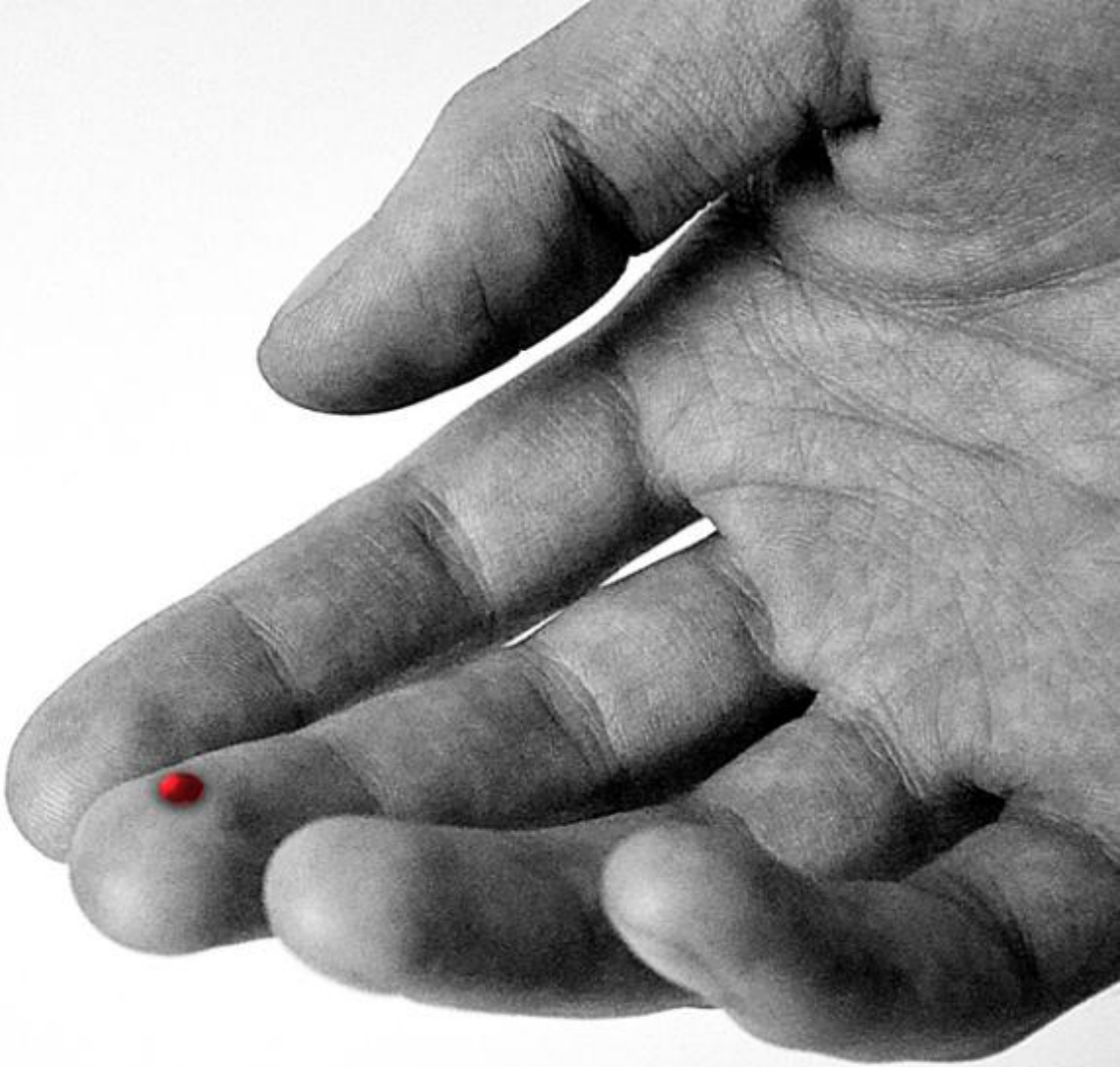
Diabetes 101

Michael See, MS, RCEP, CDE



Massachusetts Medical Interpreter Conference

June 2019

Presentation Outline

- Diabetes in culturally diverse populations
- What is Diabetes
- Epidemiology
- Classifications
- Criteria for diagnosis
- Risk Factors
- Pathogenesis
- Approach to patient management
- Complications
- Self-management – nutrition, physical activity, medication….
- Treatment and ongoing care
- Case studies

Presentation Objectives

At the end of the presentation, attendees should be able to:

- Discuss the challenges of managing diabetes in culturally diverse populations.
- Describe the criteria for diagnosis and symptoms of diabetes.
- Discuss the risk factors and pathophysiology of diabetes.
- List the target for blood glucose, blood pressure and lipids.
- Discuss the role of nutrition and the benefits of physical activity in the management of diabetes.
- List the types of medication for the treatment of diabetes.
- Describe the complications and long-term risk of diabetes.
- Discuss the role of diabetes self-management education in assisting PWD to make behavioral changes to manage diabetes.

Important Points

- Diabetes affects racial/ethic minorities disproportionally
- Care provided to these groups is often suboptimal
- Diabetes is a complex, chronic illness requiring continuous medical care with multifactorial risk-reduction strategies beyond glycemic control.
- Care relies heavily on patient participation, and self-management.
- Patient-centered interactions are difficult when significant socio-cultural-linguistic barriers exist.
- Skilled interpreters is vital for PWD because essential concepts in diabetes are difficult to translate.

Medical Interpreters Perspective

- What types of patient do you translate for?
- What type of communication difficulties do you observe?
- To what do you attribute these difficulties?
- What things should providers know, understand to communicate effectively?

Managing Culturally Diverse PWD

- Acculturation
- Biology
- Depression, emotional distress
- Education level
- Fears
- Group engagement
- Health literacy
- Intimacy/Sexual Dysfunction
- Body image
- Knowledge of disease
- Language
- Medication adherence
- Nutrition
- Alternative medicines
- QOL
- Religion, faith
- SES
- Technology
- Exercise

Social Determinants

Influence of Social Determinants on Type 2 Diabetes

Disadvantages

- Poverty
- Personal financial burden of increased health care costs
- Insufficient access to the resources necessary to manage the condition: housing, nutritious food, and health care services

Consequences

- Diabetes can decrease an individual's productivity at work , employment-related problems
- Limit educational attainment

Exacerbate the cycle of inequality

Provider Perspective

- **Judging** – unilateral approach to patient-provider communication
- **Cultural competence** – respecting cultural differences
- **Unconscious bias** – prejudice, unsupported judgement

Improving patient–provider communication: insights from interpreters

Patricia Hudelson

Hudelson P. Improving patient–provider communication: insights from interpreters. *Family Practice* 2005; **22:** 311–316.

- Interpreters represent an untapped source of insight into common patient-provider communication problems.
- MI interviewed to understand experiences, perceptions regarding Pt. - Provider communication difficulties.
  - Differences in ideas about illness, it causes, treatment, meaning
  - Expectations of clinical encounter
  - Verbal, non-verbal communication styles can have different meanings
- Recommendations:
  - Awareness of communication pitfalls
  - Important to show interest in Pt. country to establish rapport
  - Communication would be facilitated using simpler, less technical language
  - Use more conversational style with patients
  - Schedule time with MI to discuss communication issues

BMC Family Practice

RESEARCH ARTICLE Open Access

Interpreter-mediated diabetes consultations: a qualitative analysis of physician communication practices

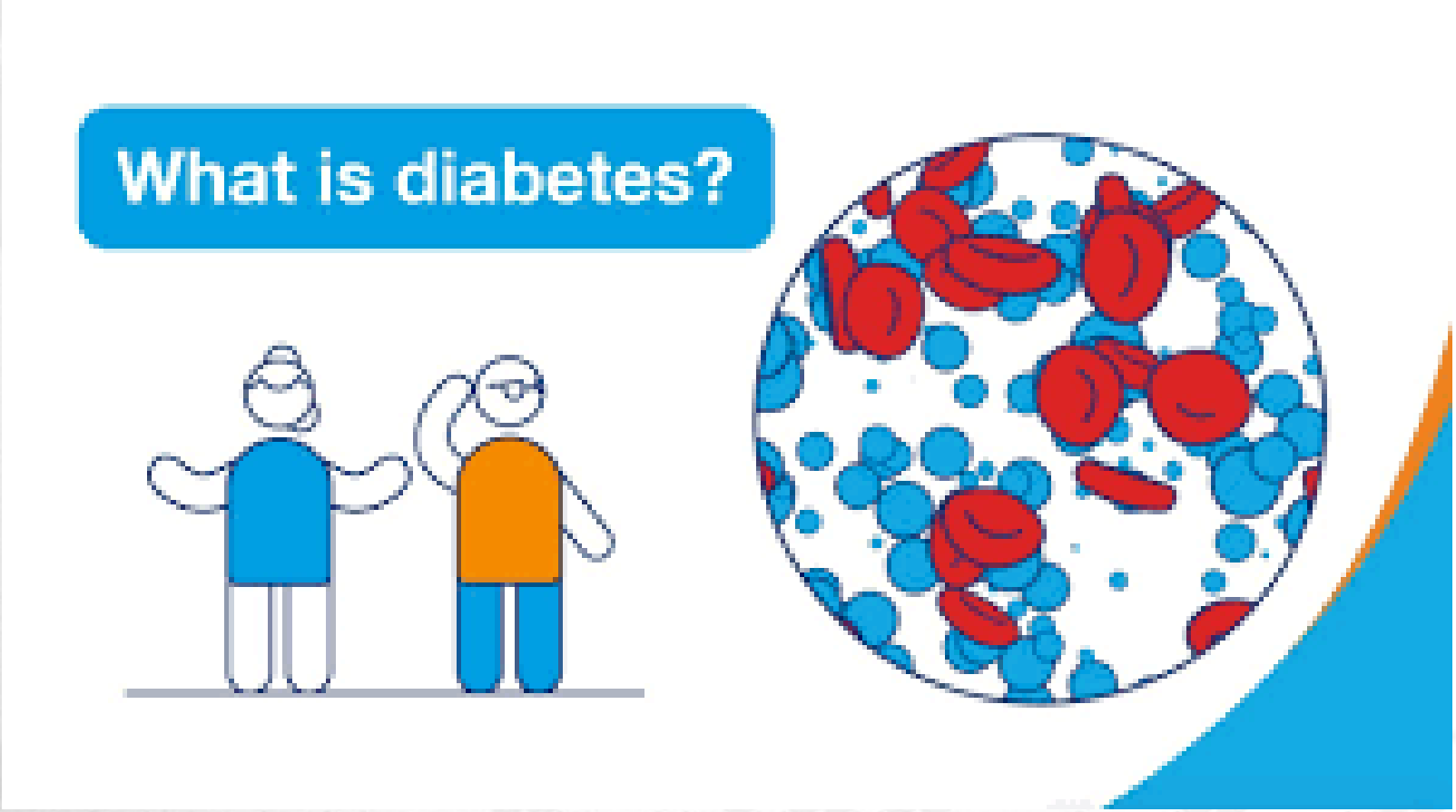
Patricia Hudelson*, Melissa Dominicé Dao, Noelle Junod Perron and Alexander Bischoff

- Analyzed transcripts from 8 audio recorded, outpatient consultations involving both interpreter and family members

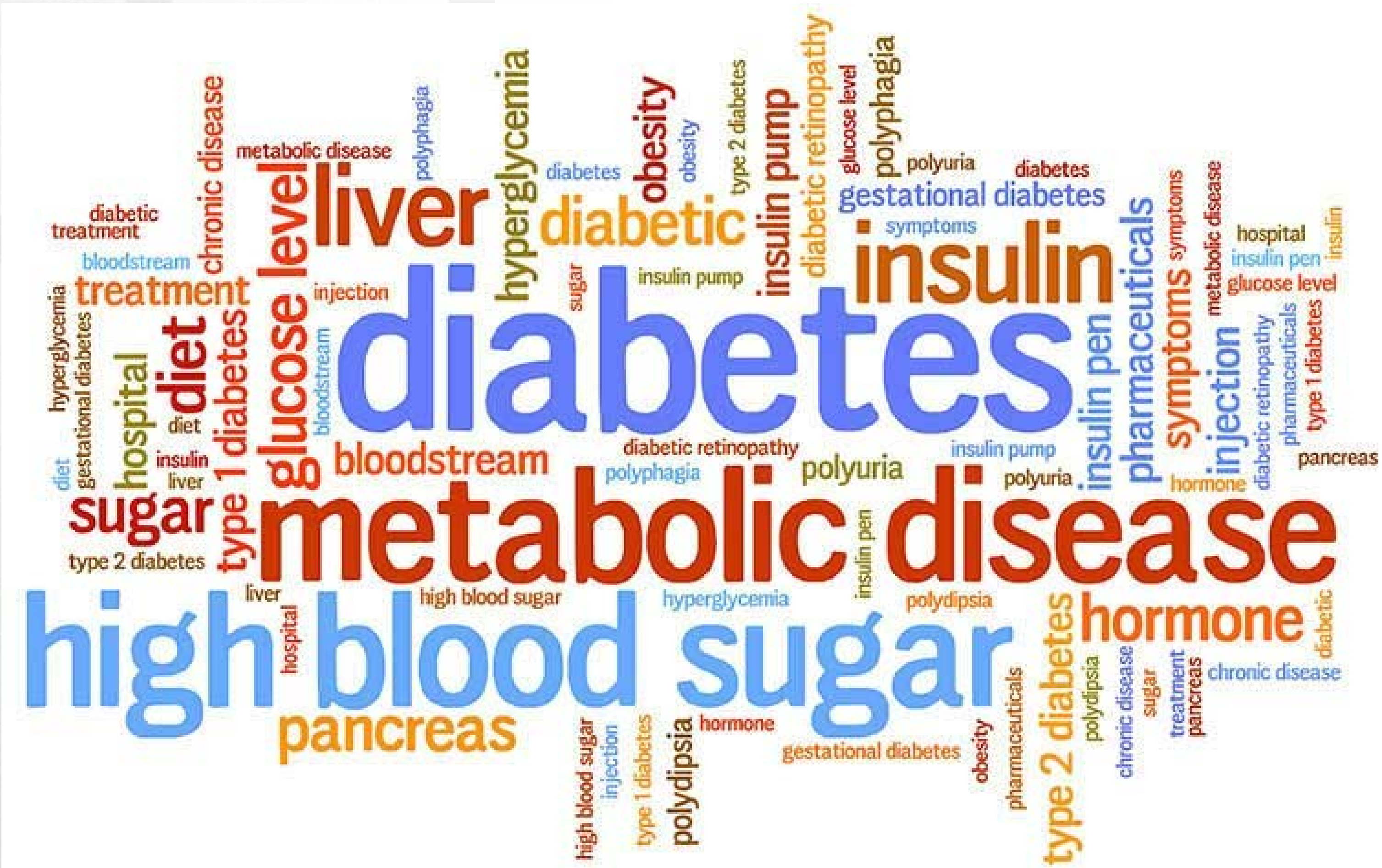
Findings:

- Providers used closed ended questions when asking about symptoms and glucose control.
- When providing information, explanations, spoke in long, complex speech
- Providers directed speech to interpreter, became sidetracked by family questions.
- Patients participation was minimal, limited to brief answers.

What is Diabetes?



What comes to mind when you think of diabetes?



Diabetes

- Diabetes is a disease that affects how you body handles sugar (glucose)
- “A metabolic disease in which the body’s inability to produce any or enough insulin causes elevated levels of glucose in the blood.”

Diabetes: Myth or Fact

- Diabetes is a relatively new disease that has come into existence with changing lifestyle habits.

- Diabetes symptoms go back to 1552 B.C. when an Egyptian physician Hesy-Ra, documented diabetic symptoms such as frequent urination and drastic weight loss for no apparent reason.

- 11th century “water tasters” would taste the urine of people thought to have diabetes. Diagnosis given if the urine tasted sweet.

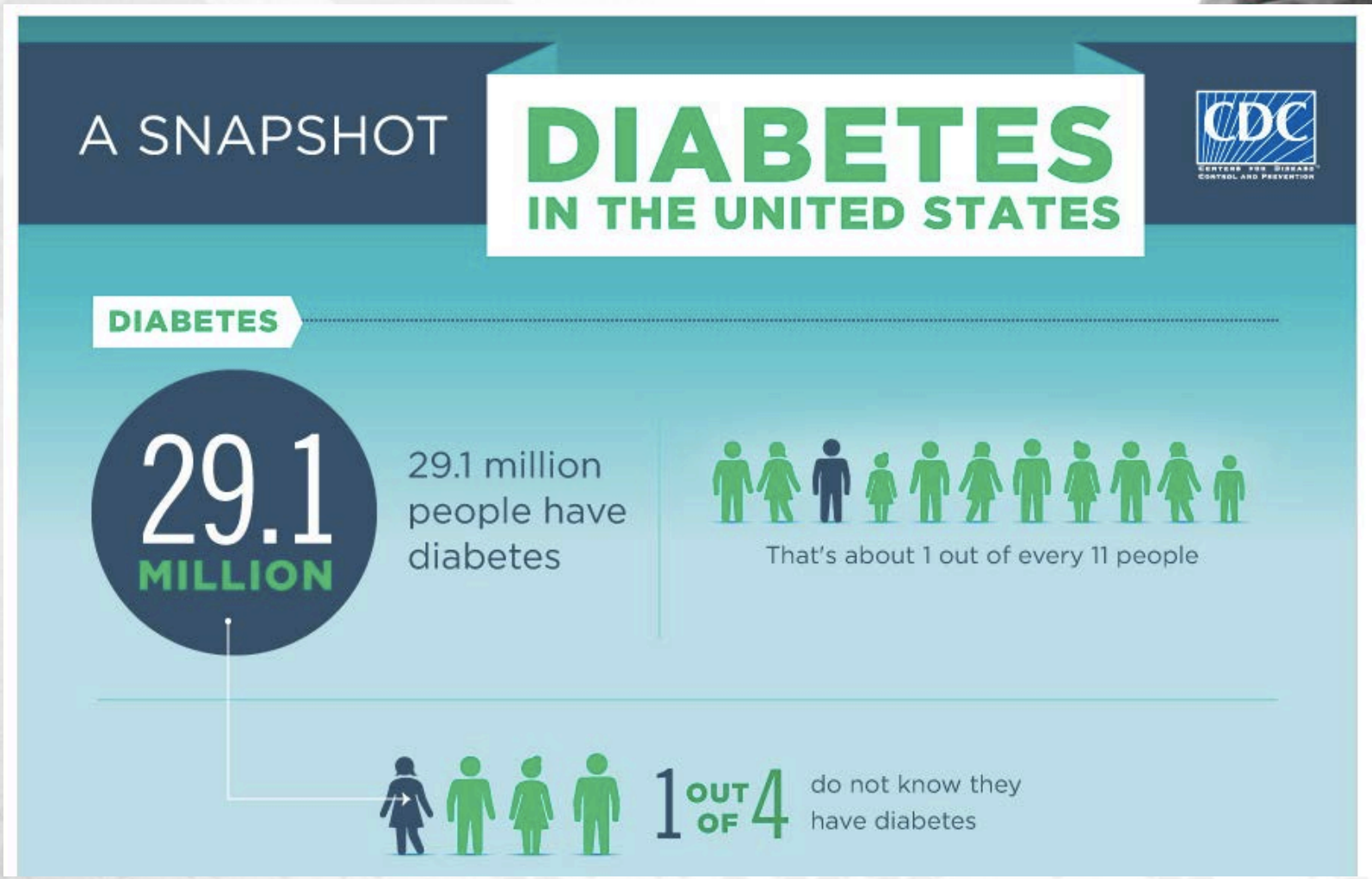
History of Diabetes

- In 1921, J.J.R. Macleod, Charles Best, Frederick Banting, and James Collip succeeded in purifying insulin and successfully treating a diabetes patient with it.

