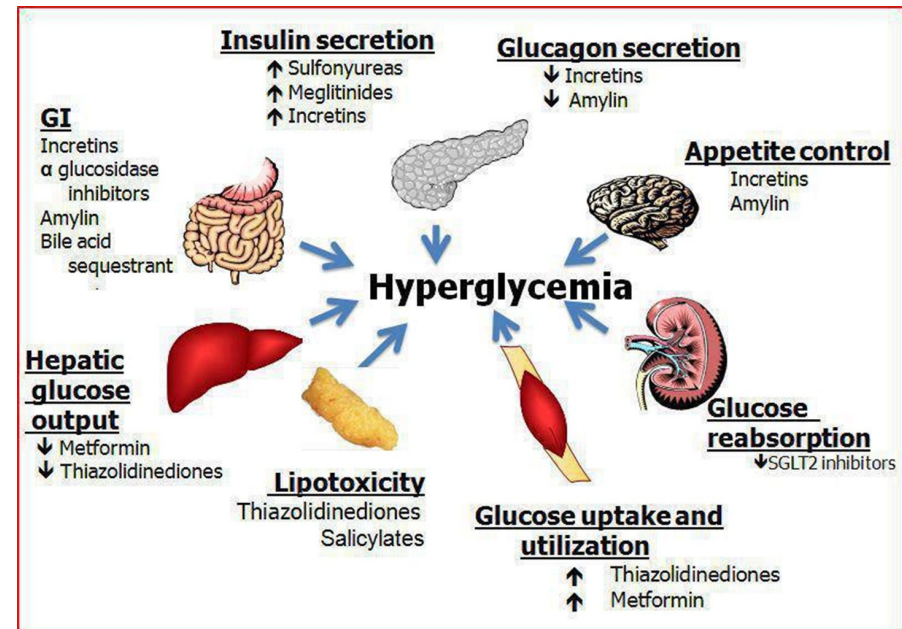
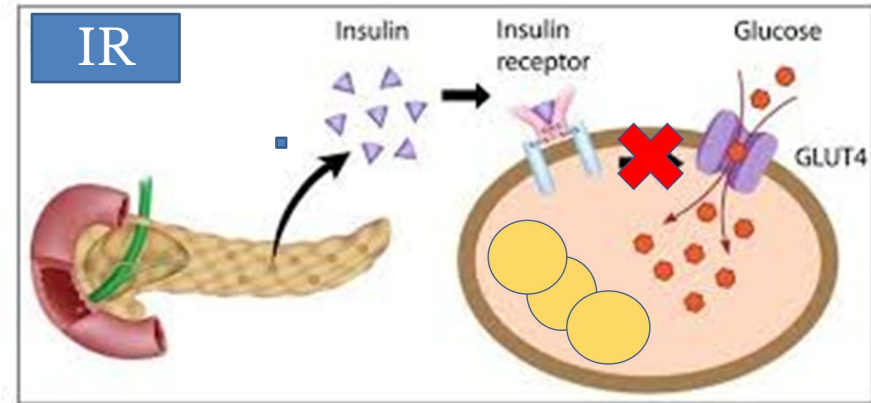
● Insulin requirements vary with sleep, exercise, stress, growth, renal function, menstrual cycle, temperature, etc.



● Without Insulin □ Diabetic Keto-Acidosis (DKA)

# Type 2 Diabetes

- Now the most common form of Diabetes - 90-95% of Diabetes
- Due to *insulin resistance* causing the body to need more insulin combined with *inability to produce sufficient insulin to compensate* for the increased need
  - Multiple different gene combinations
  - Multiple environmental/lifestyle factors
    - Adiposity (especially visceral fat & fat in organs) - But *not all people with T2DM are obese*
    - Diet composition (saturated fats, refined carbs)- Adverse effect on Beta Cells as well Insulin Resistance
    - Sedentary lifestyle
    - Age related – reduced Beta Cell function
      - (worn out pancreas- makes less insulin)
    - ACEs/stress; air pollution, etc.

