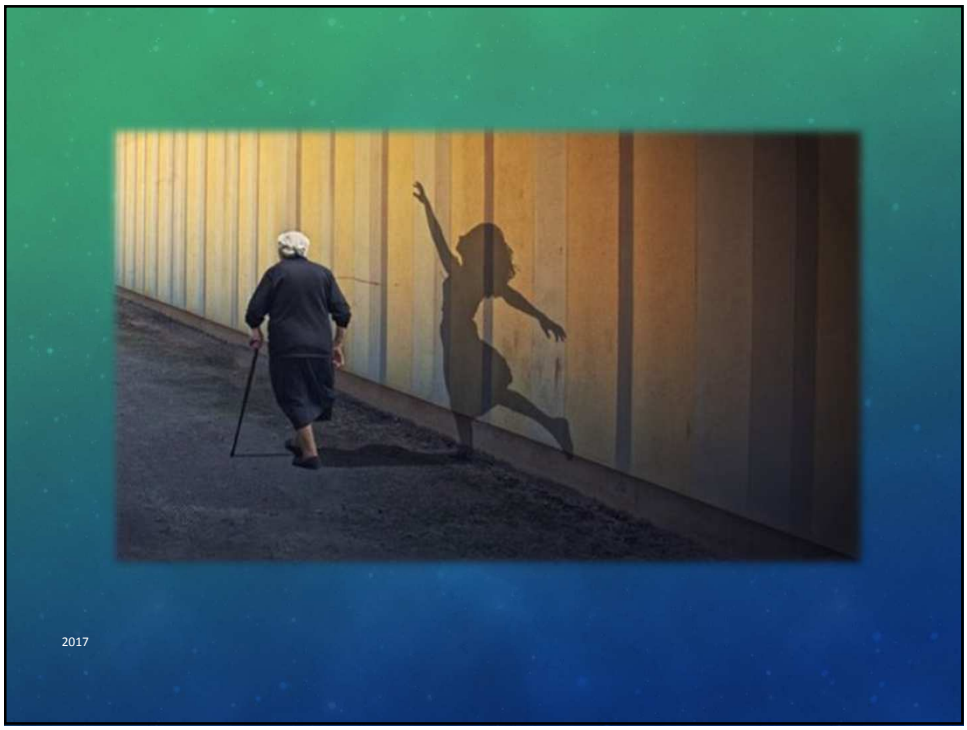
Northern Physicians Organization Diabetes Update

Kathleen Brown, RPh
Clinical Pharmacist
MTM Specialist
AADE Certified

NORTHERN PHYSICIANS ORGANIZATION

NPOINC.ORG

April 19, 2017



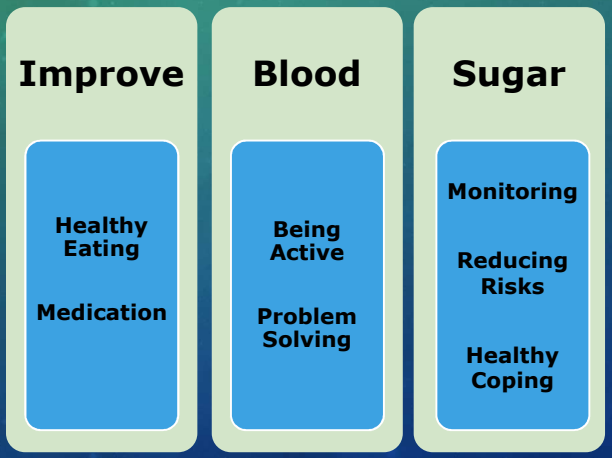
TERMINOLOGY

- Diabetes does not define people.
- People with diabetes are individuals with diabetes, not "diabetics."
- "Diabetic" will continue to be used related to complications, e.g., "diabetic retinopathy."

American Diabetes Association.

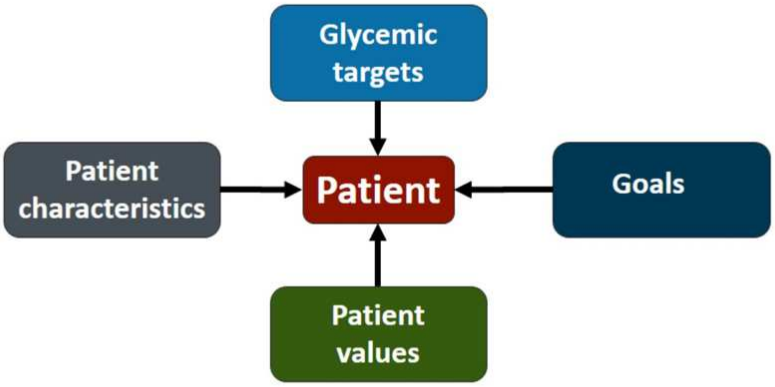
American Diabetes Association Standards of Medical Care in Diabetes. Introduction. *Diabetes Care* 2016; 39 (Suppl. 1): S1-S2

Diabetes Management



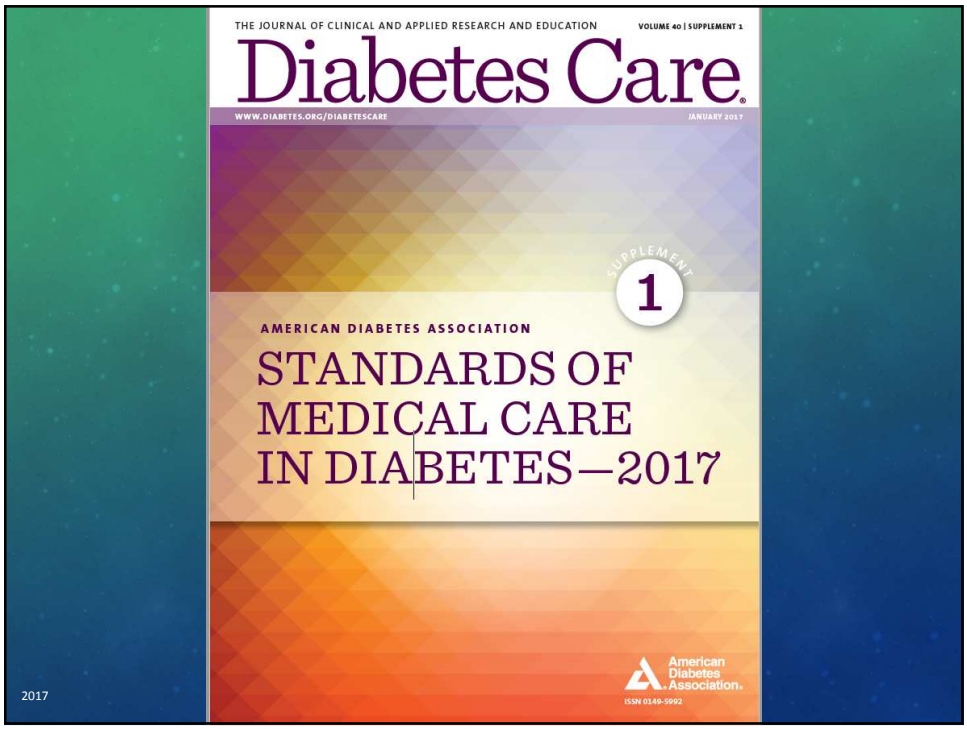
2017

Patient-Centered Care



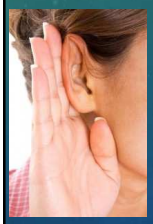
- Move from a one-size-fits-all approach to personalization of therapy.