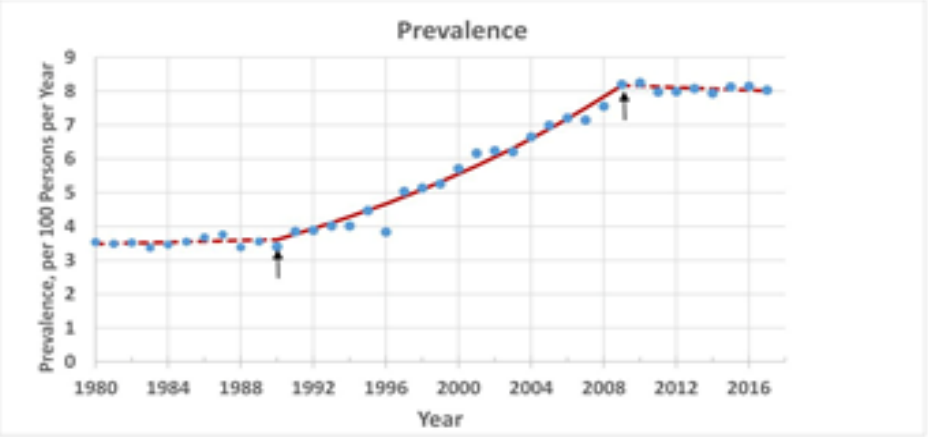
History of Diabetes

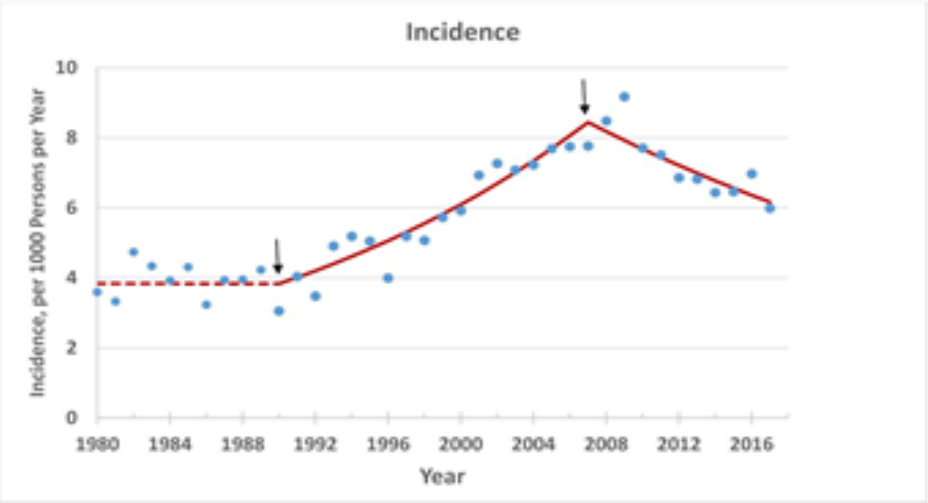
- This discovery saved many people from dying in a coma due to high blood glucose levels. Diabetes has been around a long time, but we still need new and better therapies.

U.S. Prevalence



Trends in age-adjusted diagnosed diabetes prevalence and incidence among adults aged 18–79 years, 1980–2017.

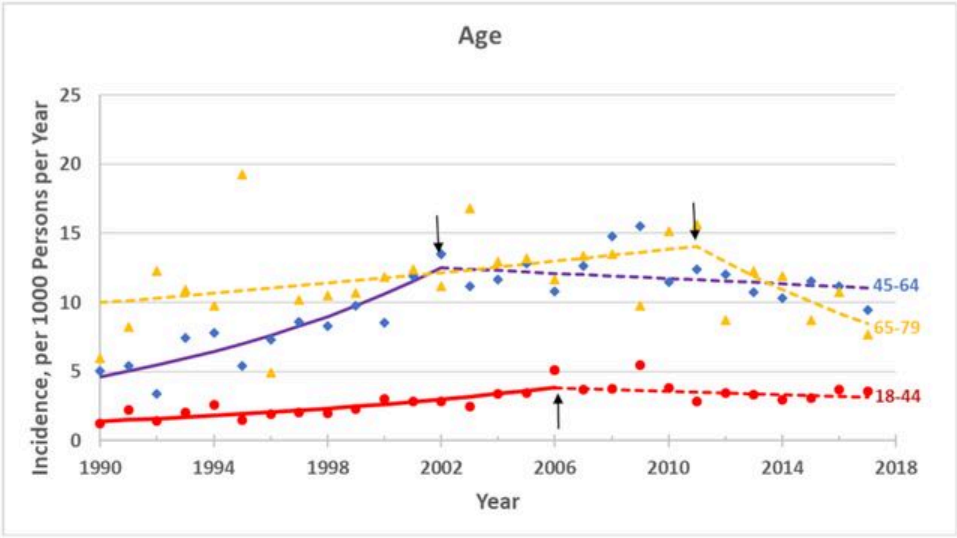


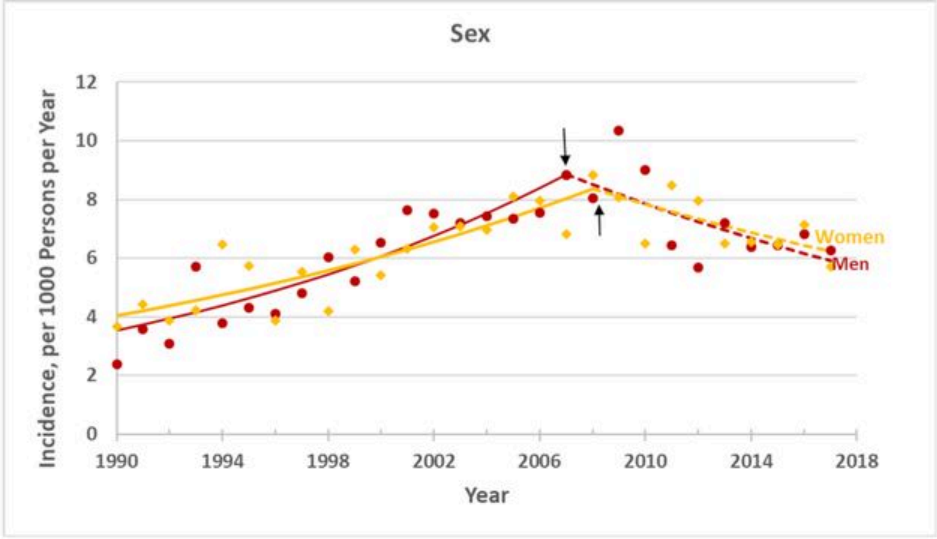


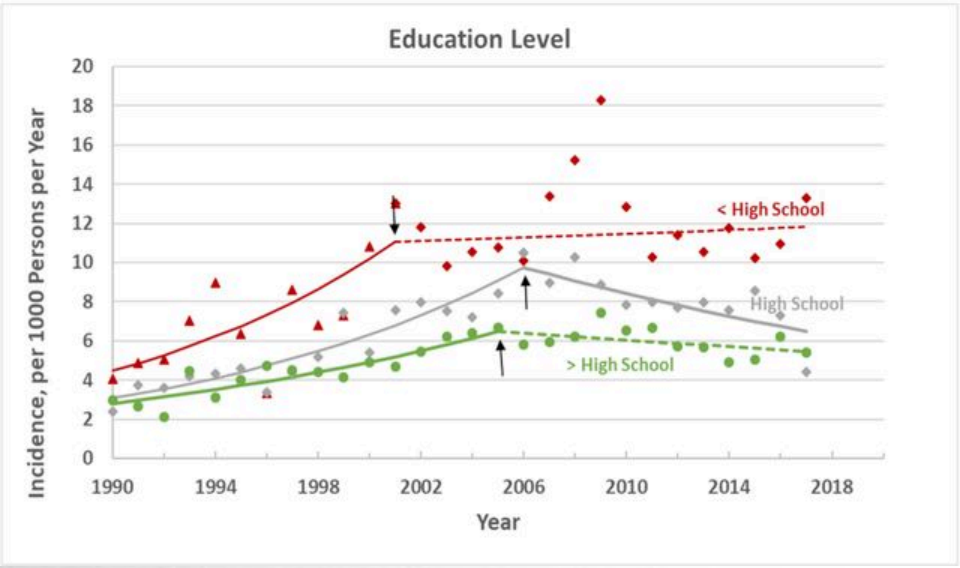
Stephen R Benoit et al. BMJ Open Diab Res Care 2019;7:e000657

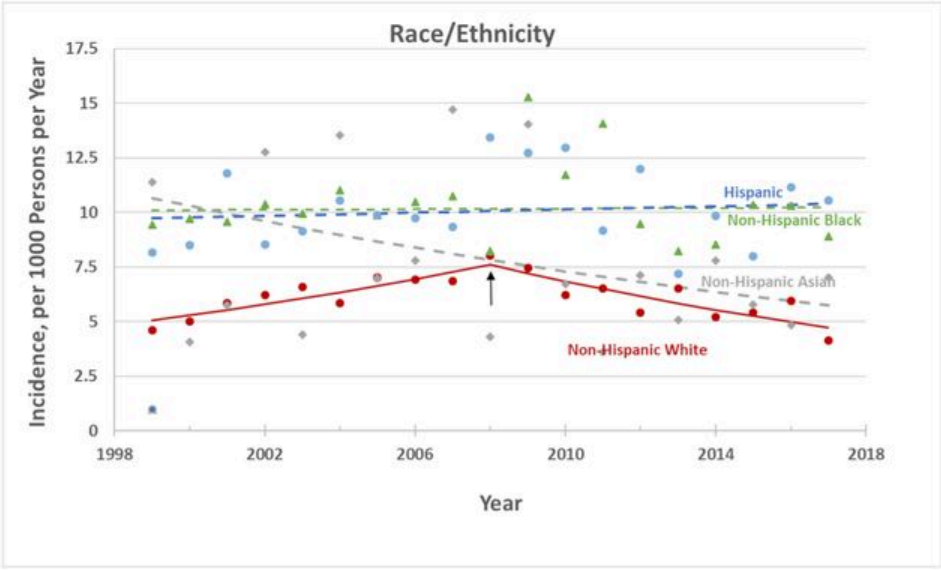
BMJ Open Diabetes Research & Care

Incidence - rate of newly diagnosed cases of diabetes
Prevalence - number of cases alive









Marked increase 1990 to 2007

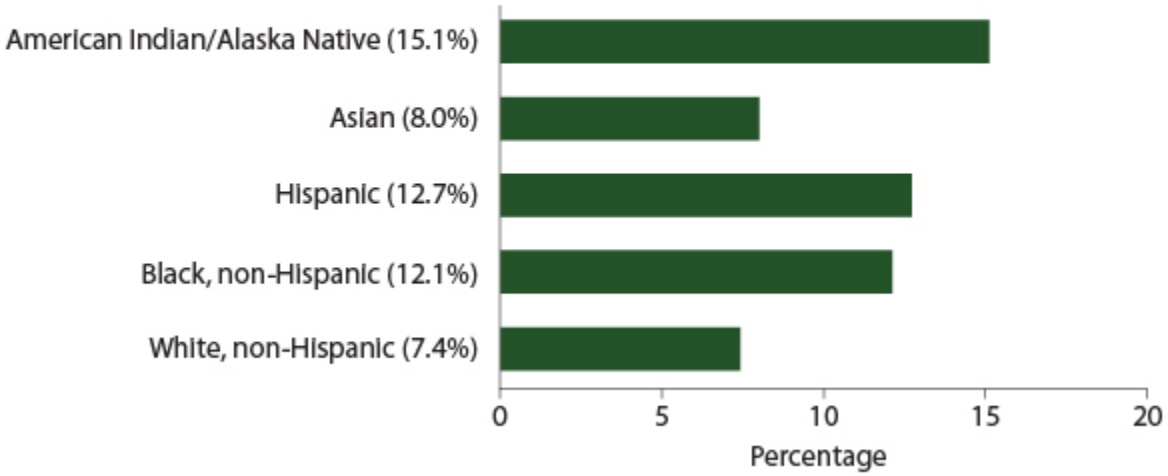
Incidence 2007 7.8 per 1000; 2017 6.0 per 1000

Driven by decrease in non-Hispanic white, higher educated

Racial & Ethnic Disparities

Percentage of US Adults Aged 18 or Older with Diagnosed Diabetes, by Racial and Ethnic Group, 2013-2015

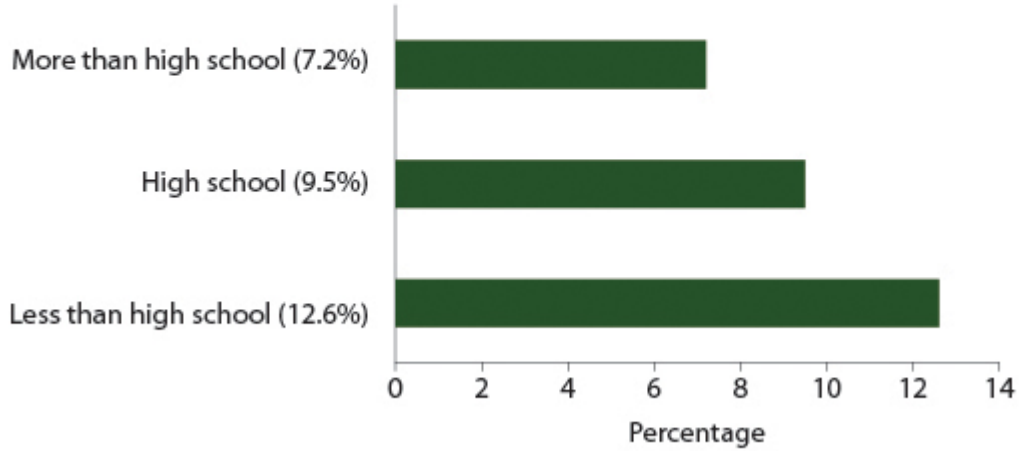
2017 Diabetes Report Card



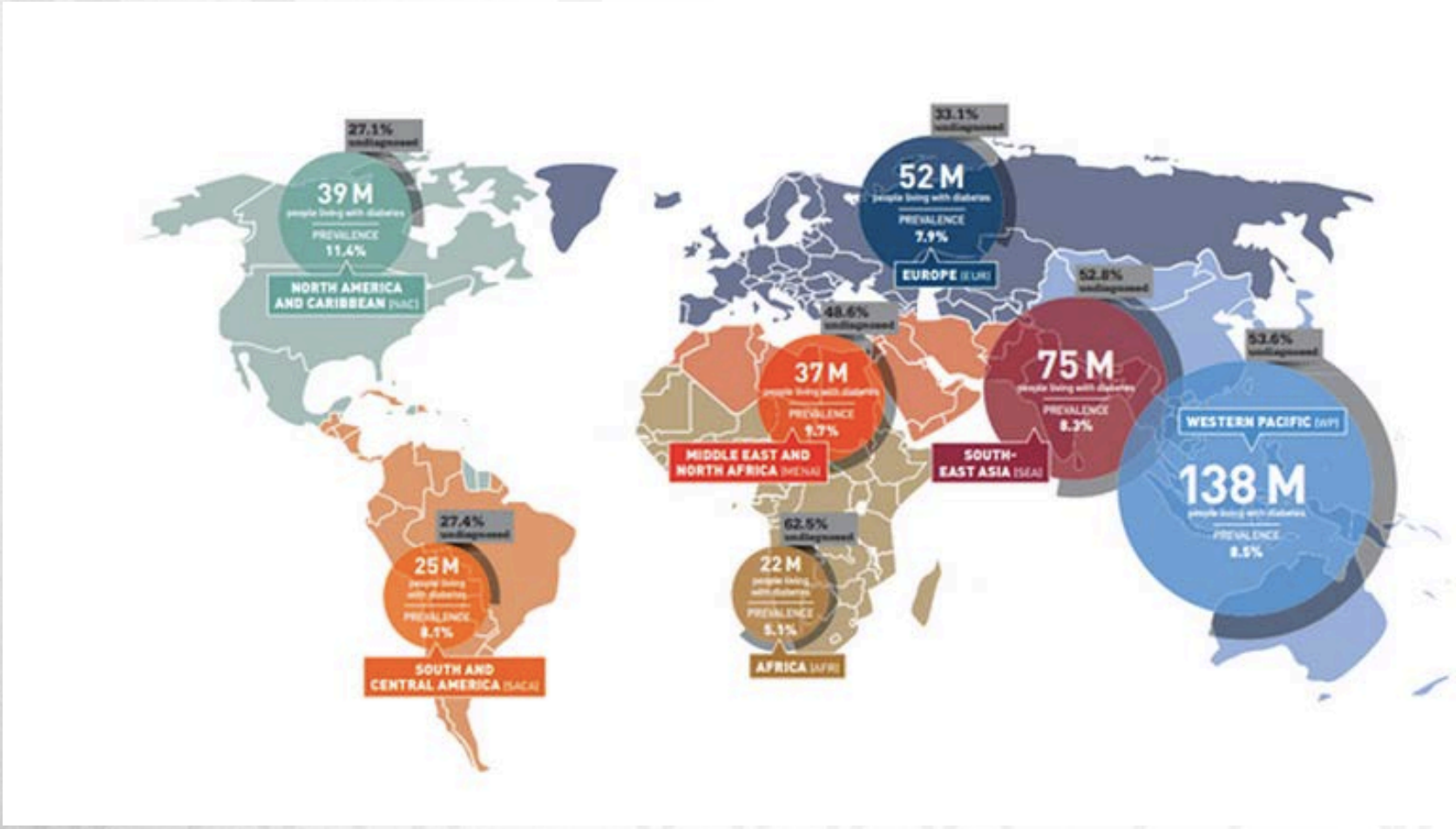
Education

Percentage of US Adults Aged 18 or Older with Diagnosed Diabetes, by Education Level, 2013-2015