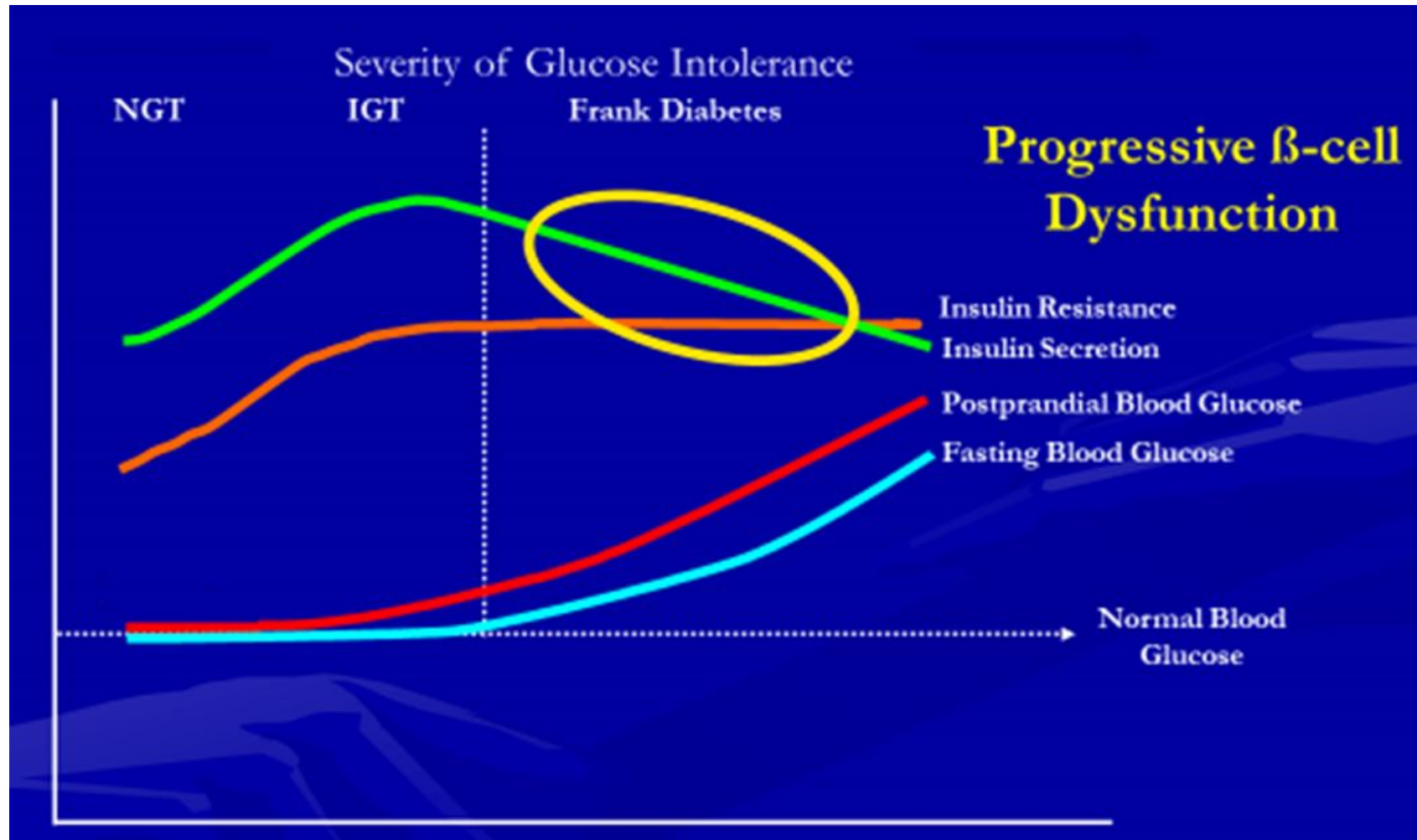


## Not all T2DM is the same

- Not all meds work for all T2DM
- This adds to the complexity
- Natural history is to progress – make progressively

# Natural History of Diabetes is to Progress (“get worse”)

Ongoing loss of Beta Cells □ More Deficient in Insulin

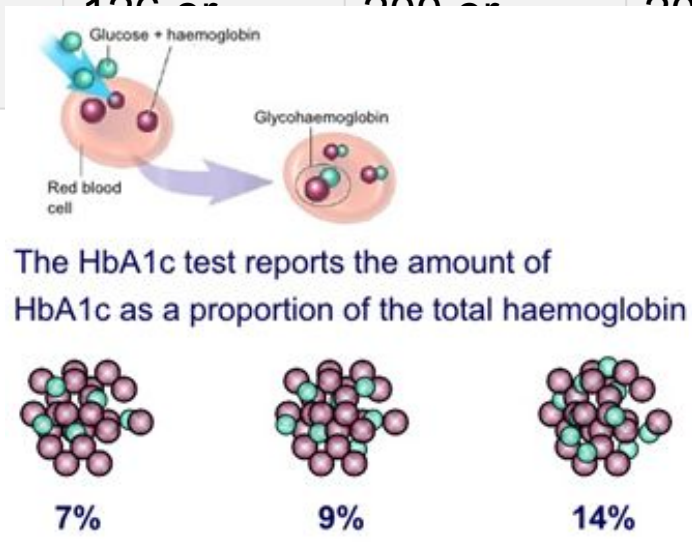


# What is high blood glucose? How is Diabetes Diagnosed?

Diagnosis	A1C (percent)	Fasting plasma glucose (FPG) <sup>a</sup>	Oral glucose tolerance test (OGTT) <sup>ab</sup>	Random plasma glucose test (RPG) <sup>a</sup>
Normal	below 5.7	99 or below	139 or below	
Prediabetes	5.7 to 6.4	100 to 125	140 to 199	
Diabetes	6.5 or above	126 or above	200 or above	200 or above

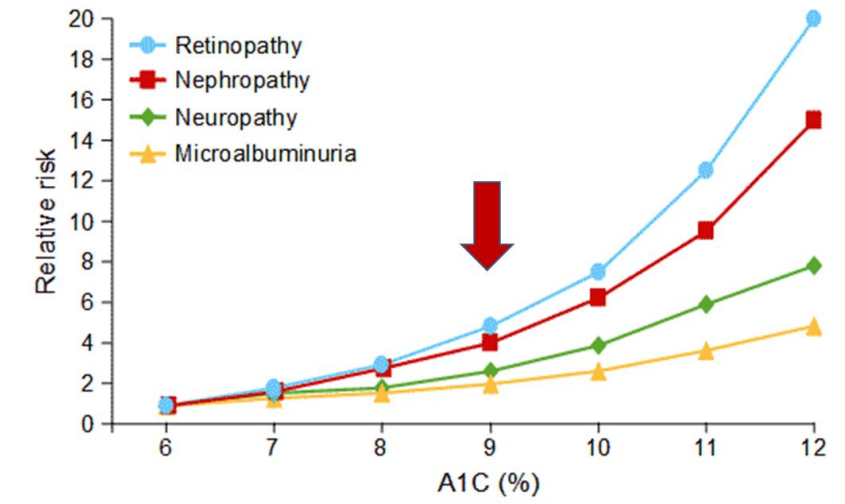
## What is A1c?