Handelsman Y, et al. *Endocr Pract*. 2015;21(Suppl 1):1-87; Inzucchi SE, et al. *Diabetes Care*. 2015;38:140-149.



ADA 2017 Standards of Care:

Patient-centered communication style should be used to optimize patient health outcomes and health-related quality of life



- uses active listening
- elicits patient preferences and beliefs
- assesses literacy, numeracy, and potential barriers to care

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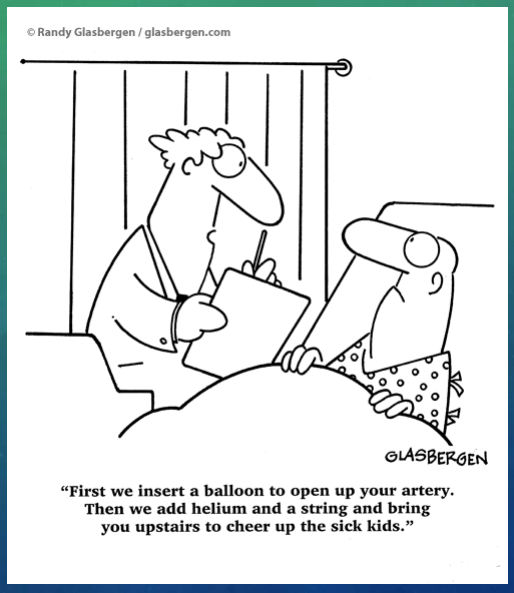
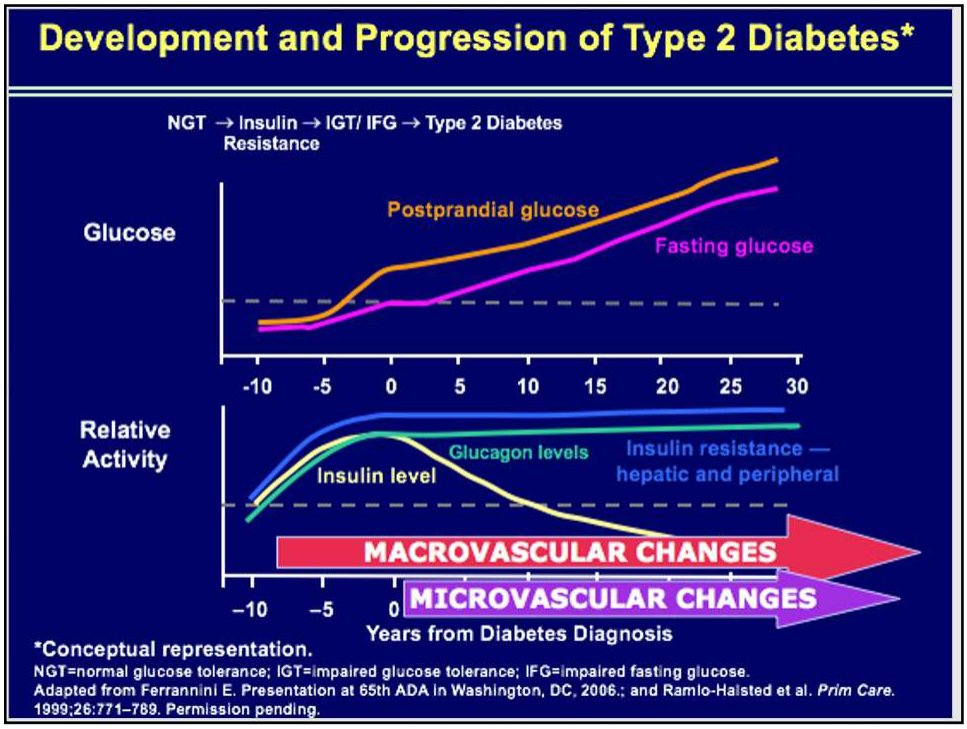
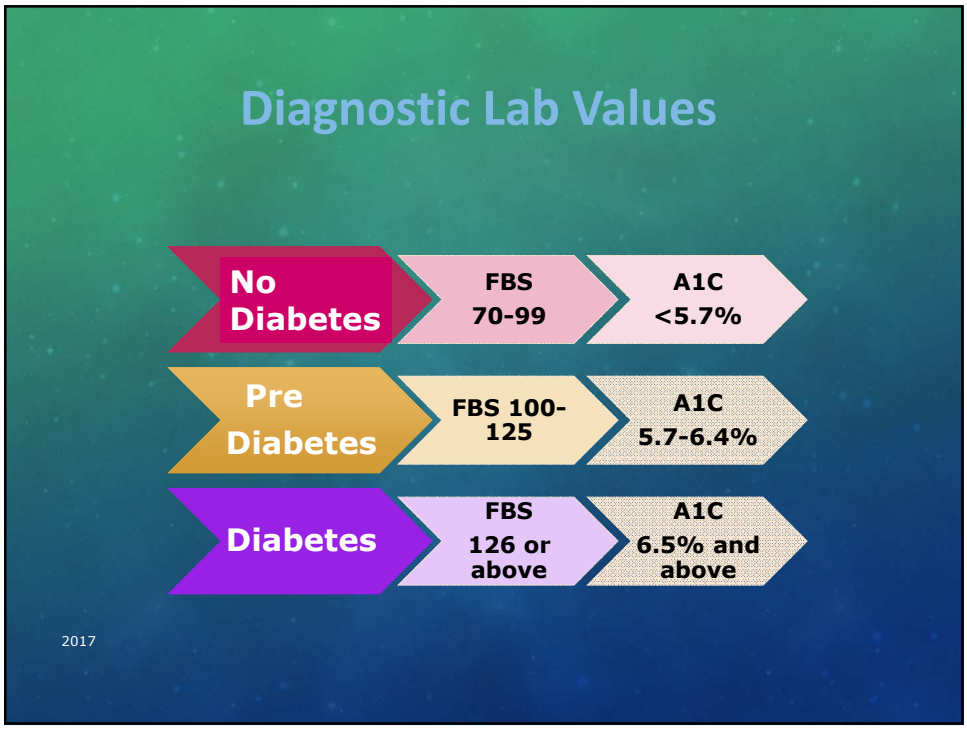


2017


Development and Progression of Type 2 Diabetes*
NGT → Insulin → IGT/ IFG → Type 2 Diabetes
Resistance
Glucose
Postprandial glucose
Fasting glucose
-10 -5 0 5 10 15 20 25 30
Relative Activity
Glucagon levels
Insulin resistance — hepatic and peripheral
Insulin level
MACROVASCULAR CHANGES
MICROVASCULAR CHANGES
−10 −5 0
Years from Diabetes Diagnosis
*Conceptual representation.
NGT=normal glucose tolerance; IGT=impaired glucose tolerance; IFG=impaired fasting glucose.
Adapted from Ferrannini E. Presentation at 65th ADA in Washington, DC, 2006.; and Ramlo-Halsted et al. Prim Care. 1999;26:771–789. Permission pending.