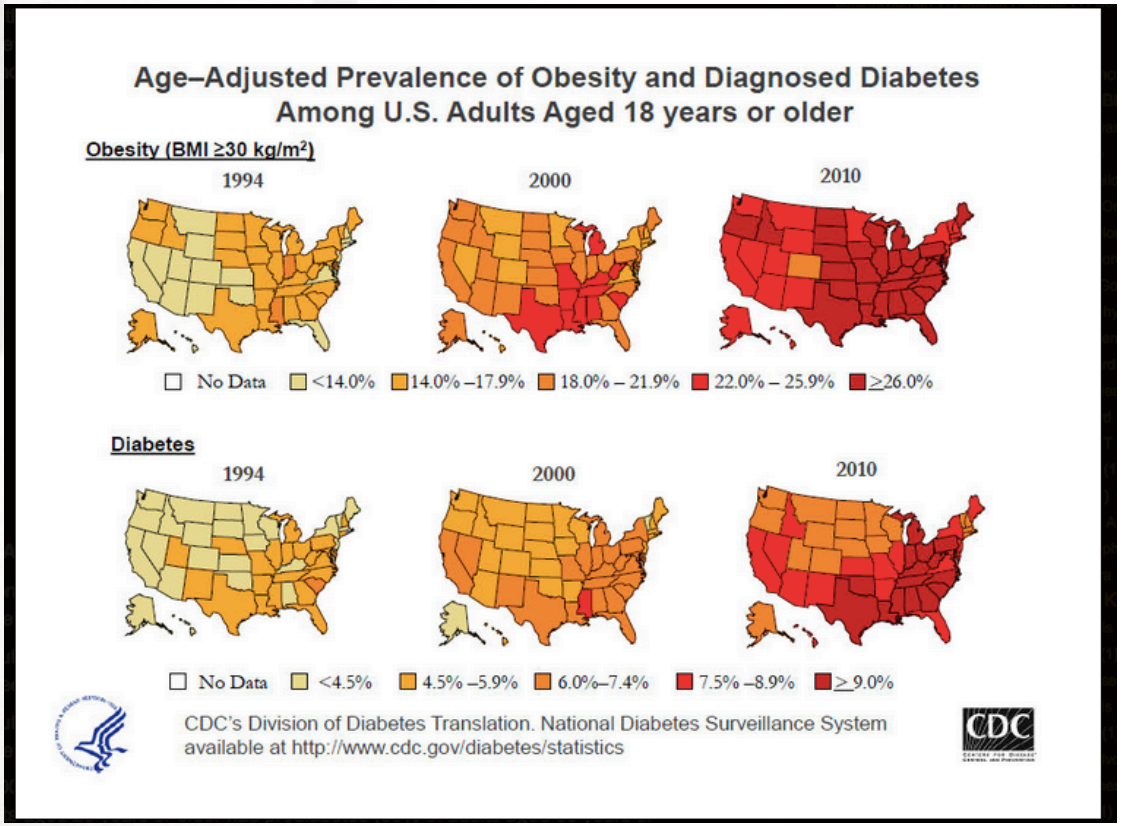
2017 Diabetes Report Card



Global Prevalence



Diabetes and Obesity



Although excess weight increases the rate of type 2 diabetes, it's worth remembering that most overweight people don't have diabetes, and many people with type 2 are of normal weight or only moderately overweight—so again, it's not clear-cut.

Cost of Diabetes (US):

Cost of Diabetes

Updated March 6, 2013

- $245 billion: Total costs of diagnosed diabetes in the United States in 2012
- $176 billion for direct medical costs
- $69 billion in reduced productivity

After adjusting for population age and sex differences, average medical expenditures among people with diagnosed diabetes were 2.3 times higher than what expenditures would be in the absence of diabetes.

Types of Diabetes

TYPES OF DIABETES

TYPE 1

BODY DOESN'T MAKE ENOUGH INSULIN

- Can develop at any age
- No known way to prevent it

Nearly 18,000 youth diagnosed each year in 2011 and 2012

In adults, type 1 diabetes accounts for approximately

5%

of all diagnosed cases of diabetes

TYPE 2

BODY CAN'T USE INSULIN PROPERLY

- Can develop at any age
- Most cases can be prevented

In adults, type 2 diabetes accounts for approximately

95%

of all diagnosed cases of diabetes

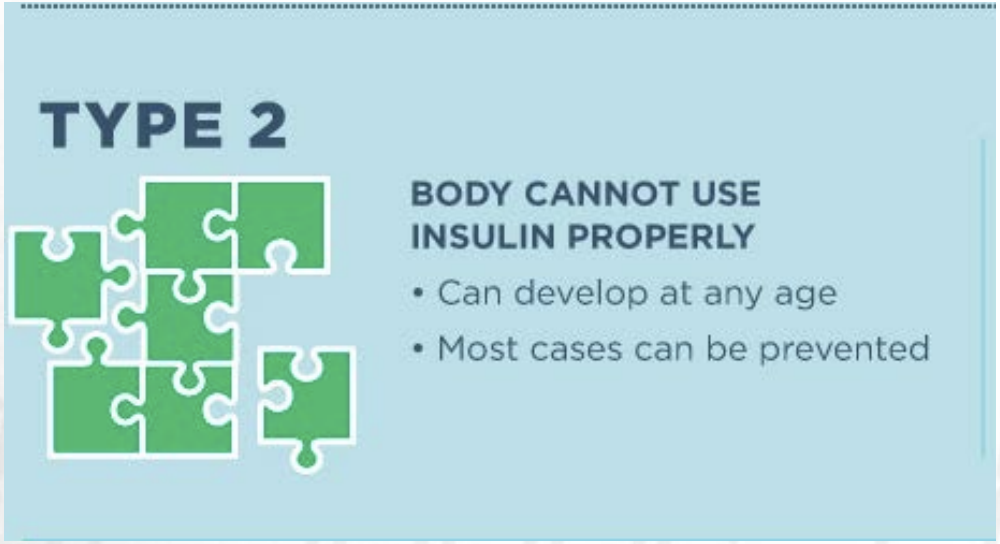
More than 5,000 youth diagnosed each year in 2011 and 2012

1.5 MILLION

People 18 years and older diagnosed in 2015

Type 2 Diabetes

- Most common form of diabetes – about 90% of cases
- Previously called adult onset, non insulin dependent diabetes
- Body produces insulin, but does not use it properly
  - glucose doesn't move into cells, they pile up in the bloodstream
- sx's when they do occur are often ignored because they may not seem serious

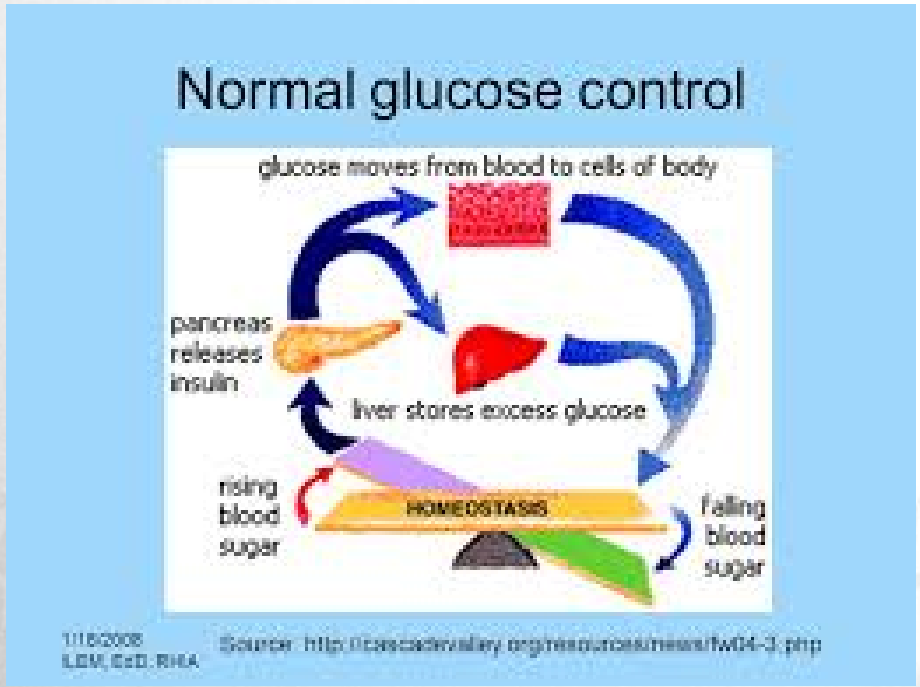


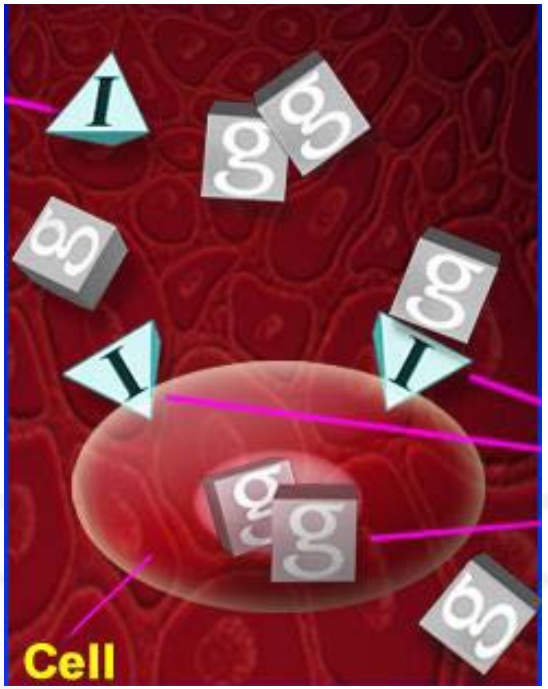
What Happens When We Eat?

After eating, most food turns into glucose, the body's main source of energy.

Normal Blood Glucose Control

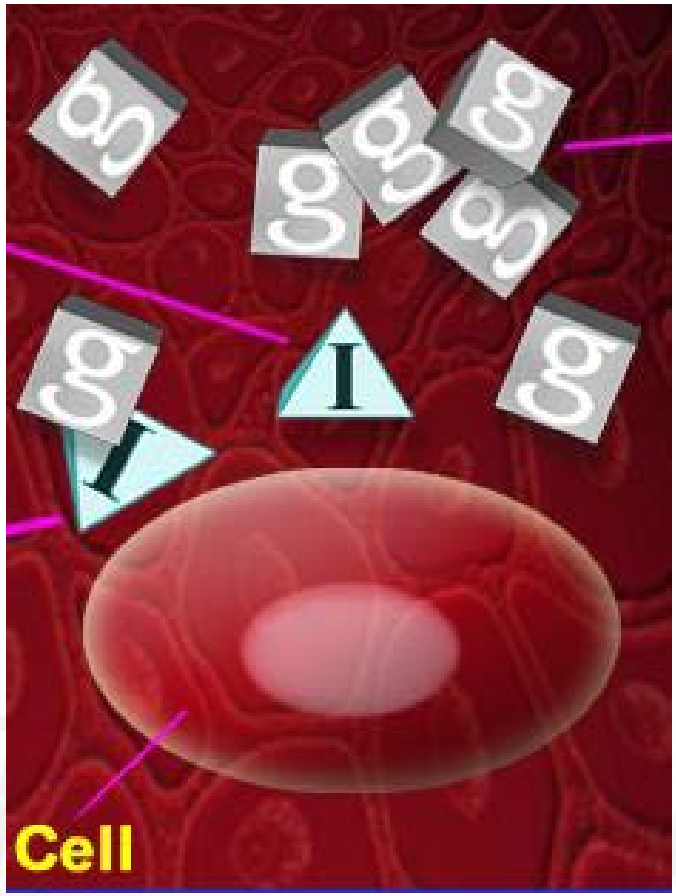
- In people without diabetes, glucose stays in a healthy range because
  - Insulin is released at the right time and in right amounts
  - Insulin helps glucose enter cells



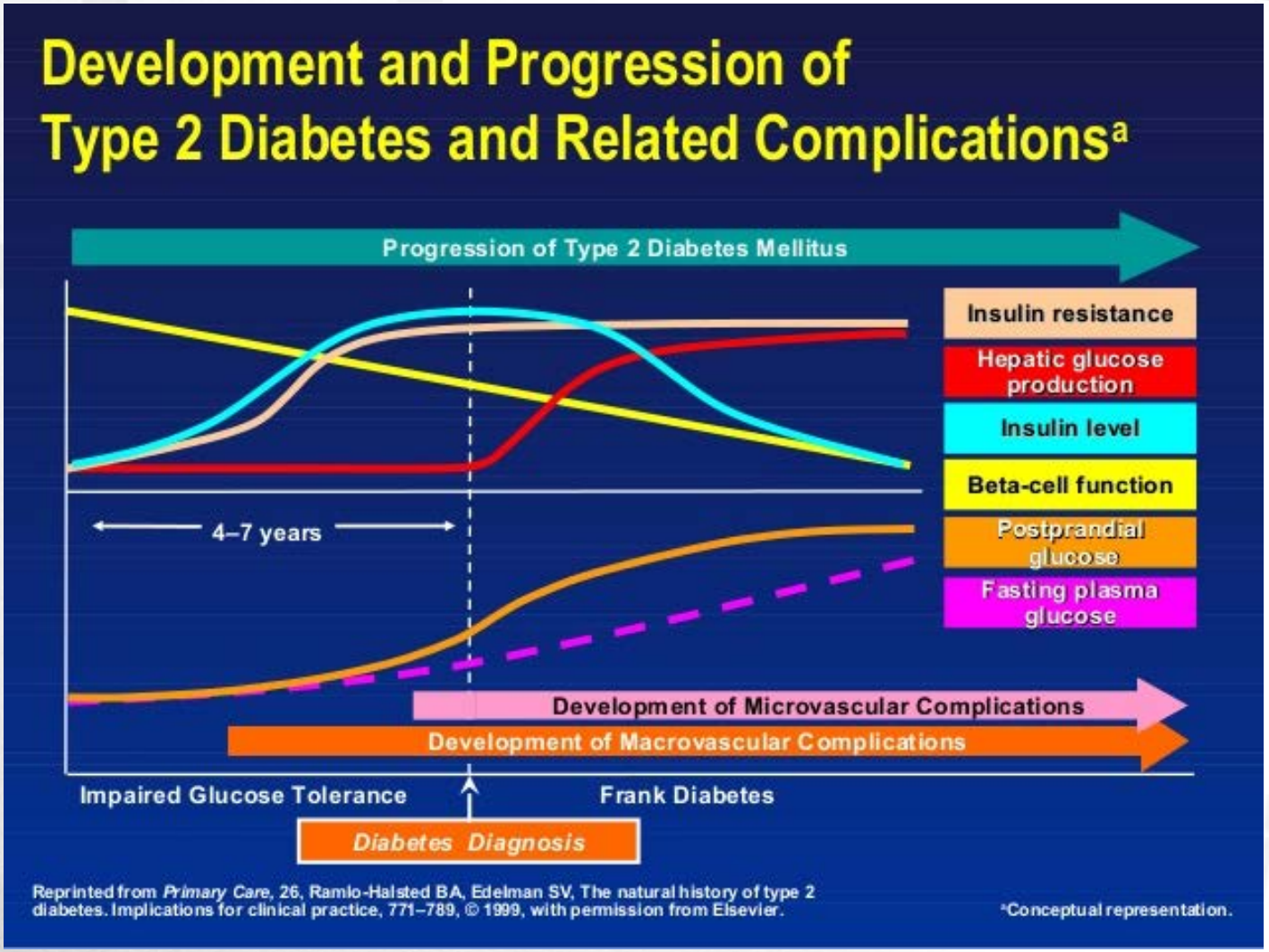


High Blood Glucose (Hyperglycemia)