Hemoglobin inside RBC - The average RBC life span is 3 months



“the memory test”

## A1c correlates with & predicts complications



1% point reduction lowers the risk of serious complications by 40-50%



# Chronic (Long-term) Complications

The longer the duration of diabetes & the higher the blood sugar — the higher the risk of complications:

## ● **Cardiovascular disease**

- coronary artery disease /heart attack
- stroke
- heart failure (CHF)
- Peripheral Artery Disease (PAD)

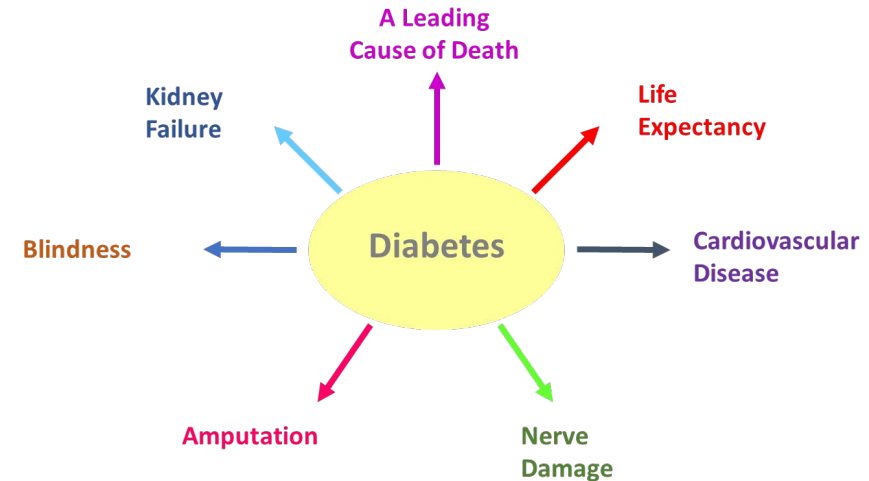
## ● **Nerve damage (neuropathy)**

## ● **Kidney damage (nephropathy)**

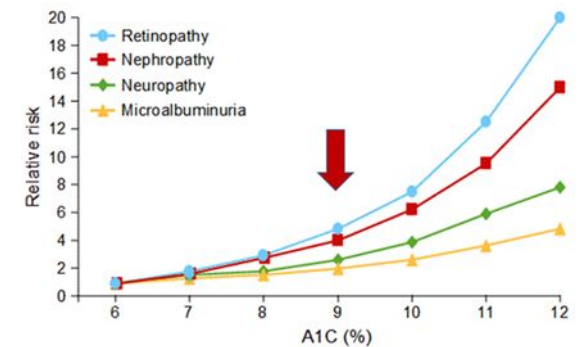
## ● **Eye damage (retinopathy)**

## ● **Dementia/Alzheimer's disease**

## ● **Hearing loss**



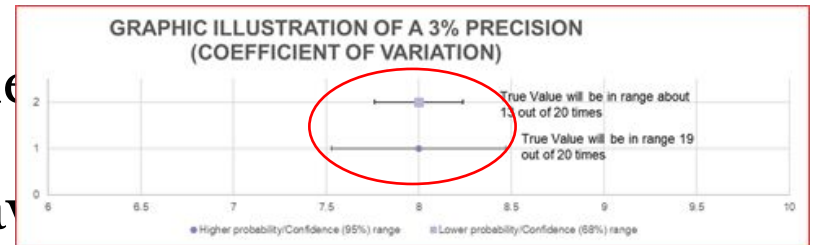
**The Good News  
Complications  
Can be  
Prevented  
or Reduced**



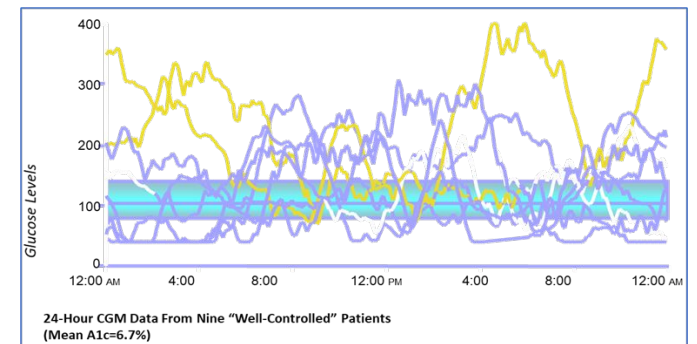
1% point reduction lowers the risk of serious complications by 40-50%