Diagnostic Lab Values
No Diabetes
FBS 70-99
A1C <5.7%
Pre Diabetes
FBS 100-125
A1C 5.7-6.4%
Diabetes
FBS 126 or above
A1C 6.5% and above
2017

A1C & EAG

- A lab test that gives a picture of your average blood glucose control for the last 2-3 months
- Helps manage diabetes by showing if treatment plan is working (meal plan, exercise, and medications)
- Can be done 3-4 times a year
- ADA suggests A1C of 7.0% or lower, and AACE suggests A1c of 6.5% or lower.
- Diabetes best evaluated and managed by the combination of A1c results and self-monitoring of blood glucose (SMBG)

2017

Hemoglobin A1C %	Estimated Average Glucose
5.0	97
5.5	111
6.0	126
6.5	140
7.0	**154**
7.5	169
8.0	183
8.5	197
9.0	212
9.5	226
10.0	240
10.5	255
11.0	269
11.5	283
12.0	298
12.5	313
13.0	327

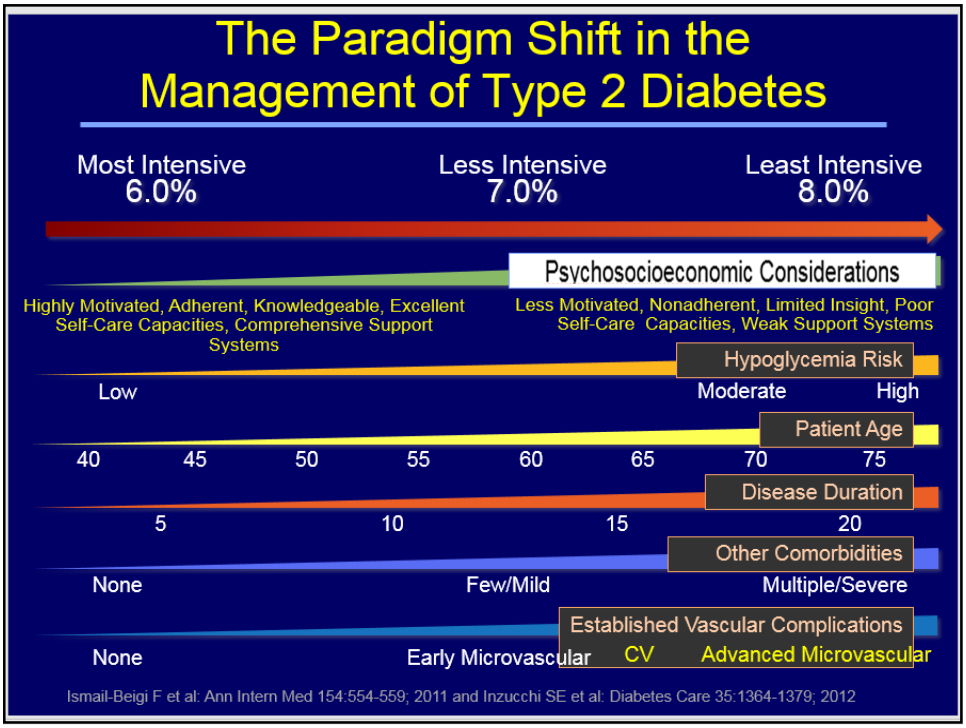
Impact of Intensive Therapy for Diabetes: Summary of Major Clinical Trials

Study	Microvasc		CVD		Mortality	
UKPDS	↓	↓	↔	↓	↔	↓
DCCT / EDIC*	↓	↓	↔	↓	↔	↔
ACCORD	↓		↔		↑	
ADVANCE	↓		↔		↔	
VADT	↓		↔		↔	

Kendall DM, Bergenstal RM. © International Diabetes Center 2009

UK Prospective Diabetes Study (UKPDS) Group. *Lancet* 1998;352:854.
Holman RR et al. *N Engl J Med*. 2008;359:1577. DCCT Research Group. N Engl J Med 1993;329;977.
Nathan DM et al. *N Engl J Med*. 2005;353:2643. Gerstein HC et al. *N Engl J Med*. 2008;358:2545.
Patel A et al. N Engl J Med 2008;358:2560. Duckworth W et al. N Engl J Med 2009;360:129. (erratum: Moritz T. *N Engl J Med* 2009;361:1024)

The Paradigm Shift in the Management of Type 2 Diabetes



Ismail-Beigi F et al: Ann Intern Med 154:554-559; 2011 and Inzucchi SE et al: Diabetes Care 35:1364-1379; 2012

Type 2 Diabetes Treatment

Go for Goal!
The earlier
the better.

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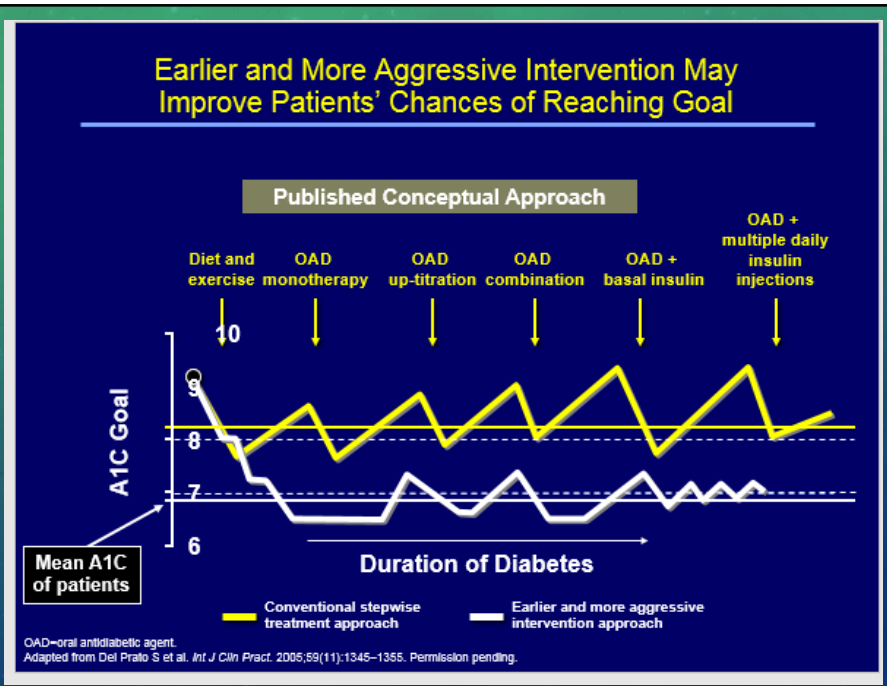
Earlier and More Aggressive Intervention May Improve Patients' Chances of Reaching Goal



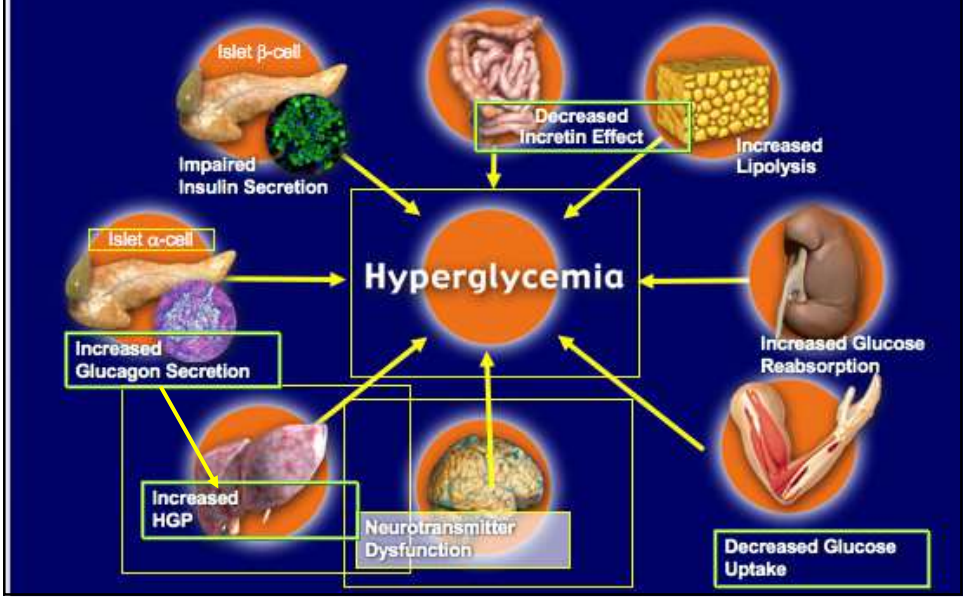
OAD=oral antidiabetic agent.
Adapted from Del Prato S et al. *Int J Clin Pract.* 2005;59(11):1345–1355. Permission pending.