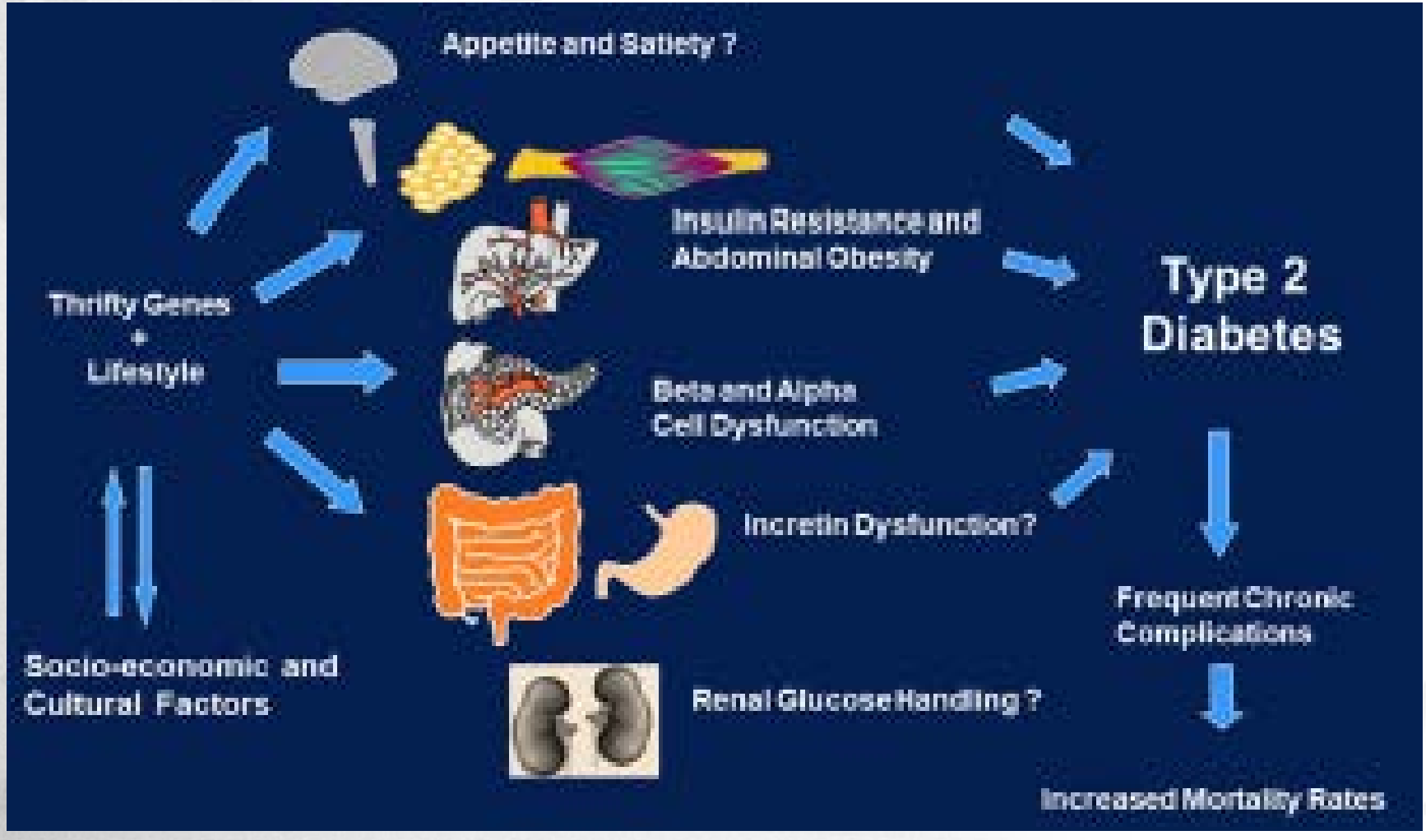
- In diabetes, blood glucose builds up for several possible reasons
  - Too little insulin is made
  - Cells can't use insulin well
  - Liver releases too much glucose



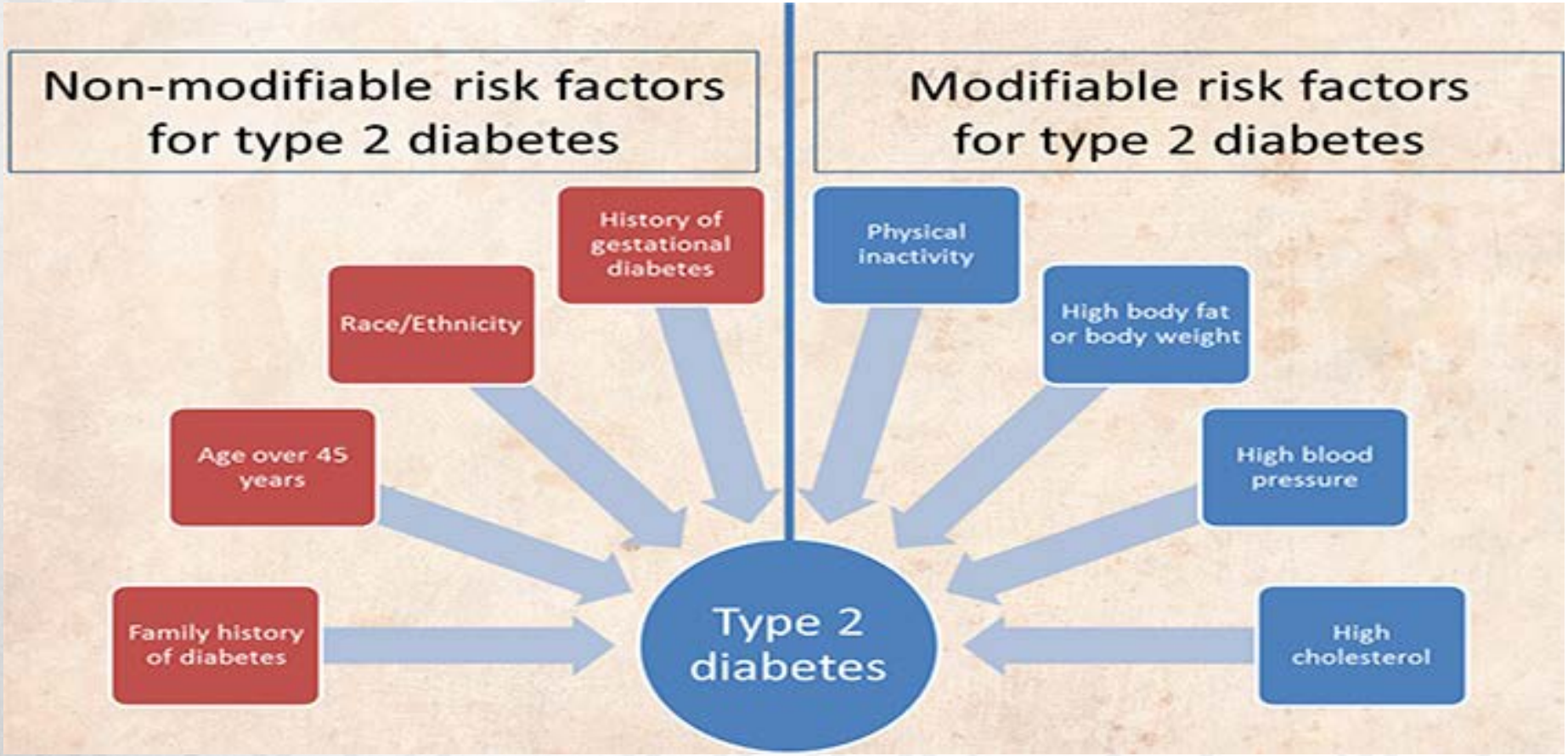
Development & Progression of T2D



Genes, Environment, Socio-Cultural Factors



Risk Factors for Diabetes?



Diagnostic Criteria

TABLE 3. Criteria for the Screening and Diagnosis of Diabetes

	Prediabetes	Diabetes
A1C	5.7–6.4%*	≥6.5%†
FPG	100–125 mg/dL (5.6–6.9 mmol/L)*	≥126 mg/dL (7.0 mmol/L)†
OGTT	140–199 mg/dL (7.8–11.0 mmol/L)*	≥200 mg/dL (11.1 mmol/L)†
RPG		≥200 mg/dL (11.1 mmol/L)‡

**For all three tests, risk is continuous, extending below the lower limit of the range and becoming disproportionately greater at the higher end of the range. †In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results from the same sample or in two separate samples. ‡Only diagnostic in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis. RPG, random plasma glucose.*

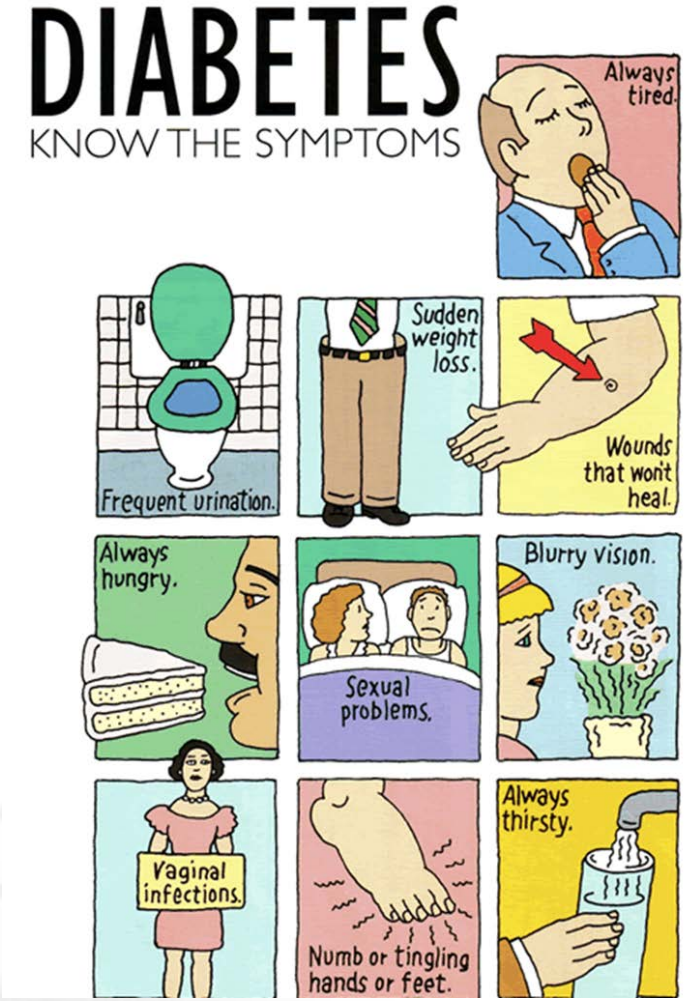
Diabetes: Myth and Facts

- *I can’t really have diabetes, I have not symptoms!*

- Fact: Many people have no symptoms. You can have diabetes for many years and not have any symptoms, diabetes can cause damage to your body.

Symptoms of Hyperglycemia

- Symptoms
  - Increased thirst (polydipsia)
  - Increased urination (polyuria)
  - Blurry vision
  - Feeling tired
  - Slow health of wounds/cuts
  - More frequent infections
  - Weight loss



Diabetes Related Complications

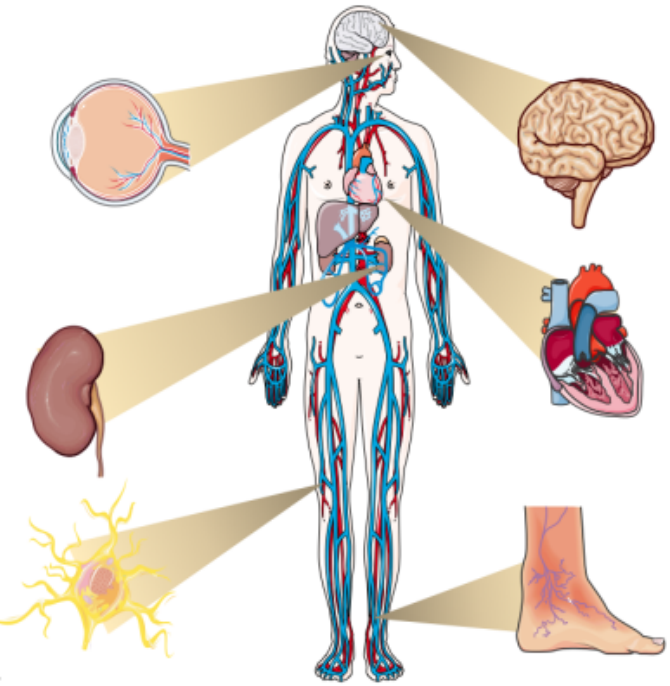
Major Complications of Diabetes

Microvascular

Eye
High blood glucose and high blood pressure can damage eye blood vessels, causing retinopathy, cataracts and glaucoma

Kidney
High blood pressure damages small blood vessels and excess blood glucose overworks the kidneys, resulting in nephropathy.

Neuropathy
Hyperglycemia damages nerves in the peripheral nervous system. This may result in pain and/or numbness. Feet wounds may go undetected, get infected and lead to gangrene.



Macrovascular

Brain
Increased risk of stroke and cerebrovascular disease, including transient ischemic attack, cognitive impairment, etc.

Heart
High blood pressure and insulin resistance increase risk of coronary heart disease

Extremities
Peripheral vascular disease results from narrowing of blood vessels increasing the risk for reduced or lack of blood flow in legs. Feet wounds are likely to heal slowly contributing to gangrene and other complications.

Disparities

Type 2 Diabetes and its Complications in Minorities

- Disparate and Disproportionate prevalence of longterm complications of type 2 diabetes in minorities vs Whites
  - lower leg amputations 2-4x
  - retinopathy and blindness 2-4x
  - stroke 2x
  - ESRD 4-6x

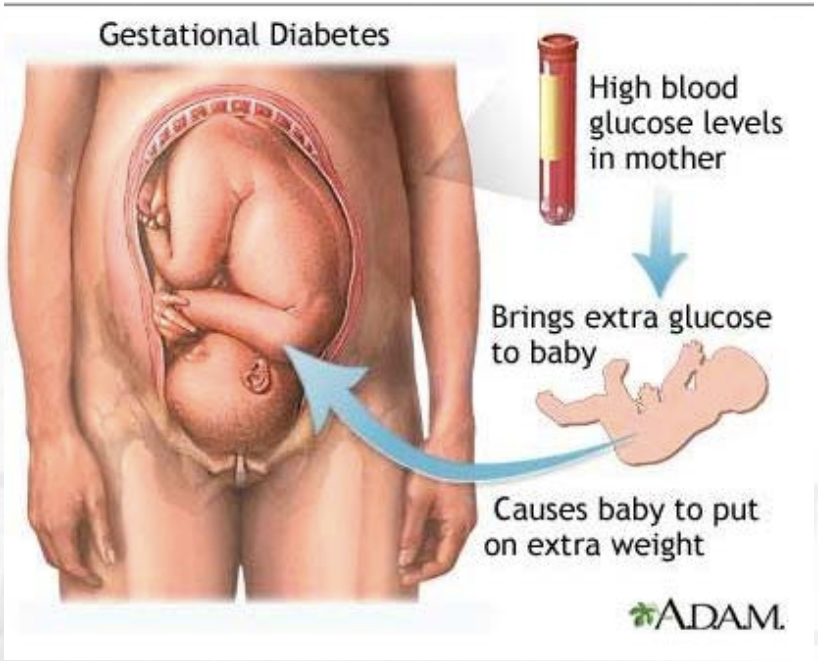
Caballero AE. Diabetes in minority populations.
In: Joslin's Diabetes Mellitus. LW & W; 2005. 14th Ed. p 505-524.

Type 1 Diabetes

- Also known as juvenile diabetes
- Usually diagnosed in children and young adults
- When body's own immune system destroys the insulin producing cells of the pancreas – beta cells – which produce insulin
- Only 5% of people have this disease
- Body does not produce insulin
- Is not preventable
  - No primary intervention
- Causes?
  - Predisposition to diabetes – genetics - and something (i.e. weather, virus ... etc) in environment triggers the disease

Gestational Diabetes Mellitus (GDM)

- Having diabetes during pregnancy
  - Family Hx of diabetes, overweight prior to pregnancy, age?
- Having gestational diabetes puts you at risk for diabetes type 2
- Giving birth to a baby >9 lbs also puts you at risk for type 2
- 18 out of every 100 pregnant females will develop GDM



Gestational Diabetes

Table 2.6—Screening for and diagnosis of GDM

One-step strategy

Perform a 75-g OGTT, with plasma glucose measurement when patient is fasting and at 1 and 2 h, at 24–28 weeks of gestation in women not previously diagnosed with diabetes.

The OGTT should be performed in the morning after an overnight fast of at least 8 h.

The diagnosis of GDM is made when any of the following plasma glucose values are met or exceeded:

- Fasting: 92 mg/dL (5.1 mmol/L)
- 1 h: 180 mg/dL (10.0 mmol/L)
- 2 h: 153 mg/dL (8.5 mmol/L)

Two-step strategy

Step 1: Perform a 50-g GLT (nonfasting), with plasma glucose measurement at 1 h, at 24–28 weeks of gestation in women not previously diagnosed with diabetes.

If the plasma glucose level measured 1 h after the load is ≥130 mg/dL, 135 mg/dL, or 140 mg/dL (7.2 mmol/L, 7.5 mmol/L, or 7.8 mmol/L, respectively), proceed to a 100-g OGTT.

Step 2: The 100-g OGTT should be performed when the patient is fasting.

The diagnosis of GDM is made if at least two* of the following four plasma glucose levels (measured fasting and 1 h, 2 h, 3 h during OGTT) are met or exceeded:

	Carpenter-Coustan (86)	or	NDDG (87)
• Fasting	95 mg/dL (5.3 mmol/L)		105 mg/dL (5.8 mmol/L)
• 1 h	180 mg/dL (10.0 mmol/L)		190 mg/dL (10.6 mmol/L)
• 2 h	155 mg/dL (8.6 mmol/L)		165 mg/dL (9.2 mmol/L)
• 3 h	140 mg/dL (7.8 mmol/L)		145 mg/dL (8.0 mmol/L)

NDDG, National Diabetes Data Group. *ACOG notes that one elevated value can be used for diagnosis (82).