# Some caveats for A1c for individual patients

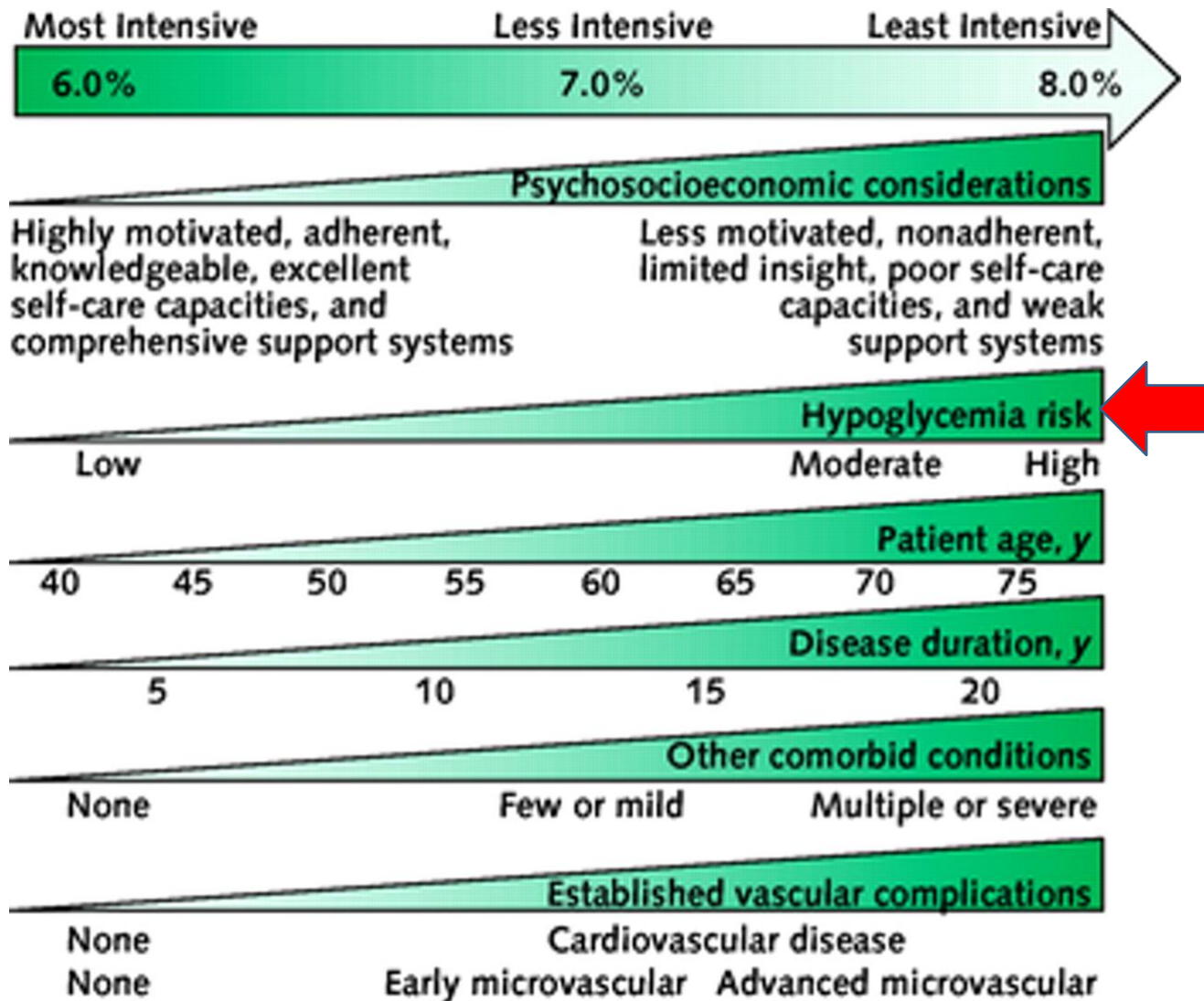
- **Assay Accuracy** (how accurately reflects actual average glucose)
  - Anything that lengthens or shortens the **RBC lifespan** or alters **glycosylation rate** or **interferes** with assay
    - Interfering substances/conditions – e.g. falsely elevated A1c with iron deficiency
    - Age and ethnic/race difference – A1c higher for a given BG



- **Assay Precision** (how precise or reproducible is the result)
  - Having a **target range** is probably better than a cut-point
- **Glucose Variability** (daily ups & downs) not represented
- **Short-term change** in glucose control not reflected



# Individualized glucose targets



## Hypoglycemia in Patients with Diabetes

- Hypoglycemia defined as blood glucose <70 for people with diabetes = “Low Blood Sugar”
  - **Level 1:** BG <70 and >54
  - **Level 2:** BG <54
  - **Level 3: Severe Hypoglycemia (SH)** defined as altered mental&/or physical status needing assistance to treat or <40 mg/dl
- **Asymptomatic Hypoglycemia -Hypoglycemic Unawareness** defined as not getting the adrenergic warning symptoms of hypoglycemia
- **Pseudo-Hypoglycemia** - Some patients, especially with T2DM & poorly controlled DM, get symptoms of hypoglycemia with a blood sugar >70
- **Fear of Hypoglycemia** – can be cause for high blood sugars and/or roller-coaster blood sugars

“But most of our patients have T2DM – is hypoglycemia still a concern?”

# Hypoglycemia- the stats

- Second leading cause Adverse Drug Events
  - Patients on insulin experience on average of **24 hypoglycemic episodes** per year, ranging from mild to severe
  - **~300,000 ED visits annually** for Hypoglycemic events for T1DM and T2DM
  - >30,000 Hospitalizations per year for hypoglycemia – associated with
    - **18.1% 30-day readmission rate**
    - **5% 30-day mortality rate** (up to **30% in elderly patients**)
  - In the elderly □ **105/100,000 person-years admissions for hypoglycemia** vs **70/100,000 person-years for hyperglycemia**
    - Lipska study (Yale): From 1999 to 2011 rates of hospital admissions for hypoglycemia have risen by 11.7% in US Medicare beneficiaries.
      - There were **40% more admissions for hypoglycemia than for hyperglycemia** over the 12-year period.



# Hypoglycemia Risk

## -in patients taking *Insulin & Insulin secretagogues*



- Intensive or tight control & targets



- But also risk with A1c >9%

- Risk higher with longer duration of diabetes

- Increased in the elderly

- especially if cognitive impairment (*vicious cycle*)

- Renal and/or Hepatic Impairment

- Reduced clearance of insulin and reduced



Glucagonogenesis (GNG)