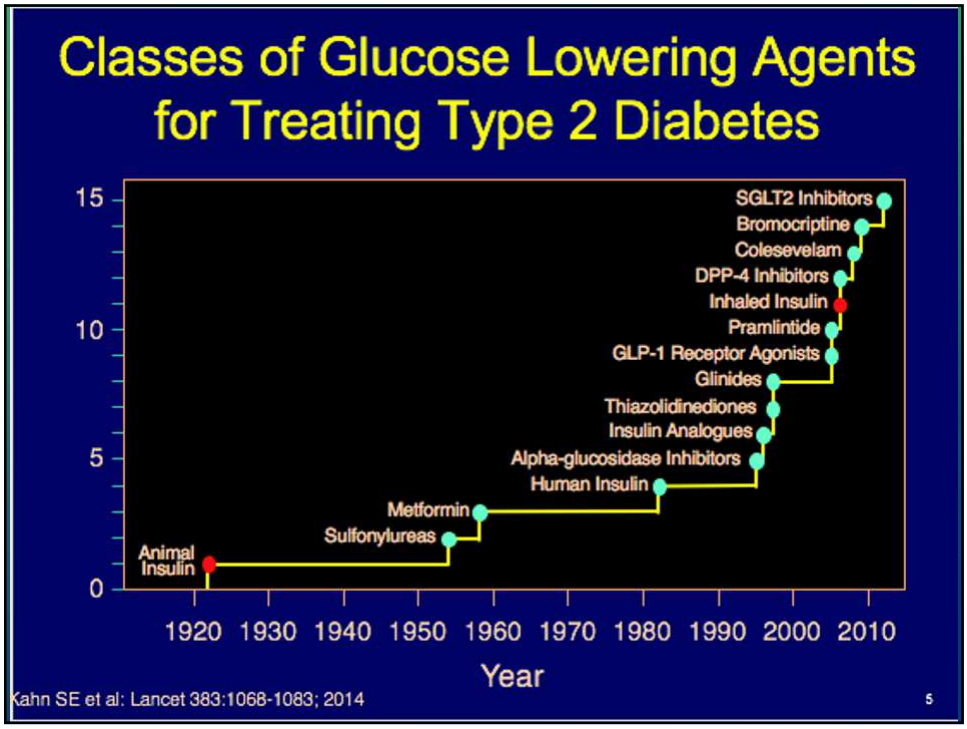
Target Blood Glucose

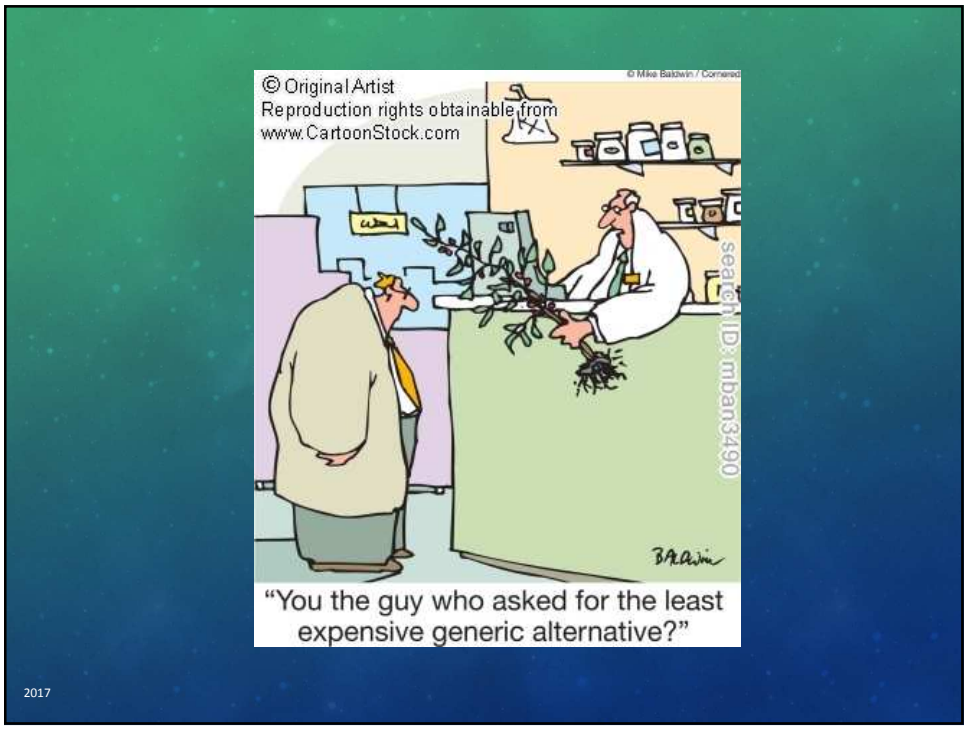
	Without Diabetes	**Goal With Diabetes**
Before Meals	70-100	**80-130**
Two-hours After Meals	140 or Less	**Less than 180**

2017

Main Pathophysiological Defects in T2DM "The Ominous Octet"




Classes of Glucose Lowering Agents for Treating Type 2 Diabetes
15
10
5
0
SGLT2 Inhibitors
Bromocriptine
Colesevelam
DPP-4 Inhibitors
Inhaled Insulin
Pramlintide
GLP-1 Receptor Agonists
Glinides
Thiazolidinediones
Insulin Analogues
Alpha-glucosidase Inhibitors
Human Insulin
Metformin
Sulfonylureas
Animal Insulin
1920 1930 1940 1950 1960 1970 1980 1990 2000 2010
Year
Kahn SE et al: Lancet 383:1068-1083; 2014
5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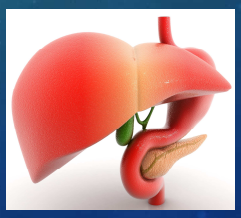
www.CartoonStock.com
"You the guy who asked for the least expensive generic alternative?"
2017

Metformin (Glucophage)

- Slows down glucose release from the liver
- Decreases insulin resistance
- May reduce weight, CVD, & death
- Decreases A1c average 1.5-2%



2017

Metformin side effects

- **Stomach or intestinal problems**
  Start with low doses and slowly increase
  If nausea/ vomiting or dehydration- hold the dose.
- **Vitamin B-12 Deficiency**
- **(new to ADA 2017 Standards of Care, consider periodic monitoring and supplement if needed).**
- Lactic Acidosis … *very rare*

(Symptoms at first are nonspecific: muscle aches, slow heart rate, difficulty breathing)