Blood Glucose Targets

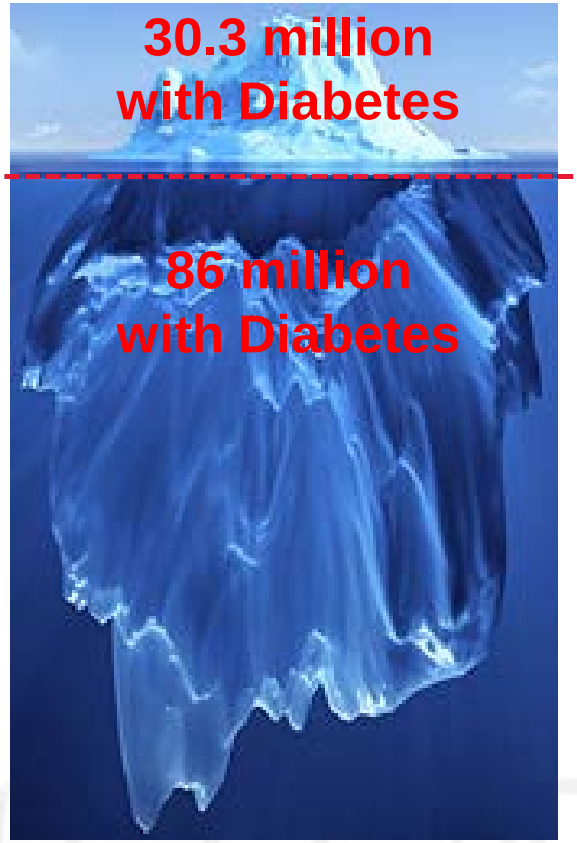
- Fasting <95 mg/dL (5.3 mmol/L) and either
- One-hour postprandial <140 mg/dL (7.8 mmol/L) or
- Two-hour postprandial <120 mg/dL (6.7 mmol/L)

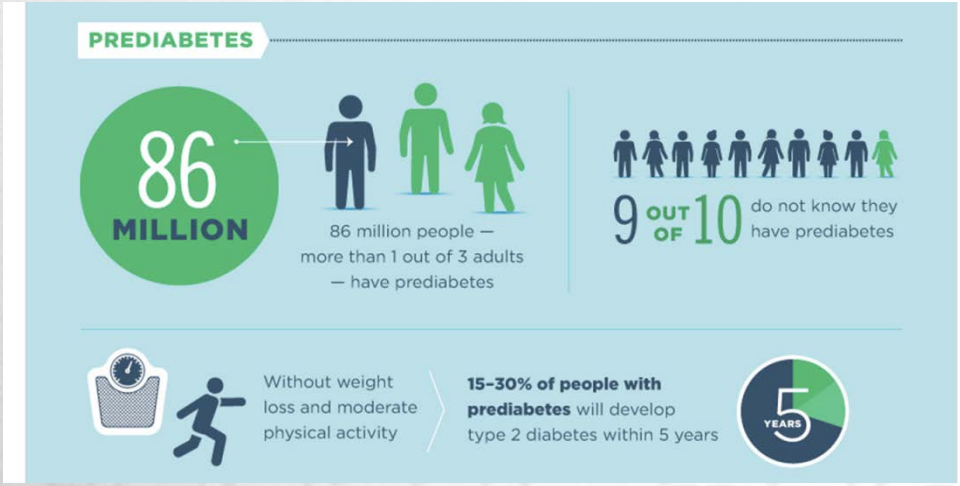
Prevention/Treatment of GDM

- Preconception planning
- Gestational diabetes:
  - Physical activity
    - Researchers found being physically active before and after their pregnancy reduced their risk of GDM by about 70% or more
  - Diet
    - A study showed that each 10 gram increase in fiber a day reduced their risk of GDM by 26%

Prediabetes

- When your blood sugar level is higher than normal but not high enough to be diagnosed with type 2 diabetes





Are You at Risk for Diabetes?

ARE YOU AT RISK FOR

TYPE 2 DIABETES?

American Diabetes Association.

Diabetes Risk Test

1. **How old are you?**
   Less than 40 years (0 points)
   40—49 years (1 point)
   50—59 years (2 points)
   60 years or older (3 points)

2. **Are you a man or a woman?**
   Man (1 point) Woman (0 points)

3. **If you are a woman, have you ever been diagnosed with gestational diabetes?**
   Yes (1 point) No (0 points)

4. **Do you have a mother, father, sister, or brother with diabetes?**
   Yes (1 point) No (0 points)

5. **Have you ever been diagnosed with high blood pressure?**
   Yes (1 point) No (0 points)

6. **Are you physically active?**
   Yes (0 points) No (1 point)

7. **What is your weight status?** *(see chart at right)*

Write your score in the box.

Height	Weight (lbs.)		
4' 10"	119-142	143-190	191+
4' 11"	124-147	148-197	198+
5' 0"	128-152	153-203	204+
5' 1"	132-157	158-210	211+
5' 2"	136-163	164-217	218+
5' 3"	141-168	169-224	225+
5' 4"	145-173	174-231	232+
5' 5"	150-179	180-239	240+
5' 6"	155-185	186-246	247+
5' 7"	159-190	191-254	255+
5' 8"	164-196	197-261	262+
5' 9"	169-202	203-269	270+
5' 10"	174-208	209-277	278+
5' 11"	179-214	215-285	286+
6' 0"	184-220	221-293	294+
6' 1"	189-226	227-301	302+
6' 2"	194-232	233-310	311+
6' 3"	200-239	240-318	319+
6' 4"	205-245	246-327	328+
	(1 Point)	(2 Points)	(3 Points)

You weigh less than the amount in the left column (0 points)

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009.
Original algorithm was validated without gestational diabetes as part of the model.

Add up your score.

If you scored 5 or higher:
You are at increased risk for having type 2 diabetes. However, only your doctor can tell for sure if you do have type 2 diabetes or prediabetes (a condition that precedes type 2 diabetes in which blood glucose levels are higher than normal). Talk to your doctor to see if additional testing is needed.

Type 2 diabetes is more common in African Americans, Hispanics/Latinos, American Indians, and Asian Americans and Pacific Islanders.

Higher body weights increase diabetes risk for everyone. Asian Americans are at increased diabetes risk at lower body weights than the rest of the general public (about 15 pounds lower).

For more information, visit us at diabetes.org or call 1-800-DIABETES (1-800-342-2383)

Lower Your Risk

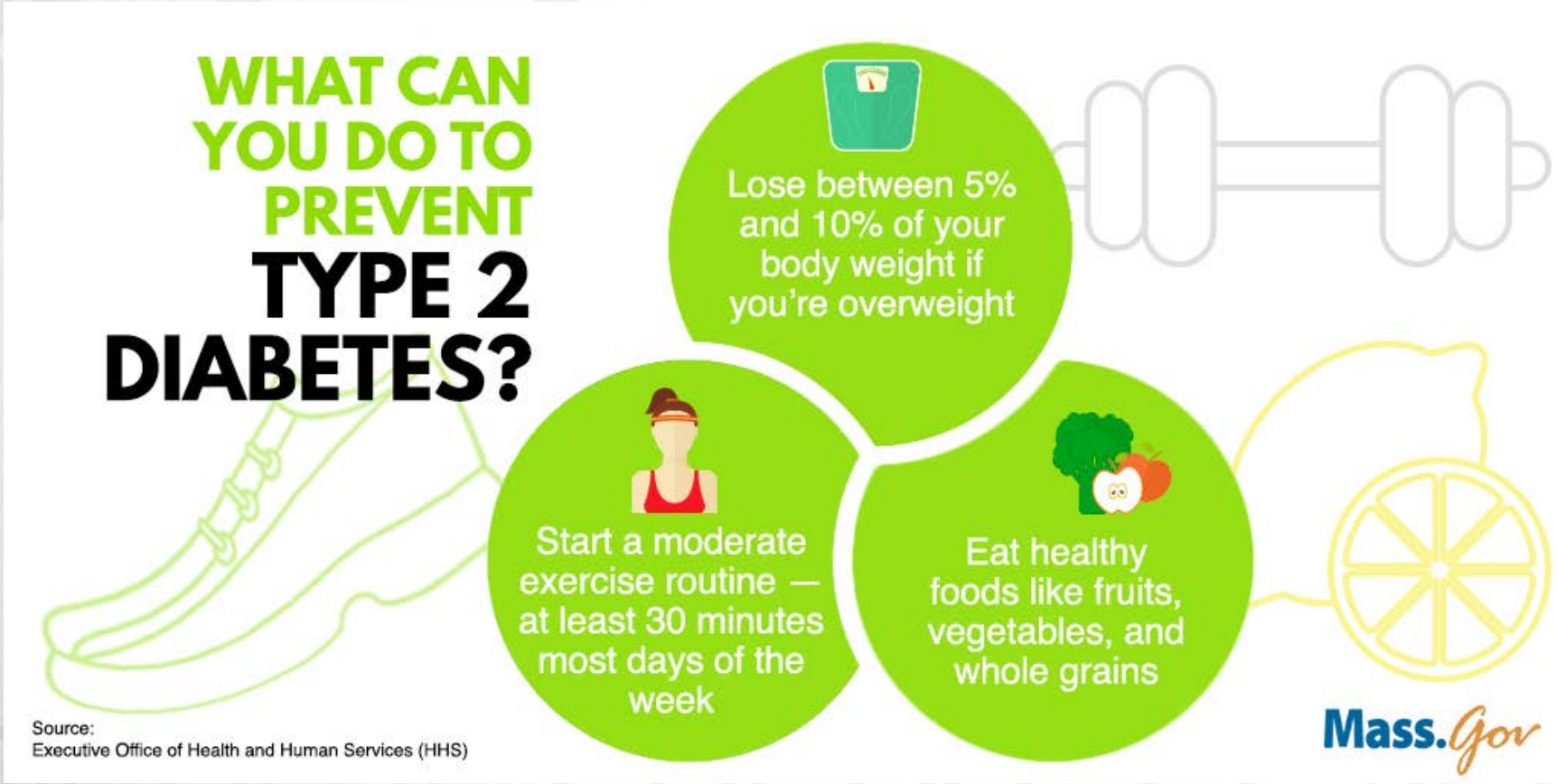
The good news is that you can manage your risk for type 2 diabetes. Small steps make a big difference and can help you live a longer, healthier life.

If you are at high risk, your first step is to see your doctor to see if additional testing is needed.

Visit diabetes.org or call 1-800-DIABETES (1-800-342-2383) for information, tips on getting started, and ideas for simple, small steps you can take to help lower your risk.

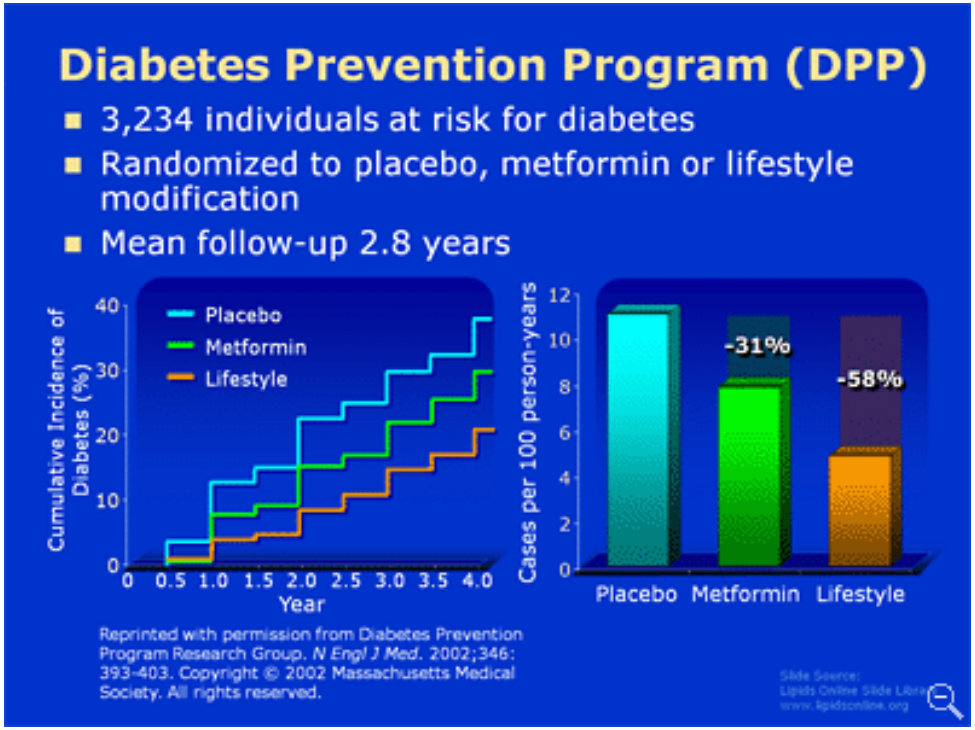
Visit us on Facebook
Facebook.com/AmericanDiabetesAssociation

Diabetes Prevention



Diabetes Prevention Program (DPP)

- 1-2 year program
  - Education, resources, social support, accountable
- Goals of DPP
  - 7% weight loss
  - 150 min. physical activity

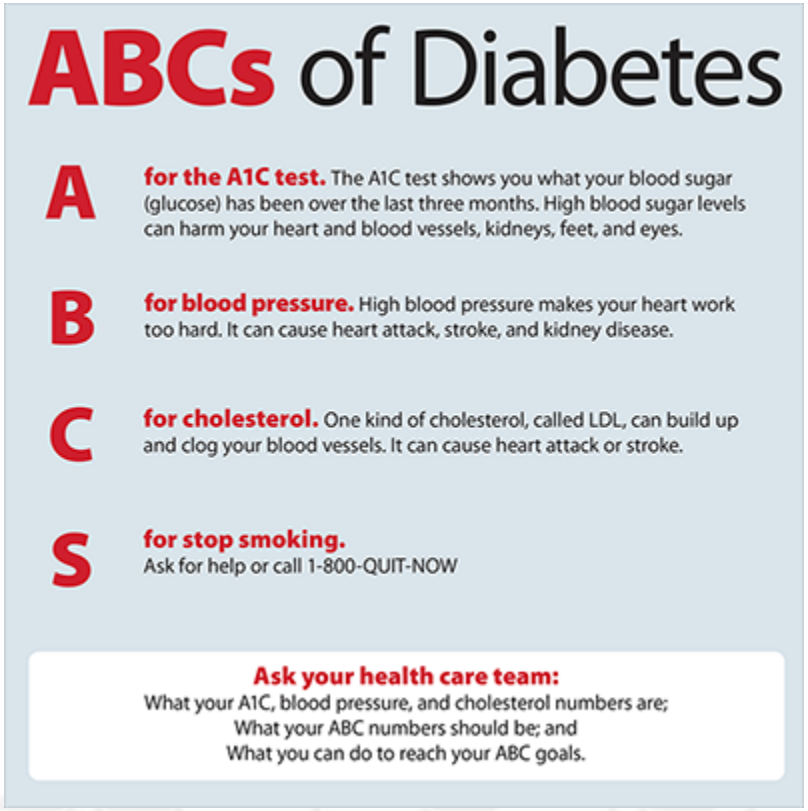


Treatment of Diabetes

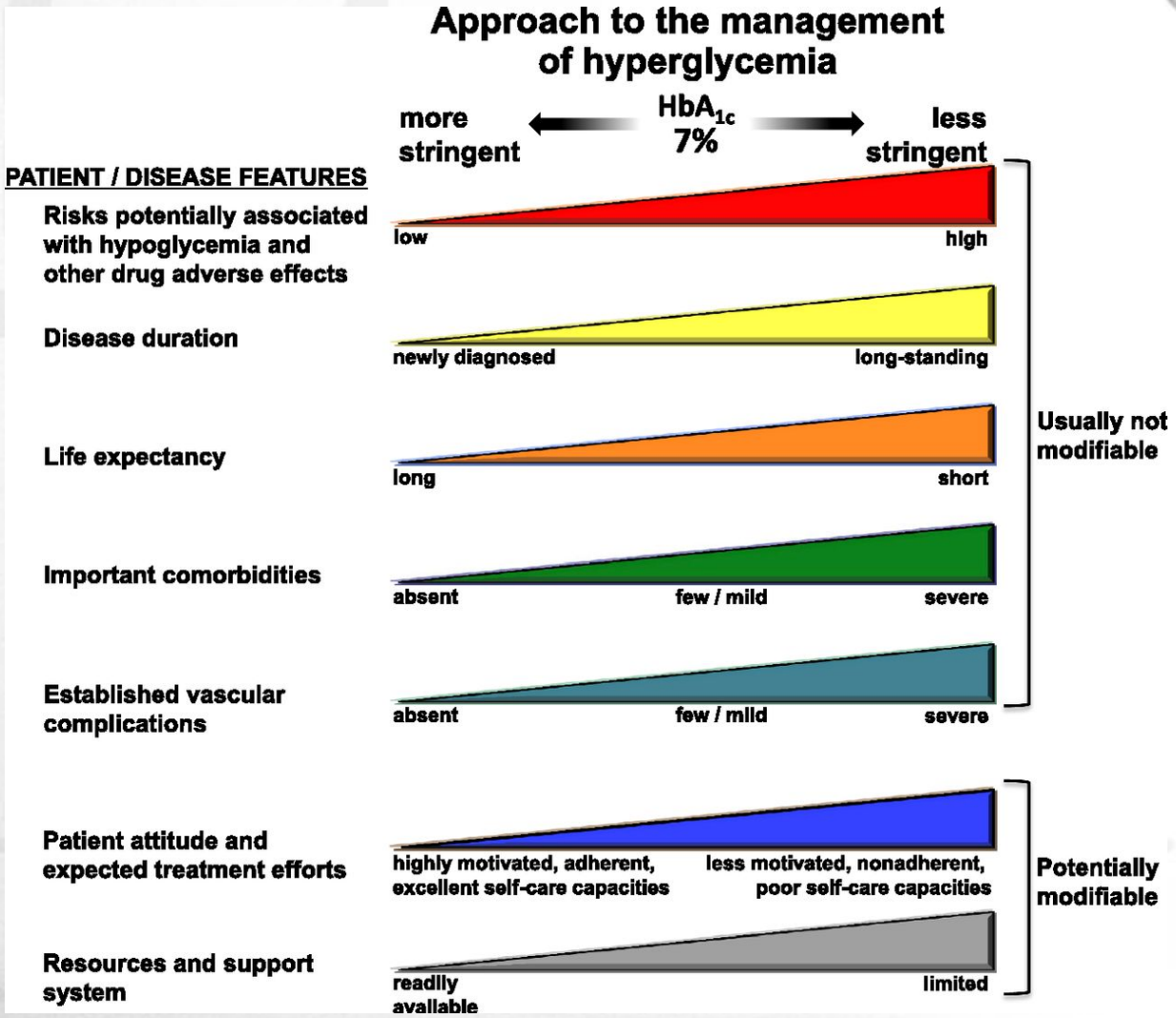
Early diagnosis, patient education and treatment pays off with longer life, increased productivity, QOF and decreased long-term cost.