- Medication errors & safety



- literacy, numeracy, lack of education

- Missed / irregular meals

- food insufficiency



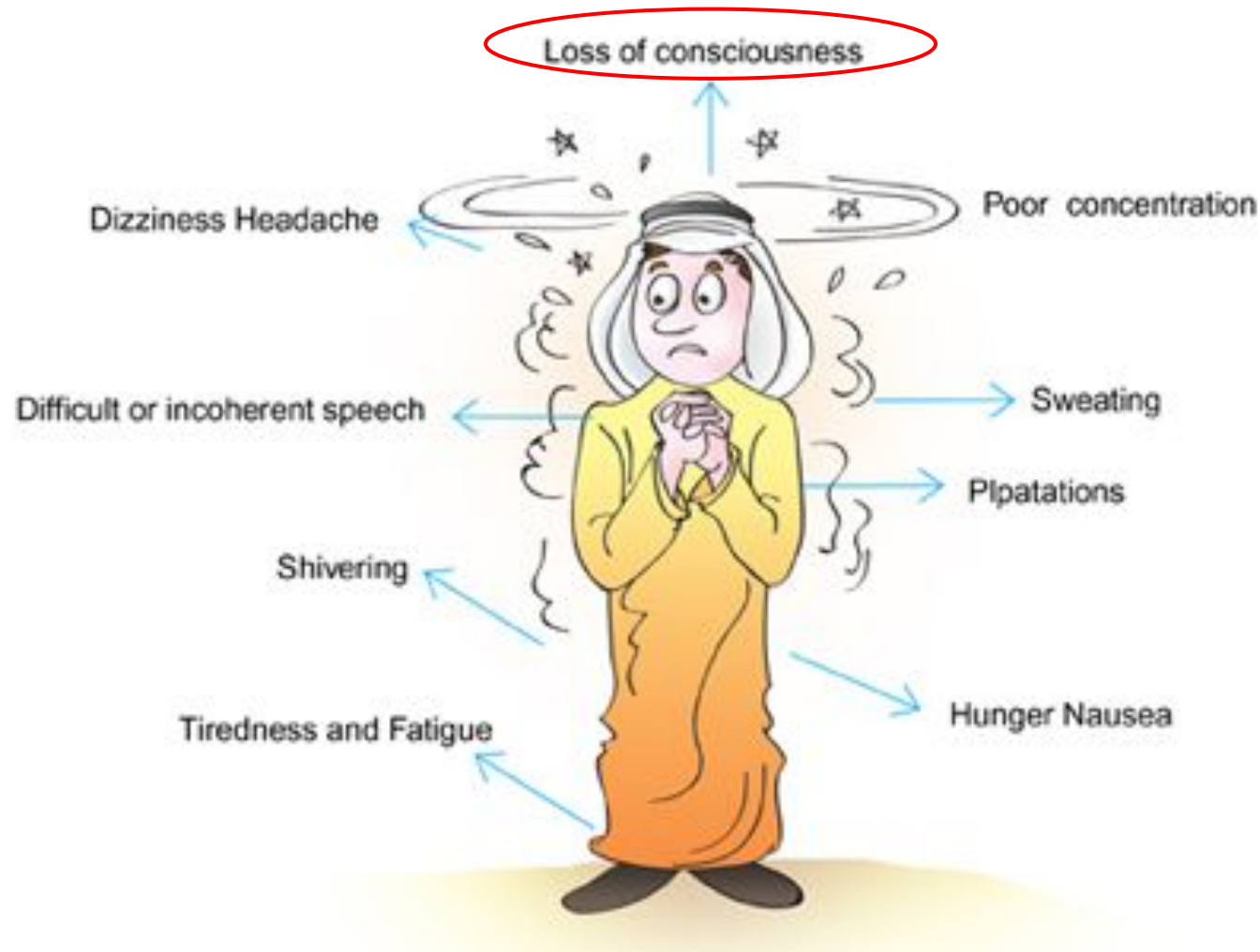
- EtOH (alcohol), opioids, benzodiazepines

- Reduced counter-regulatory responses

- Exercise / Increased activity

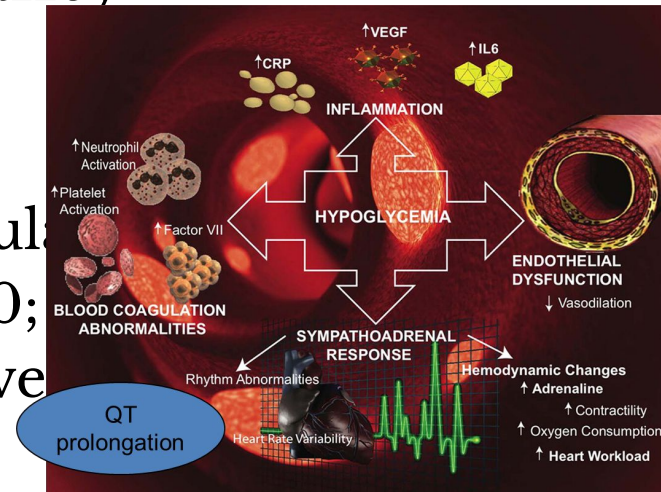


# Neurogenic response Neuroglycopenia



# Hypoglycemic Effects

- Neurocognitive effects
  - cognitive effects & impairment, coma, seizures, brain dead, dementia
- Increased falls and trauma
  - Impaired driving/ accidents
  - Fractures, lacerations, Traumatic Brain Injury
- Increased CVD and Mortality
  - Acute Ischemia
  - Atherogenic effects
    - Pro-inflammatory/ Pro-coagulative
    - Greater at BG 50 than BG 200;
    - Elevated for >7-8 days after event
  - Arrhythmogenic effects
    - “Dead in bed”