2017

Avoid Metformin use with…

- Binge drinking or chronic alcohol use
- Severe heart/lung disease
- Patients with impaired kidney function
  - eGFR<30

Hold Metformin prior to & 48 hours after test with contrast dye

2017

A few more points…

- Take with food, usually with breakfast & evening meal.
- Extended release product may leave tablet residual in stool, don't worry about that

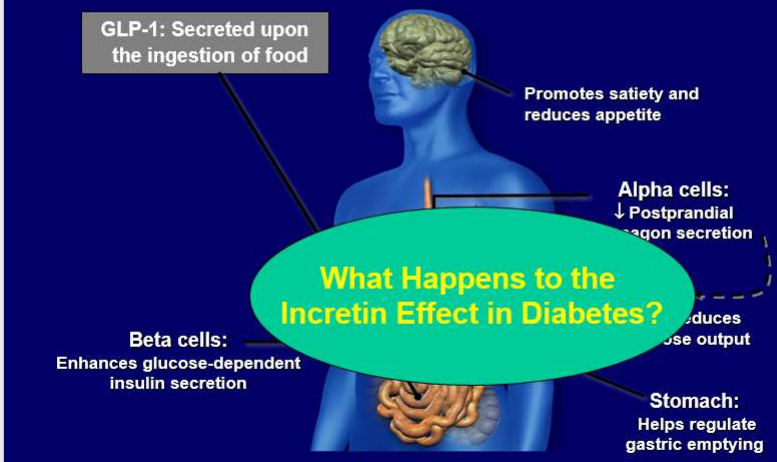
2017

Incretin Hormones

- Gut hormones
- Secreted in intestines in response to food intake
- Decreased in people with Diabetes

2017

GLP-1 Modulates Numerous Functions in Humans



Data from Flint A, et al. *J Clin Invest.* 1998;101:515-520; Data from Larsson H, et al. *Acta Physiol Scand.* 1997;160:413-422
Data from Nauck MA, et al. *Diabetologia.* 1996;39:1546-1553; Data from Drucker DJ. *Diabetes.* 1998;47:159-169

Byetta, Victoza, Bydureon, Tanzeum, Trulicity

- Injections that are NOT insulin
- GLP-1 agonists
- Decrease HbA1c by about 1%

2017

Byetta, Victoza, Bydureon, Tanzeum, Trulicity

- Byetta is given any time within 60 minutes before morning and evening meals
- Victoza is given once daily
- Bydureon, Tanzeum & Trulicity are given once a week
- The pen can be stored at room temperature.
- Unopened pens should be stored in the refrigerator.
- Throw away after 30 days of use.
- Use a new needle with each injection

2017

GLP-1 Side Effects

- Weight loss
- Nausea/vomiting/diarrhea
- Dizziness
- Headache
- Feeling jittery

Caution

- Problems with stomach
- Severe kidney disease or dialysis
- Pregnancy

- Avoid if thyroid cancer or previous pancreatitis

2017

Januvia, Onglyza, Tradjenta, Nesina

- DPP 4 inhibitors
- Increase our own Incretin hormones
- Usually taken once daily
- Weight neutral
- Lower doses needed for impaired kidney function except for Tradjenta
- Decrease A1c by<1%

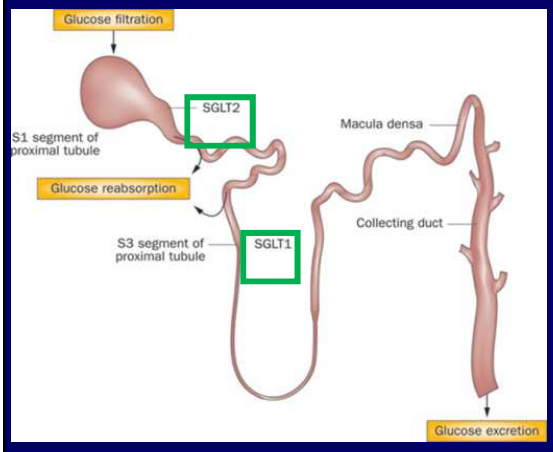
2017

Side Effects of DPP4's

- Upper respiratory infection
  - Nasal congestion
  - Headache
  - Stomach discomfort
  - Diarrhea
- Avoid if previous pancreatitis

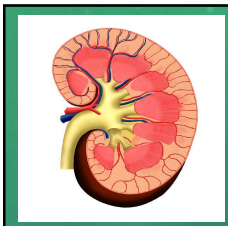
2017

"Sodium Glucose Co-transporter 2" Mediates Glucose Reabsorption in S1/S2 Segments of Renal Proximal Tubule; SGLT1 in S3 Segment



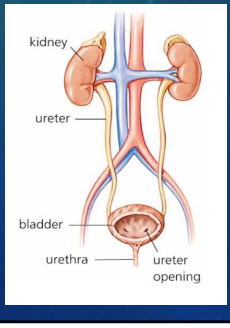
- SGLT1 also in GI
- SGLT2 is "heavy lifter"
- Normal GFR, reabsorption capacity ~300g/day, typical load average 180g/day
- If absorptive capacity exceeded = glucosuria

Ferrannini, E. & Solini, A. *Nat. Rev. Endocrinol* .2010; EM Wright et al, *Physiol Rev*, **2010**.



Jardiance, Farxiga, Invokana

- SGLT2 Inhibitors
- Work in kidneys to remove excess sugar from the body
- One tablet before the first meal of the day
- Decrease A1c by about 1%



2017

Side Effects - Jardiance, Farxiga, Invokana

- Weight loss
- Lower blood pressure
- Urinary infections

- **DRINK WATER! DRINK WATER! DRINK WATER!**
- **If nausea/vomiting/diarrhea HOLD DOSE**

*Extra caution for patients with fracture risk, bladder cancer, frequent urinary tract infections.

2017

EMPA-REG OUTCOME®: Therapeutic considerations

Jardiance (empagliflozin), as used in this trial, for 3 years in 1,000 patients with type 2 diabetes at high CV risk:

- 25 lives saved (82 vs 57 deaths)
  - 22 fewer CV deaths (59 vs 37)
- 14 fewer hospitalizations for heart failure (42 vs 28)
- 53 additional genital infections (22 vs 75)
- Indicated for CV protection in patients with Diabetes

35

Thiazolidinediones (TZDs) Actos (pioglitizone)

- Insulin sensitizer
- Lowers A1c 1-1.5%
- Side effect: **fluid retention**
- Caution with patients with fracture risk, bladder cancer,

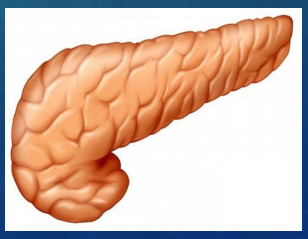
Congestive Heart Failure

2017

Sulfonylureas
Glipizide, Glyburide & Glimepiride

- Stimulates the pancreas to release more insulin

- Long track record
- Economical
- Effective in most people
- Lowers HA1c by 1.5-2%