Know you ABCs

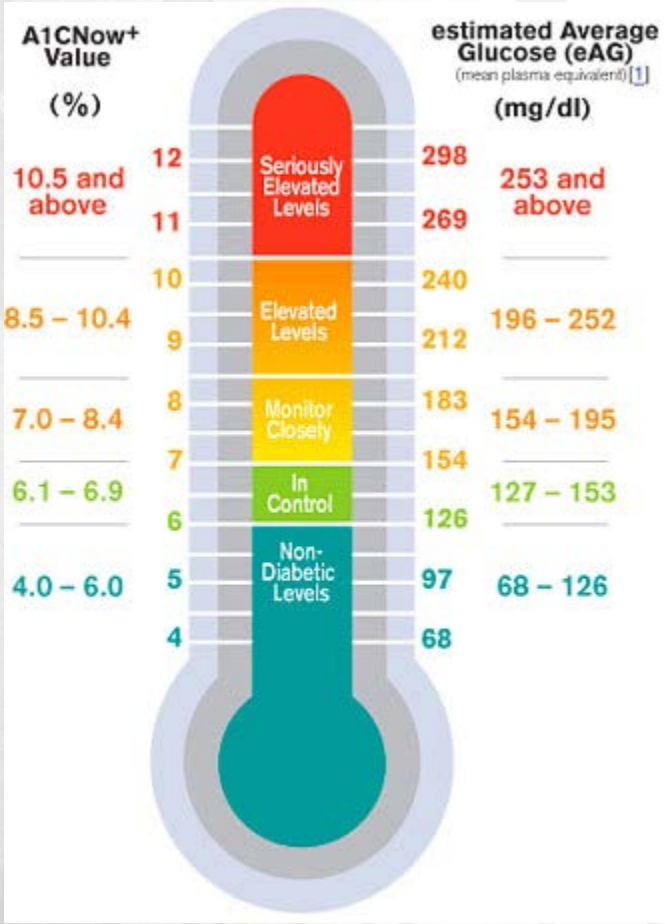
- A1c
  - Avg. blood sugar the past 2-3 mo.
  - Individualized <7%
  - At least 2x yr.
- Blood Pressure
  - Force of blood inside vessels
  - <130/80
  - Every medical visit
- Cholesterol
  - LDL “bad” <100 mg/dl
  - HDL “good” >50 women; >40 men
  - Triglycerides <150

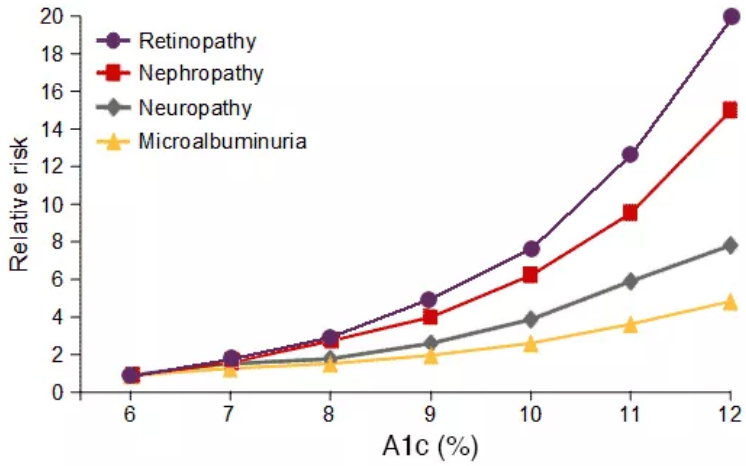


Individualized Care



A1c & Complications





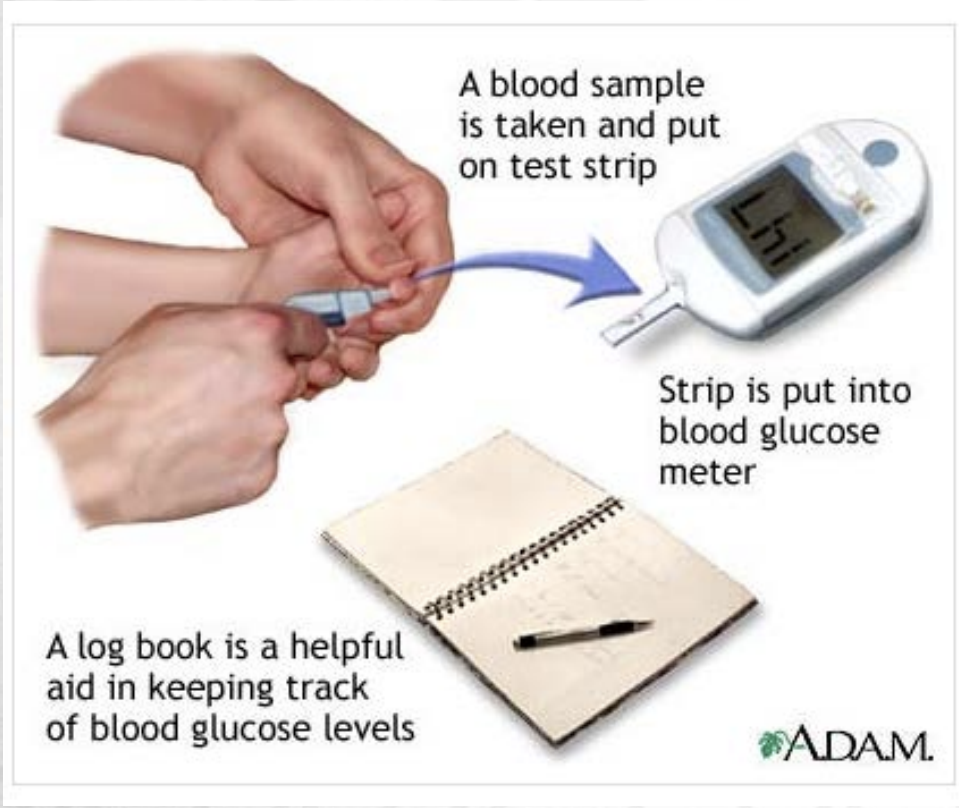
Diabetes: A Self-Management Disease

- Meal plan
- Activity plan
- Medications
- BG monitoring; logging and interpreting results
- Regular health care appt. and lab work
- Diabetes-related technology
- Sick day plan
- Daily foot care
- Skin and dental care

Role of Diabetes Educator

- Healthcare professional who practices across a wide range of primary roles (nurse, dietician, pharmacists, exercise specialists, etc.) and focus on helping people at risk and with diabetes achieve behavior change goals which lead to better clinical outcomes and improved health status.
  - Counsel persons on how to incorporate healthy eating and physical activity into their life,
  - monitor their glucose to avoid the risk of complications and give them the ability to
  - problem solve and adjust emotionally to their diabetes/prediabetes
  - Educate and prevent diabetes-related conditions (e.g. cardiometabolic)
  - Leverage technology-driven diabetes care, education, and support
  - Promote the integration of behavioral and mental health

Self-Monitoring (SMBG)



Blood Sugar Classification	Fasting Blood Sugar Levels	Post Meal Blood Sugar Levels
Normal	70-100 mg/dL	70-140 mg/dL
Prediabetes	101-125 mg/dL	141-200 mg/dL
Diabetes	125 mg/dL and above	200 mg/dL and above

Regular Care

DIABETES CARE SCHEDULE

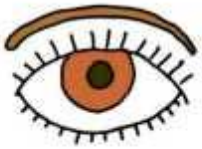
TAKE GOOD CARE OF YOURSELF

Every 3 Months

- Regular doctor's office visit
- A1C blood test
  Every 3 months if your blood sugar (glucose) number is *too high*
- Blood pressure check
- Weight check
- Foot check

Every 6 Months

- A1C blood test
  Every 6 months if your blood sugar (glucose) number is *good*
- Teeth and gums exam by your dentist



Every Year

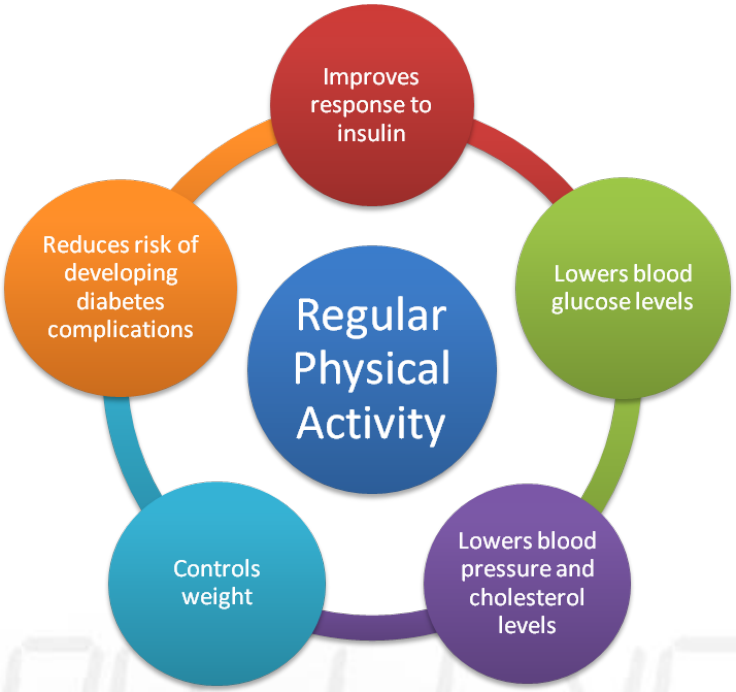
- Physical check-up (exam) by your doctor
- Complete foot exam
- Check cholesterol and other body fats (lipid profile test)
- Complete (dilated) eye exam by an eye doctor
- Flu shot
- Kidney tests

Provided as a FREE educational service by www.learningaboutdiabetes.com.
Always talk to your doctor or other member of your diabetes-care team before making any changes in your diabetes treatment plan.

Stretch Break

Diabetes: Myth or Fact

- It is dangerous for people with diabetes to exercise



Benefits of Exercise

Beneficial

Fitness

Insulin requirement

Lipids

Endothelial function

Mortality

Insulin resistance

CVD

Well-being

Uncertain or limited data

Microvascular disease

Osteoporosis

Cancer

Beta cell function

Blood pressure

Glycaemic control

Type 1 diabetes

Beneficial

Fitness

Insulin requirement

Lipids

Endothelial function

Mortality

Insulin resistance

CVD

Blood pressure

Beta cell function

Glycaemic control

Type 2 diabetes

Uncertain or limited data

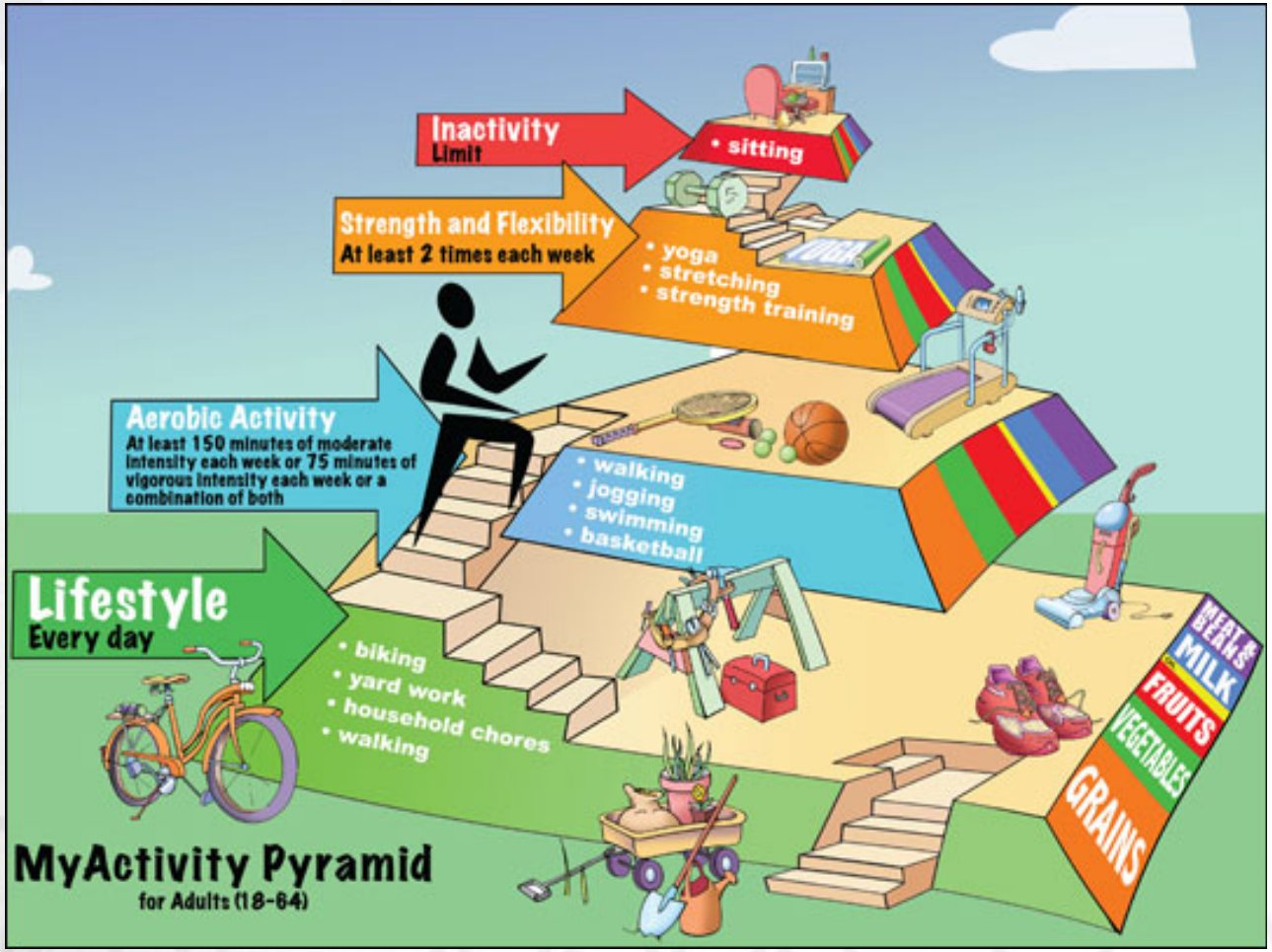
Microvascular disease

Osteoporosis

Cancer

Well-being

Be Active Your Way



Medication

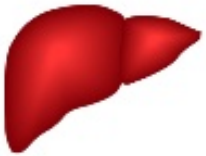
Type 2 Diabetes Medications

Drug Sites of Action

Glucose absorption:

GLP-1, DPP-IV inhibitors *delay gastric emptying*

Alpha glucosidase inhibitors-*block breakdown of complex carbs into glucose*



Liver-*glucose production*:

Metformin (biguanide)

Muscle- *improved insulin sensitivity*: thiazolidinediones (TZDs), metformin (lesser effect)

Pancreas- *increased insulin secretion-* Sulfonylureas, non-sulf. insulin secretagogues, GLP-1, and DPP-IV inhibitors

Kidney- *increased glucose and sodium excretion-* Sodium-glucose co-transporter 2 (SGLT2) inhibitors

Oral Medications

TYPES AND NAMES OF DIABETES MEDICATIONS*	
CLASS	BRAND NAMES
Biguanides	Glucophage, Fortamet
GLP-1 receptoragonists	Trulicity, Tanzeum, Bydureon, Victoza
DPP-IV inhibitors	Januvia, Onglyza, Nesina
SGLT-2 inhibitors	Invokana, Farxiga, Jardiance
Sulfonylureas	Amaryl, Glucotrol, DiaBeta, Glynase
Insulin	Tresiba, Toujeo, Afrezza, Levemir, Lantus
Combination drugs	Janumet, Jentadueto, Kombiglyze, Tradjenta, Kazano, Oseni

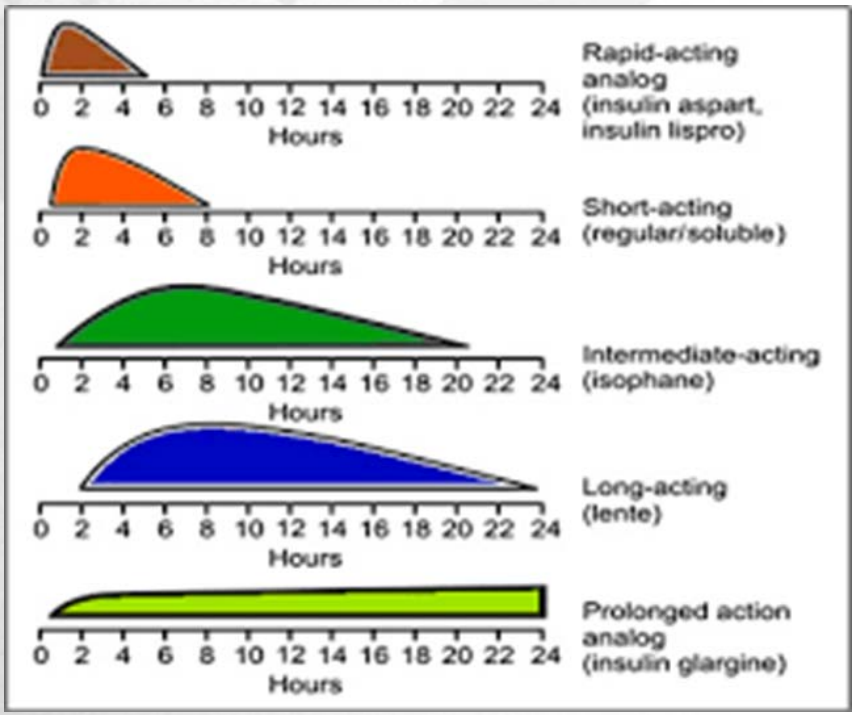
*This chart provides examples of some, but not all, medications used to treat diabetes.