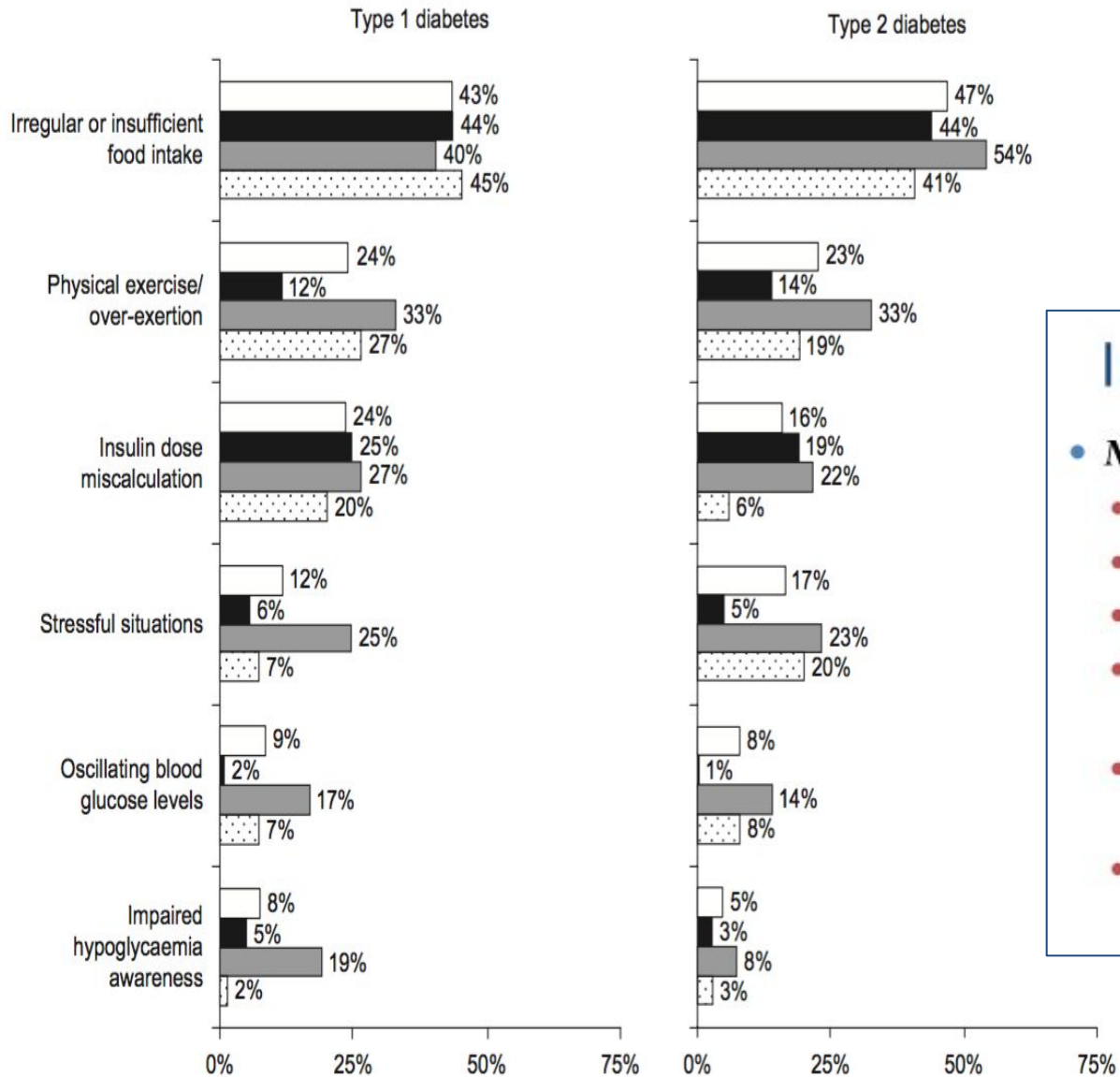
Desouza C V et al. Dia Care 2010;33:1389-1394

# Strongest Risk Factor?

- In patients with T2DM on insulin and/or sulfonylurea meds (glyburide, glipizide, Amaryl -glimepiride) – what do you think is the leading risk factor for hypoglycemia (low blood sugar)?



# Causes of Severe Hypoglycemia



## Irregular or Insufficient Food Intake

- **Missed / Delayed / Reduced Meals**
  - Job demands, travel, meetings, etc.
  - Fasting for tests or procedures
  - Illness (unable to eat or eat less or vomiting)
  - Lack of nutritional knowledge (carbs) (eggs & bacon)
    - Struggles with numeracy (carb counting & insulin dose)
  - Reduced ability to shop for or prepare meals
    - Aging, widower, loss of vision, amputations, etc.
  - Lack of food (food insecurity)
    - Insufficient money or SNAP funds for purchasing food



# Hypoglycemia in Patients with Diabetes

- The main focus in diabetes care has been on reducing hyperglycemia and chronic complications due to hyperglycemia (high blood sugar)
  - Tight control advocated
  - Can take up to 9 to 20 years to develop chronic complications of hyperglycemia (youth < elderly)
- Need to consider Benefit vs Risk
  - Risk of Hypoglycemia Event(s) (*of having low blood sugar*)
  - Risk of Harm from Hypoglycemia (*being hurt by the low blood sugar*)
    - Living or working alone
    - Driving/ operating heavy equipment /other dangerous work/life exposure
    - Comorbid susceptibility to effects of hypoglycemia
      - e.g. Coronary artery disease, epilepsy, dementia
    - Can also cause complications (worse CVD, dementia, etc.)

# Does your care team have an approach to help prevent hypoglycemia and harm from hypoglycemia?

## *Clinician & Care Team Education*

- Awareness that people with T2DM can have serious hypoglycemic & harm from hypoglycemia
- Symptoms and consequences
  - How to recognize hypoglycemia
  - When to think about it and ask about it
- How to treat hypoglycemia
- How to teach patients & families / caregivers about hypoglycemia
- Appropriate targets (risk vs benefit)
- Medication management (vs just medication reconciliation)

# ADA standards of care for Hypoglycemia

- Recommendation - Counsel patients to treat hypoglycemia with fast-acting carbohydrate
  - *Pure Glucose (15-20 g) is the preferred treatment* for the conscious individual with hypoglycemia (glucose alert value of <70) although any form of carbohydrate that contains glucose may be used.
  - Fifteen minutes after the treatment, if SMBG shows continued hypoglycemia, the treatment should be *repeated*.
  - Once SMBG returns to normal, the individual should consume a *meal or snack* to prevent recurrence of hypoglycemia – *ongoing insulin activity or insulin secretagogues*



# Sources of Carb (want “rapid” Carbs for fast absorption)

## Great Sources of Carbohydrate for a Low Blood Sugar

- *Glucose gels (cake gels) (absorbed from lining of mouth)*  
*Glucose tabs*  
*Smarties*  
*Pixie Sticks*



- These are all dextrose and glucose and are **broken down and in your system within 10 minutes**. Dextrose is very similar to glucose in terms of molecular structure, which makes it a fast source of carbohydrate for a low.