2017

Sulfonylureas
Glipizide, Glyburide & Glimepiride

❖**Low blood sugar**

❖ **Weight gain**

❖ **Skin reactions (sulfa allergy)**

2017

COMBINATION DRUGS

Glucovance* = Metformin & glyburide

ActoPlus Met* = Metformin & Actos

Janumet = Metformin & Januvia

Janumet XR = Metformin & Januvia

Metaglip* = Metformin & Glipizide

PrandiMet = Metformin & Prandin

Kombiglyze XR = **Metformin** & Onglyza

Duetact = **Actos &** Glimepiride

Jentadueto = **Metformin** & Tradjenta

Kazano = Metformin & Nesina

Oseni = Nesina & Actos

Invokamet = Metformin & Invokana

Xigduo XR = Metformin & Farxiga

Glyxambi = Jardiance & Tradjenta

Synjardy = Metformin & Empagliflozin

Soliqua = insulin glargine & lixisenatide

** = generic availability*

2017

Non Insulin

Table 8.2—Median monthly cost of maximum approved daily dose of noninsulin glucose-lowering agents in the U.S. (48)

Class	Compound(s)	Dosage strength/product (if applicable)	Median AWP (min, max)†
Biguanides	• Metformin	500 mg (IR)	$84 ($5, $94)
		850 mg (IR)	$108 ($5, $108)
		1,000 mg (IR)	$86 ($4, $87)
		500 mg (ER)	$90 ($82, $6,672)
		750 mg (ER)	$72 ($65, $92)
		1,000 mg (ER)	$1,028 ($1,010, $7,213)
Sulfonylureas (2nd Gen)	• Glyburide	5 mg	$94 ($64, $103)
		6 mg (micronized)	$50 ($48, $71)
	• Glipizide	10 mg (IR)	$74 ($67, $97)
		10 mg (XL)	$97
	• Glimepiride	4 mg	$74 ($71, $198)
Meglitinides (glinides)	• Repaglinide	2 mg	$799 ($163, $878)
	• Nateglinide	120 mg	$156
TZDs	• Pioglitazone	45 mg	$349 ($348, $349)
	• Rosiglitazone	4 mg	$355
α-Glucosidase inhibitors	• Acarbose	100 mg	$104 ($104, 105)
	• Miglitol	100 mg	$241
DPP-4 inhibitors	• Sitagliptin	100 mg	$436
	• Saxagliptin	5 mg	$436
	• Linagliptin	5 mg	$428
	• Alogliptin	25 mg	$436
Bile acid sequestrant	• Colesevelam	625 mg tabs	$679
		1.875 g suspension	$1,357
Dopamine-2 agonists	• Bromocriptine	0.8 mg	$719
SGLT2 inhibitors	• Canagliflozin	300 mg	$470
	• Dapagliflozin	10 mg	$470
	• Empagliflozin	25 mg	$470
GLP-1 receptor agonists	• Exenatide	10 μg pen	$729
	• Exenatide (extended-release)	2 mg powder for suspension or pen	$692
	• Liraglutide	18 mg/3 mL pen	$831
	• Albiglutide	50 mg pen	$527
	• Dulaglutide	1.5/0.5 mL pen	$690
Amylin mimetics	• Pramlintide	120 μg pen	$2,124

ER and XL, extended release; IR, immediate release; TZD, thiazolidinedione. †Calculated for 30 day supply (AWP unit price × number of doses required to provide maximum approved daily dose × 30 days); median AWP listed alone when only one product and/or price. *Utilized to calculate median AWP (min, max); generic prices used, if available commercially. **Administered once weekly. ††AWP calculated based on 120 μg three times daily.

2017

PROFILES OF ANTIDIABETIC MEDICATIONS

	MET	GLP-1 RA	SGLT-2i	DPP-4i	AGi	TZD (moderate dose)	SU / GLN	COLSVL	BCR-QR	INSULIN	PRAML
HYPO	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	SU: Moderate/Severe; GLN: Mild	Neutral	Neutral	Moderate to Severe	Neutral
WEIGHT	Slight Loss	Loss	Loss	Neutral	Neutral	Gain	Gain	Neutral	Neutral	Gain	Loss
RENAL / GU	Contrain-dicated if eGFR < 30 mL/min/1.73 m²	Exenatide Not Indicated CrCl < 30; Possible Benefit of Liraglutide	Not Indicated for eGFR < 45 mL/min/1.73 m²; Genital Mycotic Infections; Possible Benefit of Empagliflozin	Dose Adjustment Necessary (Except Linagliptin); Effective in Reducing Albuminuria	Neutral	Neutral	More Hypo Risk	Neutral	Neutral	More Hypo Risk	Neutral
GI Sx	Moderate	Moderate	Neutral	Neutral	Moderate	Neutral	Neutral	Mild	Moderate	Neutral	Moderate
CHF / CARDIAC* / ASCVD	Neutral	Possible Benefit of Liraglutide; Possible CV Benefit	Possible Benefit of Empagliflozin; Possible CV Benefit	Possible Risk for Saxagliptin and Alogliptin; Neutral	Neutral	Moderate; May Reduce Stroke Risk	More CHF Risk; ?	Neutral; Benefit	Neutral; Safe	More CHF Risk; Neutral	Neutral
BONE	Neutral	Neutral	Canagliflozin Warning	Neutral	Neutral	Moderate Fracture Risk	Neutral	Neutral	Neutral	Neutral	Neutral
KETOACIDOSIS	Neutral	Neutral	DKA Occurring in T2D in Various Stress Settings	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

Few adverse events or possible benefits | Use with caution | Likelihood of adverse effects | ? Uncertain effect | * FDA indication to prevent CVD death in diabetes plus prior CVD events

GLYCEMIC CONTROL ALGORITHM

LIFESTYLE THERAPY
(Including Medically Assisted Weight Loss)

Entry A1C < 7.5%

MONOTHERAPY*
- ✓ Metformin
- ✓ GLP-1 RA
- ✓ SGLT-2i
- ✓ DPP-4i
- ⚠ TZD
- ✓ AGi
- ⚠ SU/GLN

If not at goal in 3 months proceed to Dual Therapy

Entry A1C ≥ 7.5%

DUAL THERAPY*

MET or other 1st-line agent +
- ✓ GLP-1 RA
- ✓ SGLT-2i
- ✓ DPP-4i
- ⚠ TZD
- ⚠ Basal Insulin
- ✓ Colesevelam
- ✓ Bromocriptine QR
- ✓ AGi
- ⚠ SU/GLN

If not at goal in 3 months proceed to Triple Therapy

TRIPLE THERAPY*

MET or other 1st-line agent + 2nd-line agent +
- ✓ GLP-1 RA
- ✓ SGLT-2i
- ⚠ TZD
- ⚠ Basal insulin
- ✓ DPP-4i
- ✓ Colesevelam
- ✓ Bromocriptine QR
- ✓ AGi
- ⚠ SU/GLN

If not at goal in 3 months proceed to or intensify insulin therapy

Entry A1C > 9.0%

SYMPTOMS

NO	YES
DUAL Therapy OR TRIPLE Therapy	INSULIN ± Other Agents

ADD OR INTENSIFY INSULIN
Refer to Insulin Algorithm

LEGEND
- ✓ Few adverse events and/or possible benefits
- ⚠ Use with caution

* Order of medications represents a suggested hierarchy of usage; length of line reflects strength of recommendation

PROGRESSION OF DISEASE

American Diabetes Association Guidelines

Start with Monotherapy unless:

A1C is greater than or equal to 9%, **consider Dual Therapy.**

A1C is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, **consider Combination Injectable Therapy** (See Figure 8.2).