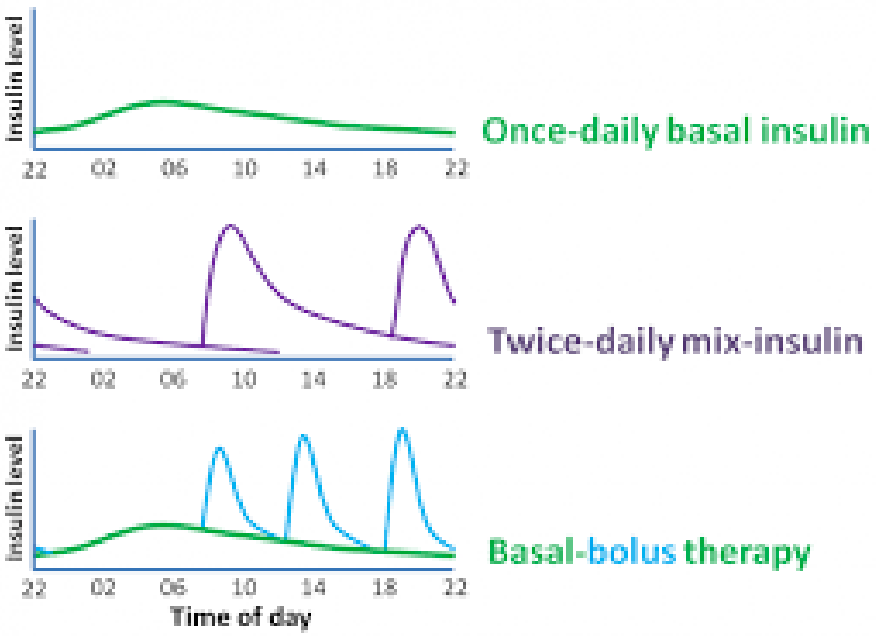
Diabetes: Myth or Fact

- Taking insulin means my diabetes is out of control

- Fact: For some people, oral medication are not the answer to managing their blood sugar-insulin may be the best way to manage blood sugar.

Insulin Profile & Regimen



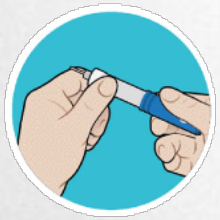


Administering Insulin

If You Use Insulin Pens

Step 1

Remove the pen cap and wipe the top of the pen with an alcohol swab to clean the area.

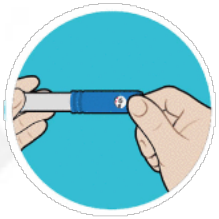


Step 2

Remove the paper tab from the pen needle, then screw the needle tightly onto the top of the pen.

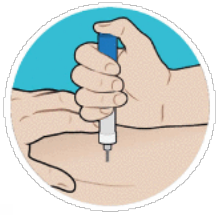
Step 3

Prime your pen to remove air from the needle and insulin: Dial 2 units of insulin, hold the pen vertically with the tip facing the ceiling, and press the dose button. You should see a drop or stream of insulin at the tip of the pen needle. If you don't, which is common the first time you prime a pen, repeat the process until a drop appears.



Step 4

Set your dose. If you take 6 units of insulin, for instance, you'll dial to 6 in the dose window.



Step 5

Holding your pen at a 90-degree angle over your injection site, push the needle into the skin. Press the dose button.

Step 6

Hold your pen still for about 10 seconds to make sure all the insulin is delivered. Remove the needle from your skin.

Step 7

Put the plastic cap on the end of the needle, unscrew the needle from the pen, and dispose of it in your sharps container. Recap your pen.

Administering Insulin

If You Use Vials and Syringes

Step 1
Clean the top of the vial with an alcohol pad, then remove the cap from the syringe needle.

Step 2
Draw air into your syringe—an amount equal to the units of insulin you'll be injecting. To do so, pull back the syringe's plunger until its black stopper reaches your insulin dose amount on the syringe barrel. So if you will be taking 6 units of insulin, pull back the plunger until the stopper hits the 6 etched onto the barrel.

Step 3
Put the vial on a flat surface and hold it. Insert the syringe into the vial, and press down on the plunger to inject the air from Step 2 back into the vial.

Step 4
With the syringe still in the bottle, turn the vial and syringe upside down. The tip of the needle should be fully covered by insulin.

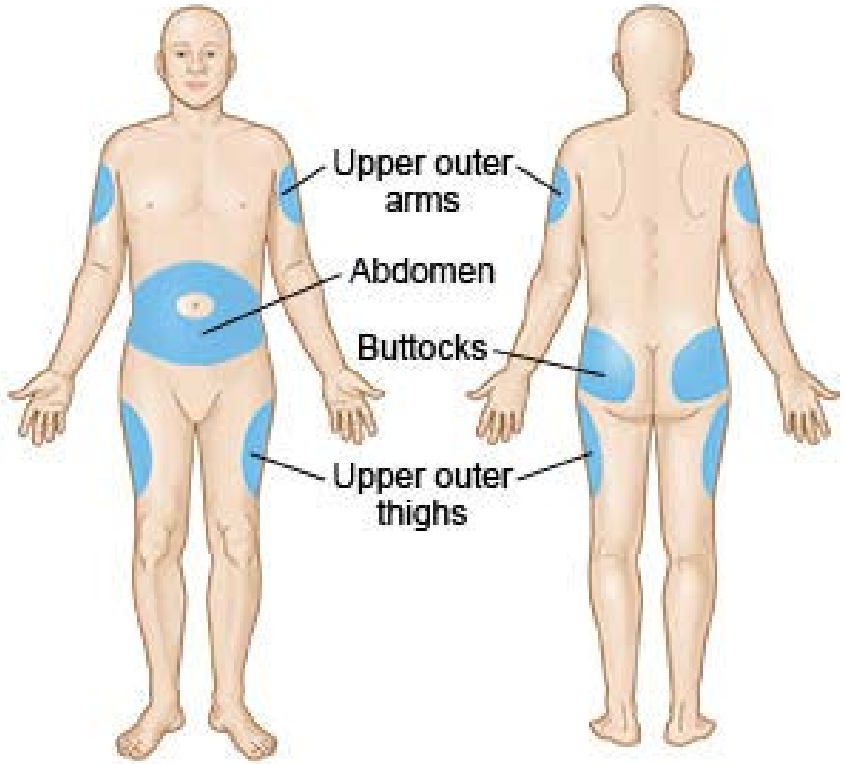
Step 5
Make air bubbles less likely by slowly pulling down on the plunger. Draw insulin past your dose. Tap the syringe a few times so any bubbles rise to the top.

Step 6
Without removing the syringe from the vial, slowly push the plunger until the edge of its black stopper reaches the number of units in your dose, as marked on the syringe. If you see any bubbles, push all that insulin back into the vial and repeat these steps until no bubbles are present.

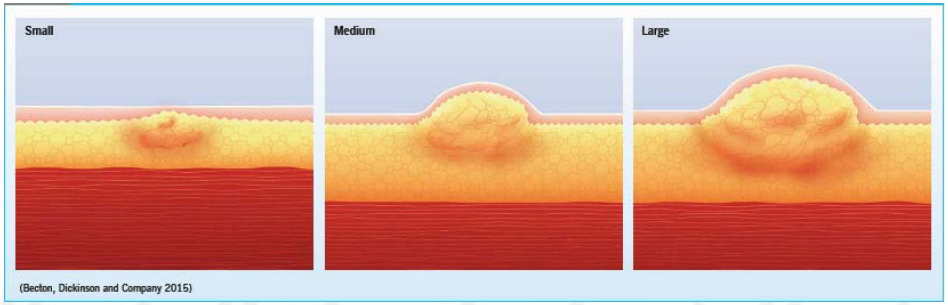
Step 7
Identify an injection site. Pinch up a bit of skin (if necessary). Insert the needle at a 90-degree angle. Hold the needle in the skin for 5 seconds to ensure there is no leakage.

Step 8
Dispose of your syringe and needle in a sharps container.

Insulin Injection Sites



Injection Site Rotation



Diabetes: Myth or Fact

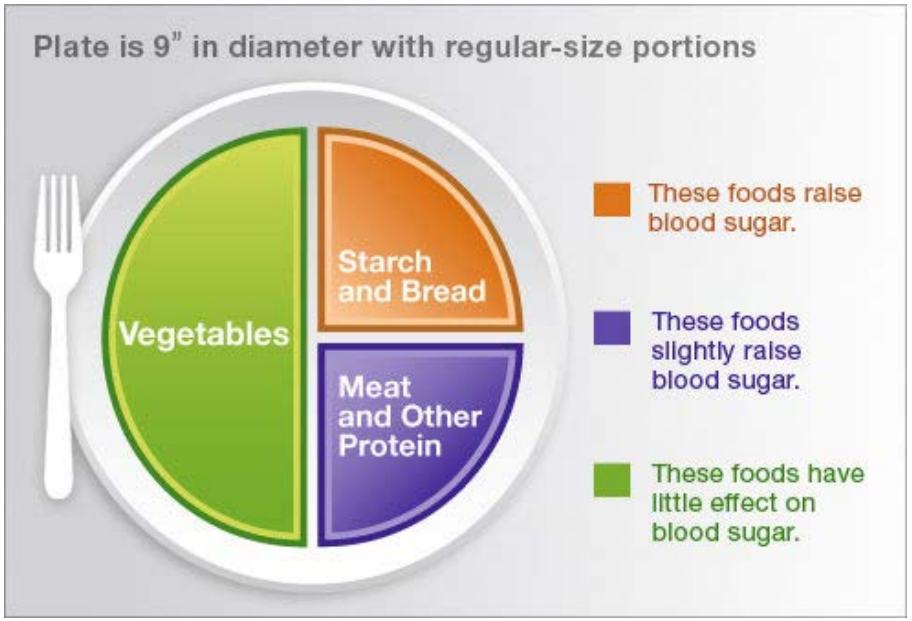
- Avoiding all “white” food (white bread, potatoes, pasta) will cure my diabetes.

- Fact: Diabetes does not just go away and there is room for all foods in a healthy meal plan. Whole grains are higher in fiber and more healthier than processed foods.

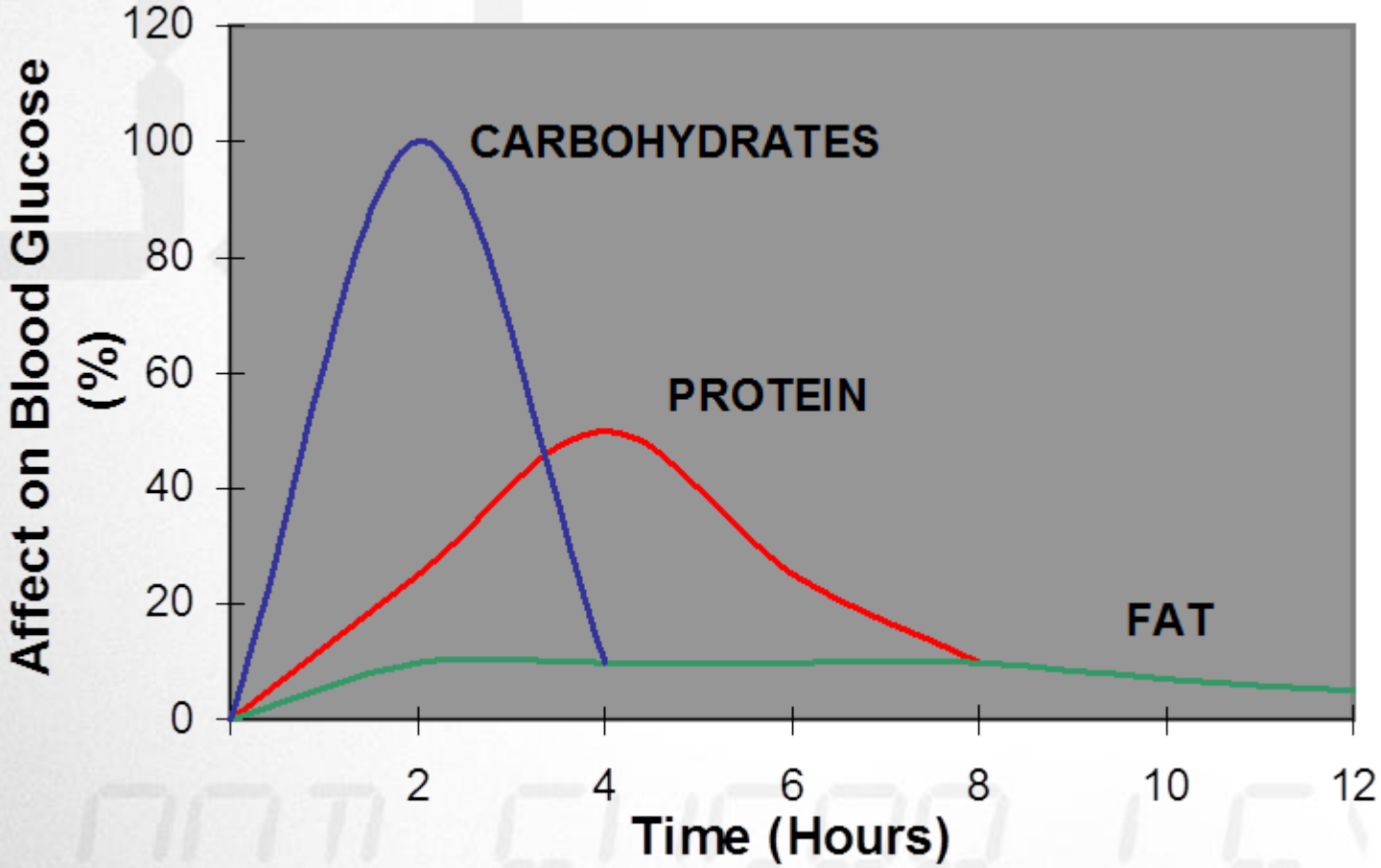
Nutrition

Meal Plan

- Meal plan based on
  - What you like to eat/drink
  - Schedule
  - Health status
  - How many calories you need
  - Physical activity level



Affect on Blood Glucose



Carbohydrates

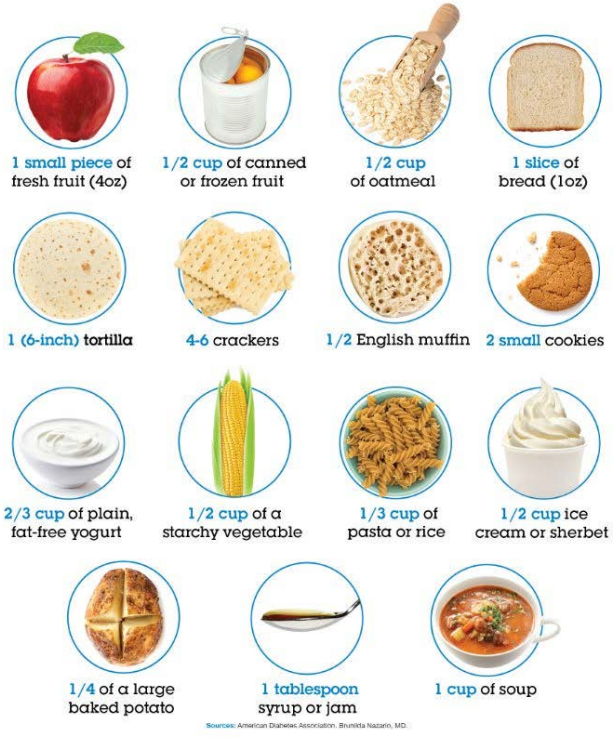
- Important part of healthy meal plan
- Raise blood glucose the most
- Keep the amount consistent can help you meet your blood glucose goals 2-4 servings 30-60 gms.
- Snacks 15-20 gms
- Serving = 15 gms.

Carbohydrates

WebMD

Carb Counting
For Diabetes Made Easy

Each of these foods contains about 15 grams of carbohydrates.