## Pretty Good Sources of Carbohydrate for a Low Blood Sugar

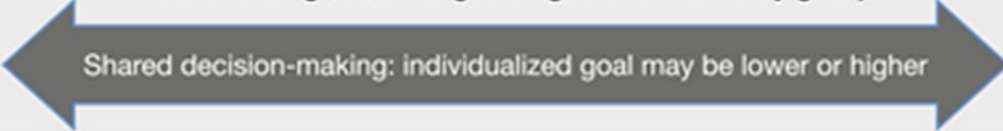
- *Juice box*  
*Soda*  
*Dried fruit*  
*Jellybeans*
- These sources can take at least **20 minutes to break down and get into your bloodstream** (e.g. Jellybeans have a lot of additives and fillers, which your body has to break down first, before digesting the carbohydrates)

## Not-So-Great Sources of Carbohydrate for a Low Blood Sugar

- *Milk*  
*Peanut Butter Sandwiches*  
*Chocolate bars*  
*Cookies*  
*Ice cream*
- These sources of carbohydrates are loaded with **fats and proteins, which will slow down the digestion process and delay your body’s ability to get that glucose into your bloodstream.** \* in T2DM protein can further **increase insulin release**

# Diabetes in Older Adults - Endocrine Society

## Guidelines 2019

Overall Health Category		Group 1: Good Health	Group 2: Intermediate Health	Group 3: Poor Health
Patient characteristics		No comorbidities <b>or</b> 1-2 non-diabetes chronic illnesses* <b>and</b> No ADL <sup>ε</sup> impairments and ≤1 IADL impairment	3 or more non-diabetes chronic illnesses* <b>and/or</b> Any one of the following: mild cognitive impairment or early dementia  ≥2 IADL impairments	Any <b>one</b> of the following:  End-stage medical condition(s)**  Moderate to severe dementia  ≥2 ADL impairments  Residence in a long-term nursing facility
<p><b>Reasonable glucose target ranges and HbA1c by group</b></p>  <p>Shared decision-making: individualized goal may be lower or higher</p>				
Use of drugs that may cause hypoglycemia (e.g., insulin, sulfonylurea, glinides)	No	Fasting: 90-130 mg/dL Bedtime: 90-150 mg/dL  <7.5%	Fasting: 90-150 mg/dL Bedtime: 100-180 mg/dL  <8%	Fasting: 100-180 mg/dL Bedtime: 110-200 mg/dL  <8.5% <sup>γ</sup>
	Yes <sup>ε</sup>	Fasting: 90-150 mg/dL Bedtime: 100-180 mg/dL  ≥7.0 and <7.5%	Fasting: 100-150 mg/dL Bedtime: 150-180 mg/dL  ≥7.5 and <8.0%	Fasting: 100-180 mg/dL Bedtime: 150-250 mg/dL  ≥8.0 and <8.5% <sup>γ</sup>



# Patient Education

- What is low blood sugar
  - Why is it dangerous
- What are the symptoms
- How do you treat
- Sick day rules
- Prevention
  - Snacking for extra physical activity (or reduce insulin)
  - Carry rapid glucose on person
  - Mealtime insulin guides (don't take if don't eat)
- Call care team if experience low blood sugar, especially if unexplained

# Meal Planning on Sick Days

## If able to eat meals

- Eat usual meals
- Drink **eight (8) ounces of *calorie-free extra fluids each hour*** throughout the day
- Examples:
  - water
  - tea
  - broth
  - diet soda
  - sugar-free Jell-O

## If not able to eat usual meals

- Try eating or drinking food or beverage items with ***15 grams carbohydrate every hour*** (see list next slide)
  - e.g. 4 oz Regular Sprite + 4 oz Diet Sprite or 8 oz Gatorade
- Continue to drink ***extra calorie-free fluids*** in between
  - Eight ounces (8 oz) of fluid each hour
  - Every third hour, consume eight ounces (8 oz) of a sodium-rich choice such as bouillon
  - If having trouble keeping fluids down, have small sips every 15

## Foods/Fluids that contain 15 grams of Carbohydrate

- 1/2 cup apple juice
- 1/2 cup regular soft drink (caffeine-free)
- 1 double-stick popsicle
- 1/4 cup regular pudding
- 1 slice dry toast
- 1/2 cup cooked cereal
- 6 saltine crackers
- 1 cup soup
- 1/3 cup frozen yogurt
- 1 cup Gatorade
- 1/2 cup regular ice cream
- 1/4 cup sherbet
- Milkshake (1/3 cup low fat milk and 1/4 cup ice cream)
- 1/2 cup regular gelatin/Jell-O
- 1 cup nonfat, sugar-free yogurt (not frozen)



Calories: 140kcal  
Sugar: 34.8g (8 tsps)



# What's the Answer – Diabetes is Hard

What does the A1c tell you? – *Not the whole story of glucose control*

What's so bad about low blood sugar? – *Harm, High Burden & Costly*

Why do my patients with diabetes always seem to get worse over time? – *Progressive loss of beta cells (insulin secretion) from the pancreas*

How do I get my patients with diabetes to do what I tell them? – *Evidence-based Ownership*



Non-adherence

(not doing what the *doctor* wants you to do)



*“Non-adherence* may be the means by which a patient may express their preferences when their values, goals and preferences are *not* incorporated into the treatment decisions during the encounter.”