Monotherapy Metformin **Lifestyle Management**

EFFICACY*	high
HYPO RISK	low risk
WEIGHT	neutral/loss
SIDE EFFECTS	GI/lactic acidosis
COSTS*	low

If A1C target not achieved after approximately 3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

Dual Therapy Metformin + **Lifestyle Management**

	Sulfonylurea	Thiazolidinedione	DPP-4 inhibitor	SGLT2 inhibitor	GLP-1 receptor agonist	Insulin (basal)
EFFICACY*	high	high	intermediate	intermediate	high	highest
HYPO RISK	moderate risk	low risk	low risk	low risk	low risk	high risk
WEIGHT	gain	gain	neutral	loss	loss	gain
SIDE EFFECTS	hypoglycemia	edema, HF, fxs	rare	GU, dehydration, fxs	GI	hypoglycemia
COSTS*	low	low	high	high	high	high

If A1C target not achieved after approximately 3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

Triple Therapy Metformin + **Lifestyle Management**

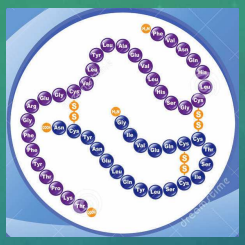
Sulfonylurea +	Thiazolidinedione +	DPP-4 inhibitor +	SGLT2 inhibitor +	GLP-1 receptor agonist +	Insulin (basal) +
TZD	SU	SU	SU	SU	TZD
or DPP-4-i	or DPP-4-i	or TZD	or TZD	or TZD	or DPP-4-i
or SGLT2-i	or SGLT2-i	or SGLT2-i	or DPP-4-i	or SGLT2-i	or SGLT2-i
or GLP-1-RA	or GLP-1-RA	or Insulin§	or GLP-1-RA	or Insulin§	or GLP-1-RA
or Insulin§	or Insulin§		or Insulin§		

If A1C target not achieved after approximately 3 months of triple therapy and patient (1) on oral combination, move to basal insulin or GLP-1 RA, (2) on GLP-1 RA, add basal insulin, or (3) on optimally titrated basal insulin, add GLP-1 RA or mealtime insulin. Metformin therapy should be maintained, while other oral agents may be discontinued on an individual basis to avoid unnecessarily complex or costly regimens (i.e., adding a fourth antihyperglycemic agent).

Combination Injectable Therapy **(See Figure 8.2)**

2017

Insulin

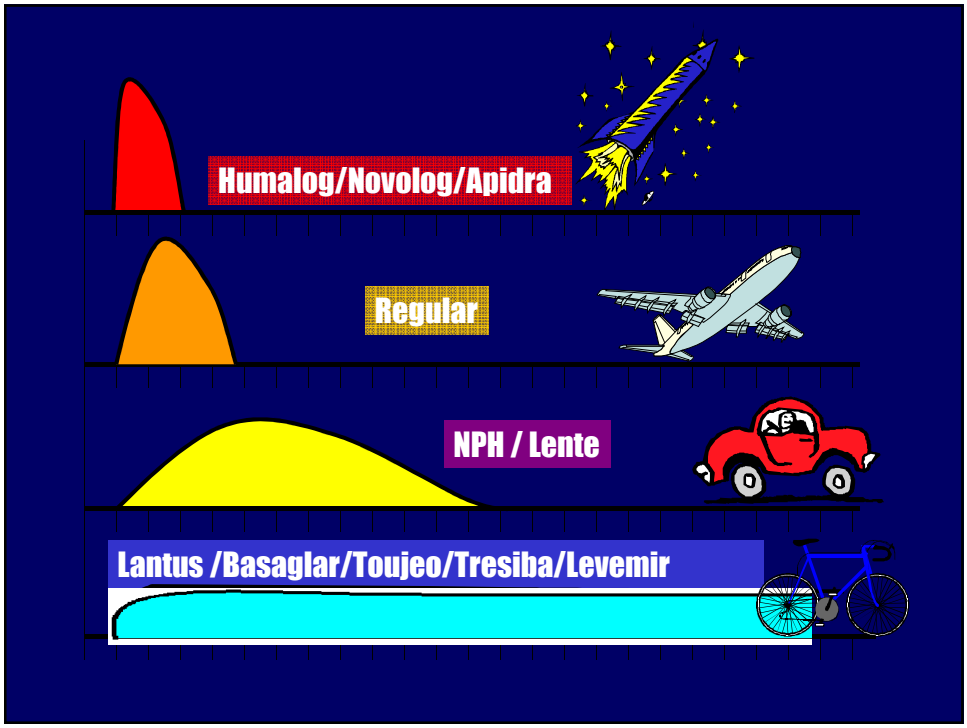


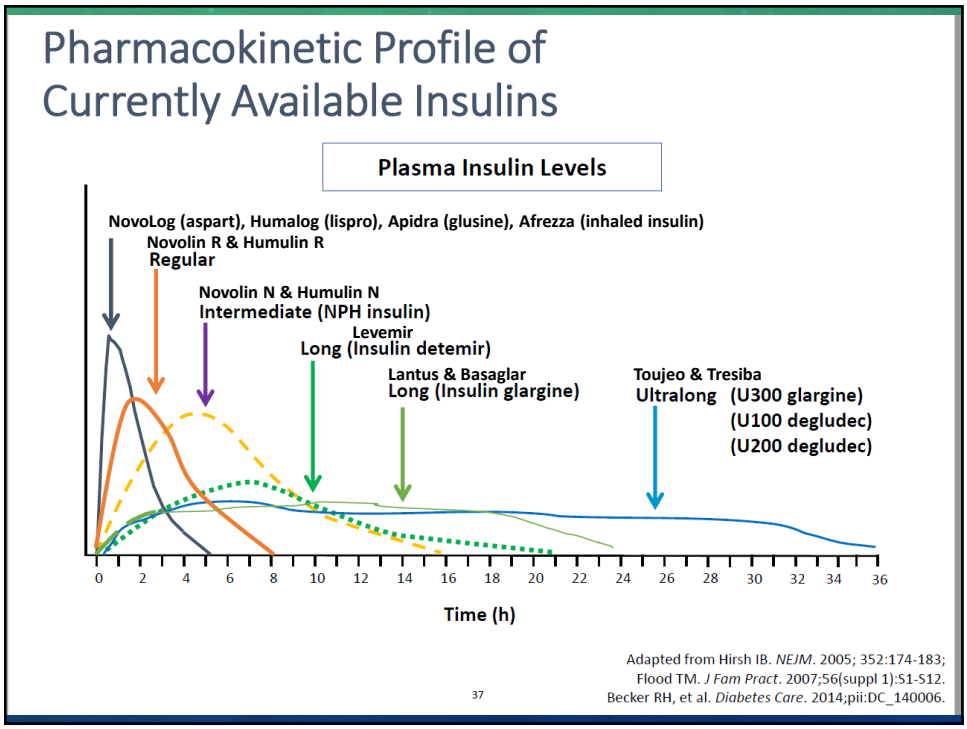
Human Insulin

- Decreased production in type 2 diabetes
- Many different kinds that work for different lengths of time
- Insulin ALWAYS works

- **Please do not use as a threat, personal failure, or punishment.**

2017


Humalog/Novolog/Apidra
Regular
NPH / Lente
Lantus /Basaglar/Toujeo/Tresiba/Levemir


Pharmacokinetic Profile of Currently Available Insulins
Plasma Insulin Levels
NovoLog (aspart), Humalog (lispro), Apidra (glusine), Afrezza (inhaled insulin)
Novolin R & Humulin R
Regular
Novolin N & Humulin N
Intermediate (NPH insulin)
Levemir
Long (Insulin detemir)
Lantus & Basaglar
Long (Insulin glargine)
Toujeo & Tresiba
Ultralong (U300 glargine)
(U100 degludec)
(U200 degludec)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
Time (h)
Adapted from Hirsh IB. NEJM. 2005; 352:174-183;
Flood TM. J Fam Pract. 2007;56(suppl 1):S1-S12.
Becker RH, et al. Diabetes Care. 2014;pii:DC_140006.
37