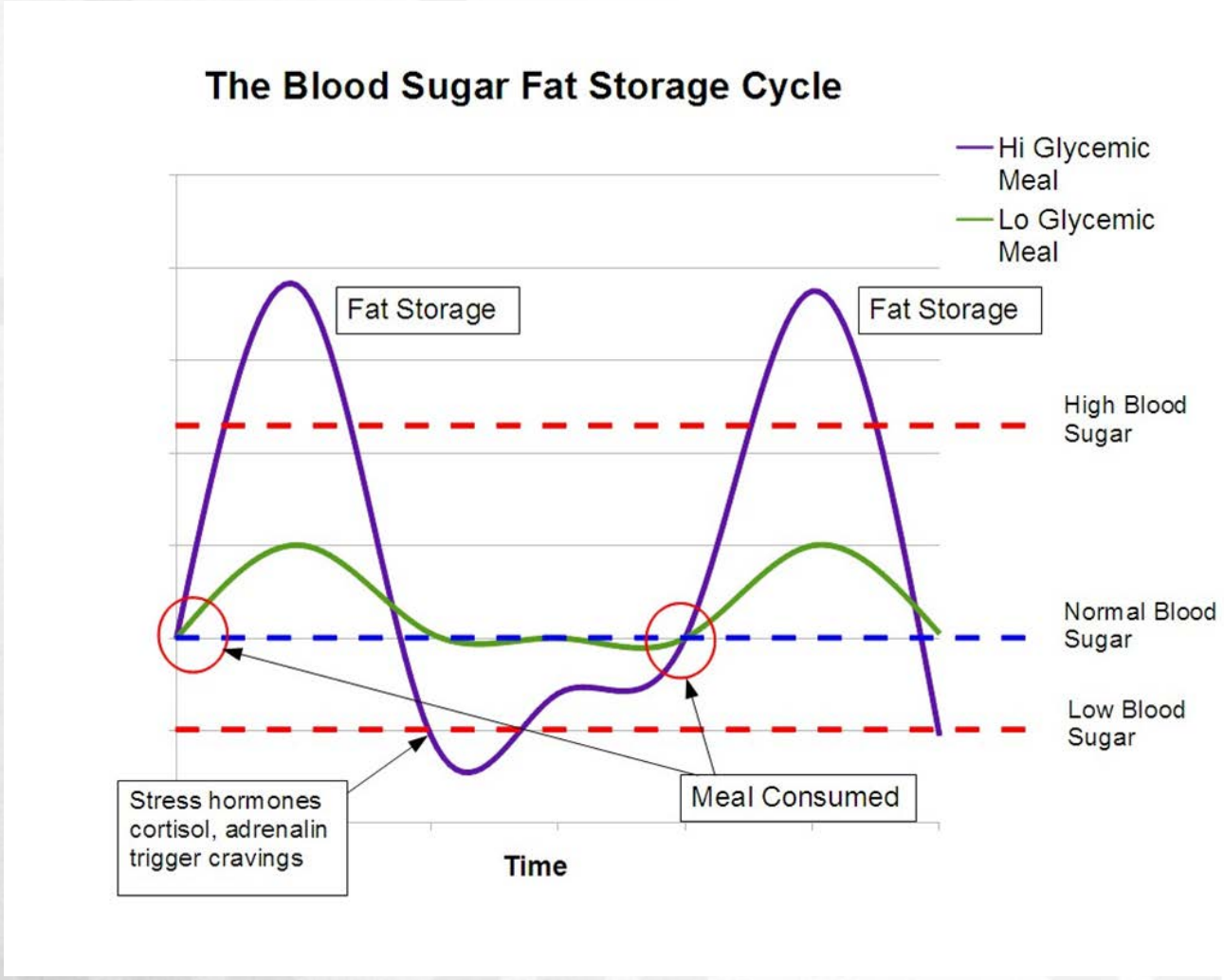
Sources: American Diabetes Association; Brunilda Nazario, MD.

Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

Grains / Starchs		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								
Bagel, White	103								

Types of Carbohydrates



Avoid the Rollercoaster

Label Reading

- Things to look at
  - Serving size
  - Type of fats
  - Carbohydrate, fiber, sugar
  - Protein gms.

ORIGINAL

Nutrition Facts

Serving Size 2/3 cup (55g)
Servings Per Container About 8

Amount Per Serving	
Calories 230	Calories from Fat 72
	% Daily Value*
Total Fat 8g	**12%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**12%**
Dietary Fiber 4g	**16%**
Sugars 1g	
Protein 3g	
Vitamin A	10%
Vitamin C	8%
Calcium	20%
Iron	45%

NEW

Nutrition Facts

8 servings per container
Serving size **2/3 cup (55g)**

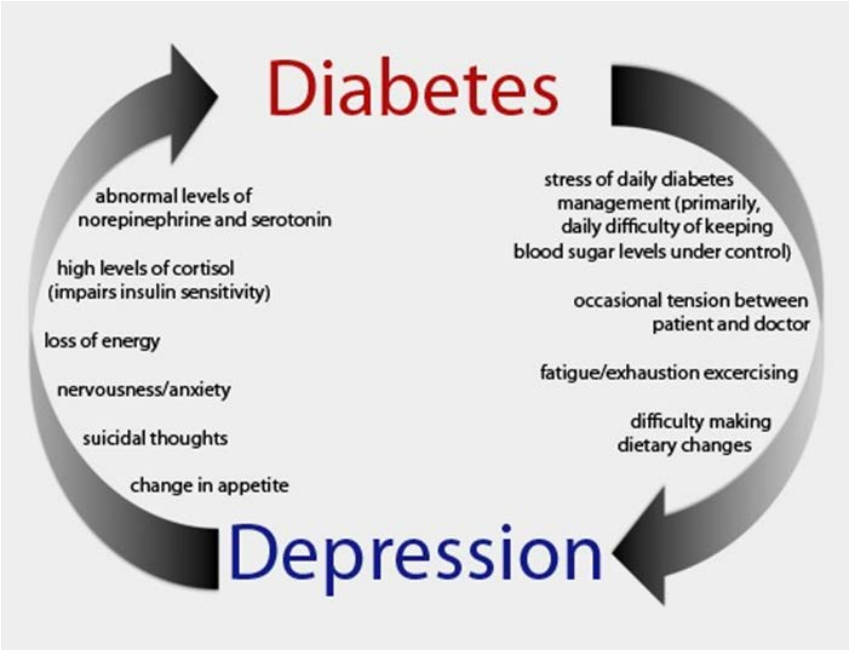
Amount per serving	
Calories	**230**
	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%

Choose Fat Wisely

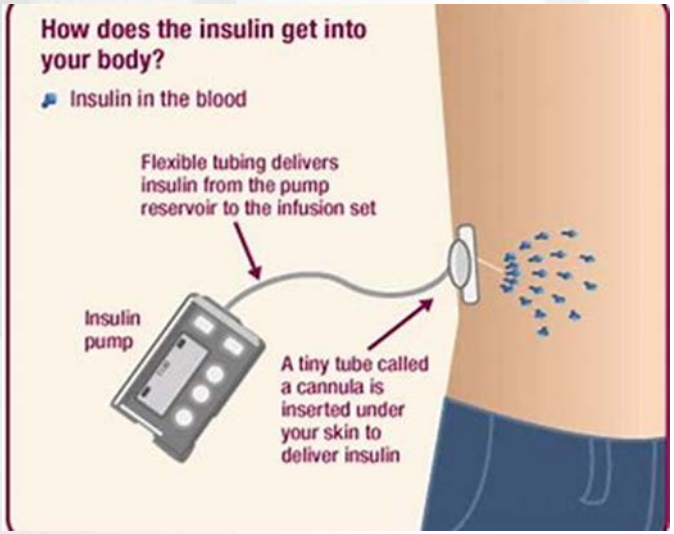
- Eat more
  - Mono, Poly, Omega-3 FA
- Eat less
  - Saturated, Trans, Cholesterol

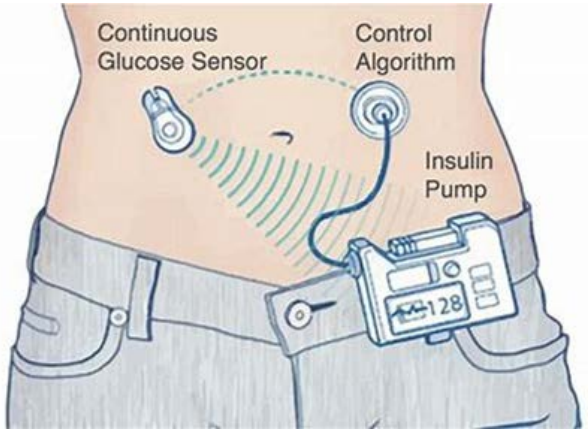
Depression

- 3-4x more prevalent in PWD than in general pop.
- Lifetime rate 5-8% gen. pop.
- 15-20% among PWD
- Ass. with poor glycemic control
- 86% higher healthcare costs
- Poorer QOL
- More complications
- Be alert for s/s of depression who are struggling with SM
- Encourage treatment



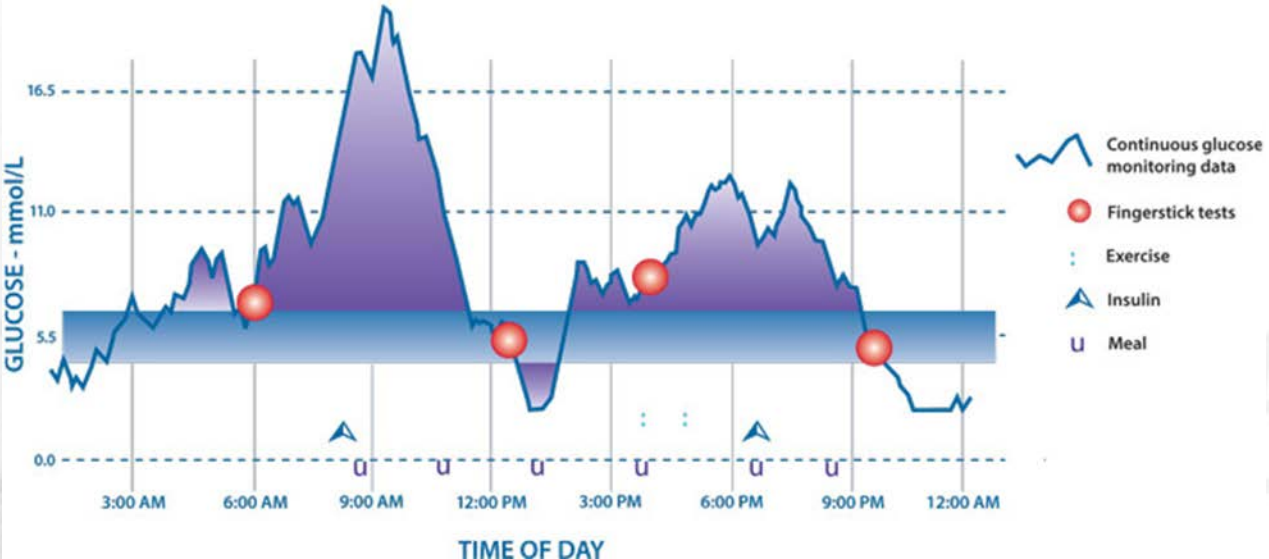
Technology


How does the insulin get into your body?
Insulin in the blood
Flexible tubing delivers insulin from the pump reservoir to the infusion set
Insulin pump
A tiny tube called a cannula is inserted under your skin to deliver insulin


Continuous Glucose Sensor
Control Algorithm
Insulin Pump
128

Technology

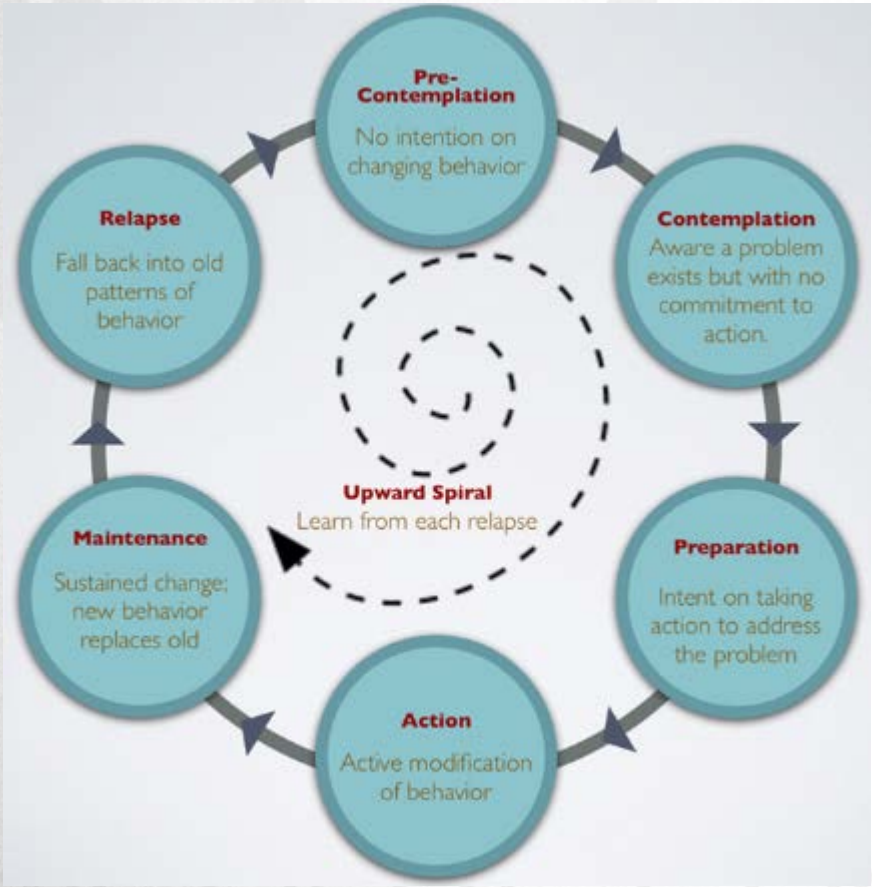

Home
110
dexcom


16.5
11.0
5.5
0.0
GLUCOSE - mmol/L
3:00 AM
6:00 AM
9:00 AM
12:00 PM
3:00 PM
6:00 PM
9:00 PM
12:00 AM
TIME OF DAY
Continuous glucose monitoring data
Fingerstick tests
Exercise
Insulin
Meal

Common Barriers to Self-Care

- Adjusting to diagnosis and to new lifestyle demands
- Not understanding the treatment plan
- Financial or insurance struggles
- Unrealistic expectations and perfectionism
- Time-management and goal-setting problems
- Poor motivation and burnout/diabetes distress
- Fear of complications
- Fear of hypoglycemia
- Anxiety, depression, eating disorders
- Denial

Behavior Change



A	AWARENESS OF THE NEED FOR CHANGE
D	DESIRE TO SUPPORT THE CHANGE
K	KNOWLEDGE OF HOW TO CHANGE
A	ABILITY TO DEMONSTRATE SKILLS & BEHAVIORS
R	REINFORCEMENT TO MAKE THE CHANGE STICK

Case Study - Jose

- Julio 52 y/o Hispanic male with limited English proficiency (LEP). Works as a gas station attendant. He went to a community health center having increased fatigue and intermittent blurred vision for approximately 1.5 years. He also reported tingling and decreased sensation in both his feet and noted that superficial wounds to his body healed more slowly than in the past. He said he recently began smoking again after having quit the habit 10 years previously. He said the attributed that to increased stress related to family issues. He is currently on no medications.

Examination and Laboratory Test Findings

- Ht., in 60 in, Wt. 212 lb., BMI 41.4 kg/m2
- Blood pressure 152/86, HR 88 bpm
- Fasting plasma glucose: 169 mg/dl
- Glycosylated hemoglobin: 7.8%
- Lipid Profile: Total Chol.: 228 mg/dL, LDL-C 146 mg/dL, HDL-C 32 mg/dL, TG 250 mg/dL

Physical Examination

- Eye examination revealed one microaneurysm.
- Foot examination revealed absent pulses. Absent ankle reflexes, absent plantar sensation and reduced distal vibratory perception.

Case Study - Maria

- Maria is a 62-year-old married Portuguese woman, with four adult children. Her husband works FT in manufacturing. She retired when the textile mill closed eight years ago. She speak limited English. She helps care for her 9 y/o grandchildren.
- Diagnosed with high blood pressure, and type 2 diabetes 25 years ago after the birth of her third child. During her pregnancy she was told that her blood sugar was “elevated” and instructed to watch her diet.
- She has been referred by her family physician to the diabetes specialty clinic. She presents with recent weight gain, suboptimal diabetes control, and foot pain. She has been trying to lose weight and increase exercise for the past 6 months without success.

- Current medications: Lisinopril 10 mg once daily, glyburide (Diabeta) 5 mg once daily, Metformin (Glucophage) 1000 mg twice daily, Januvia (Sitagliptin) 100 mg once a day, Atorvastatin (Lipitor) 10 mg once daily. She tolerates her medication and adheres to the daily schedule. Takes a Cinnamon supplement.
- She self-monitors her blood sugar first thing in the morning before breakfast.
- Reading the past week : 192 mg/dL, 171 mg/dL, 202 mg/dL, 242 mg/dL, 179 mg/dL, 197 mg/dL, 138 mg/dL
- Maria says *“what ever I do, my blood sugar is high. I don’t understand why my blood sugar is so high. I don’t eat sugar”.*
- Nutrition : Breakfast – tea, roll or cookies with butter; Lunch – sandwich, chips; Dinner – fish, vegetables, rice, roll with butter; snack – tea, cookies.

Case Study - Jose

- Jose is a an 18 year-old who moved from his native Puerto Rico six-months ago to live with his grandparents. He was admitted to the ER with vomiting and abnormal pain with a blood sugar of 842 mg/dl. He had a two week history of frequent urination and thirst, accompanied by a 20 lbs. wt. loss and blurred vision.

- He was hospitalized for three days and discharged on long acting insulin once daily and mealtime insulin as needed. On discharge, he was instructed to perform blood glucose measurements 4 times a day. The patient was seen as an outpatient 4 days after he is discharged from hospital.

- Jose speaks no English. He presents with glucometer. You have been asked to speak with him prior to his initial appointment with a diabetes educator.

- Conduct an initial visit with Jose.

	Day 1	Day 2	Day 3
Breakfast	100	176	142
Lunch	72	54	50
Dinner	149	117	--
Bedtime	207	209	--

Questions?