# Idea Sharing



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# Extra Slides



# A few useful terms & concepts

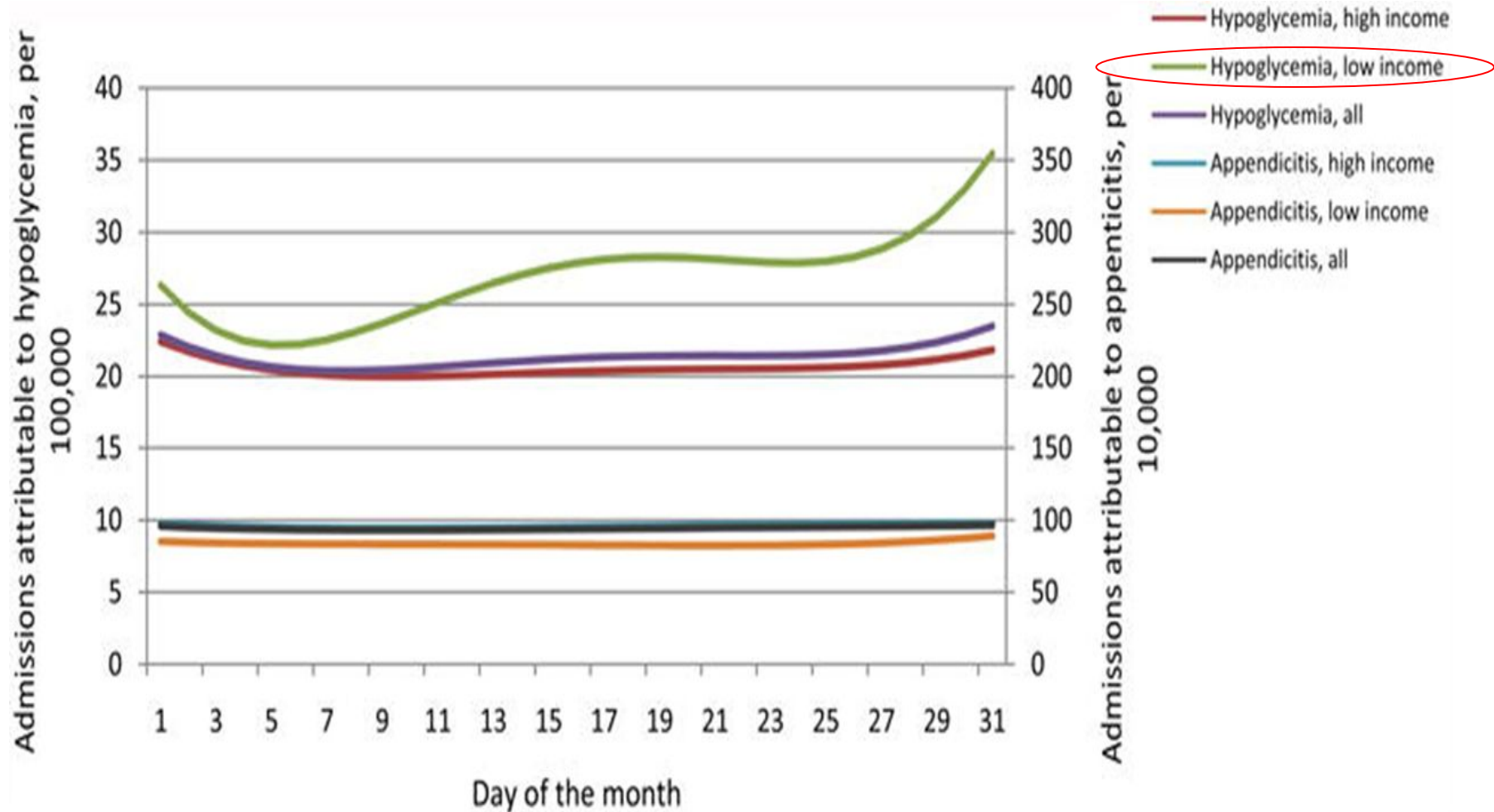
- Diabetes “Overwhelmus”
  - Clinical Inertia
  - Stigma - Expectations
- Diabetes Distress
  - Different than Depression
- Futility
  - Treatment Skepticism
  - Perceived Hopelessness
- Curiosity
- Compassion
- Confidence
- Contextual Care
- Cooperation
- Cohesion

## Table 1

Conditions causing inappropriately high or low Hba1c[10]

Inappropriately Low HbA1c	Inappropriately High HbA1c	Variable Effect on HbA1c+
<ul style="list-style-type: none"><li>• Hemolysis</li><li>• Certain hemoglobinopathies</li><li>• Recent blood transfusion</li><li>• Acute blood loss</li><li>• Hypertriglyceridemia</li><li>• Drugs*</li><li>• Chronic liver disease</li></ul>	<ul style="list-style-type: none"><li>• Iron deficiency</li><li>• Vitamin B12 deficiency</li><li>• Alcoholism</li><li>• Uremia</li><li>• Hyperbilirubinemia</li><li>• Drugs*</li></ul>	<ul style="list-style-type: none"><li>• Fetal hemoglobin</li><li>• Methemoglobin</li><li>• Certain hemoglobinopathies</li></ul>

# Hypoglycemia and food Insecurity



# DEFINITION OF MENTAL MODEL

MENTAL MODEL CAN BE DEFINED AS:

ASSUMPTIONS OR GENERALISATION BY WHICH WE MAKE SENSE  
OF THE WORLD AROUND US

- THEY ARE CONSTRUCTED FROM OUR EXPERIENCES
- PROVIDE THE FILTERS THROUGH WHICH WE CHOOSE TO SEE THE WORLD
- INTERPRET NEW EXPERIENCES AND GIVE MEANINGS TO THE EVENTS AND ULTIMATELY TAKE DECISION

MENTAL MODELS FORM OUR BELIEF SYSTEMS AND ARE DEEPLY INGRAINED AND PERSONAL. THIS IS WHY TWO PEOPLE WITH DIFFERENT MENTAL MODELS CAN OBSERVE SAME EVENT DIFFERENTLY.