Lantus	100 Units/mL
Basaglar	100 Units/mL
Levemir	100 Units/mL
Toujeo	300 Units/mL
Tresiba	100 Units/mL
	200 Units/mL

- Long acting basal insulin
- Usually given once daily
- Lantus & Levemir available in vials
- Available in pen devices

2017

Lantus, Basaglar, Levemir, Toujeo & Tresiba

- The pen or vial can be stored at room temperature
  - Lantus for 28 days
  - Basaglar for 28 days
  - Toujeo for 28 days
  - Levemir for 42 days
  - Tresiba for 56 days
- Unopened pens or vials should be stored in the refrigerator

2017

Apidra (insulin glusine)
Humalog (insulin lispro)
NovoLog (insulin aspart)

begin to work about 15 minutes after injection, peak in about 1 hour, and continue to work for 2 to 4 hours.

2017

Afrezza

- Inhaled insulin
- Similar in action to NovoLog, Humalog, Apidra

2017

Table 8.3—Median cost of insulins in the U.S. calculated as average wholesale price per 1,000 units of specified dosage form/product (48)

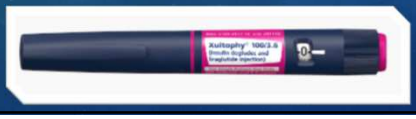
Insulins	Compounds	Dosage form/product	Median AWP package price (min, max)*
Rapid-acting analogs			
	• Lispro	U-100 vial	$306
		U-100 3 mL cartridges	$306 ($306, $379)
		U-100 prefilled pen; U-200 prefilled pen	$394
	• Aspart	U-100 vial	$306
		U-100 3 mL cartridges	$380
		U-100 prefilled pen	$395
	• Glulisine	U-100 vial	$283
		U-100 prefilled pen	$365
	• Inhaled insulin	Inhalation cartridges	$557 ($453, $754)
Short-acting			
	• Human Regular	U-100 vial	$165
Intermediate-acting			
	• Human NPH	U-100 vial	$165
		U-100 prefilled pen	$350
Concentrated Human Regular insulin			
	• U-500 Human Regular insulin	U-500 vial	$165
		U-500 prefilled pen	$213
Basal analogs			
	• Glargine	U-100 vial; U-100 prefilled pen; U-300 prefilled pen	$298
	• Detemir	U-100 vial; U-100 prefilled pen	$323
	• Degludec	U-100 prefilled pen; U-200 prefilled pen	$355
Premixed products			
	• NPH/Regular 70/30	U-100 vial	$165
		U-100 prefilled pen	$350
	• Lispro 50/50	U-100 vial	$317
		U-100 prefilled pen	$394
	• Lispro 75/25	U-100 vial	$317
		U-100 prefilled pen	$394
	• Aspart 70/30	U-100 vial	$318
		U-100 prefilled pen	$395

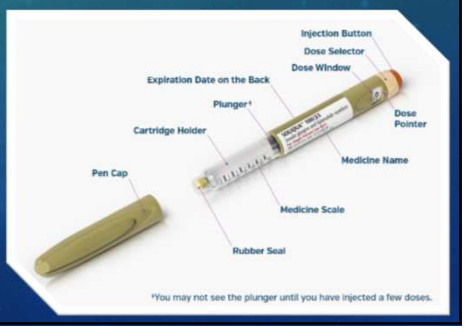
AWP listed alone when only one product and/or price.

New combos Insulin & GLP1's

Soliqua 100 units/mL & 33 mcg/mL
(Insulin glargine & lixisenatide)

Up and coming… Xultophy (Insulin degludec & liraglutide)

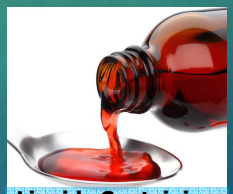




2017

Over the Counter Medications

Herbals



Liquids Containing Sugar

Vitamins

2017

Hyperglycemia Signs

- "Stomachache"
- "Owies in my legs" = Leg cramps
- "Dry mouth"
- "I'm thirsty" = excessive thirst
- "Go potty" = frequent urination

Hyperglycemia Signs

Sweaty, Fast heartbeat, Shaky, Hungry, "Owies in my head" = headache

2017

High Blood Sugar: How high is too high?

- High blood sugar is ANY number above patient's target blood sugar range
- Look for blood sugars that remain elevated, not one individual blood sugar result
- Make sure patient knows what their blood sugars should be

2017

Symptoms of Hyperglycemia

- Increased thirst
- Headaches
- Difficulty concentrating
- Blurred vision
- Frequent urination
- Fatigue (weak, tired feeling)
- Weight loss

2017

What should your patient do for high blood sugars?

- Drink lots of water, even if it feels like your are going to the bathroom too much

  Drink sugar-free fluids – at least 8 ounces every hour
- Cut down on carbs until your blood sugar comes down
- Call your healthcare provider if blood sugars remain high, or call 911

2017

To help your patient figure out why high?

- Have I been sick or had an infection?
- Did I eat more carbs than usual?
- Did I skip any of my medications I take for Diabetes?
- Did I get less exercise than usual?
- Have I been under a lot of stress?
- Have I had a procedure or surgery?
- Wash hands and recheck, maybe just sugar on finger

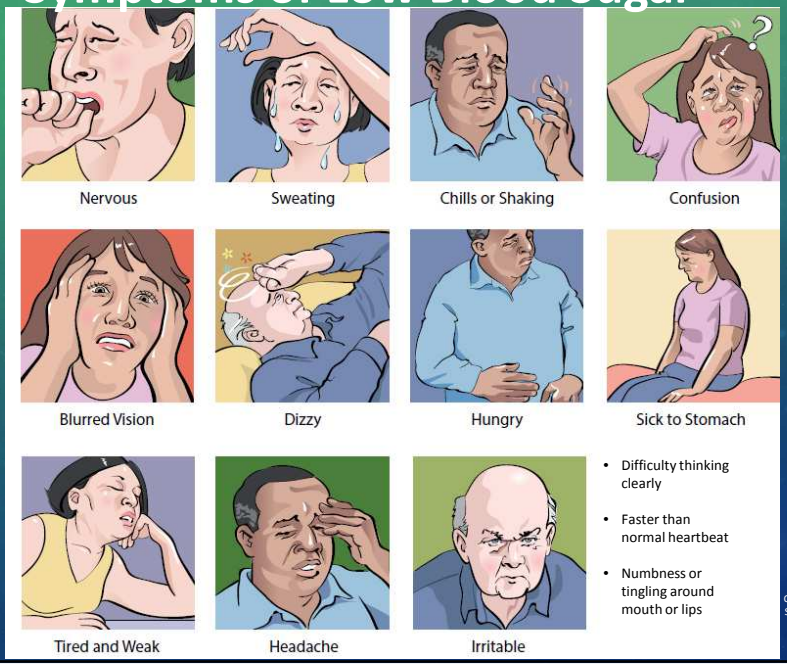
2017

Low blood sugar: How low is too low?

- Blood sugar less than 70 is the glucose alert value per the ADA Standards of care 2017.
- For some people, blood sugar less than 80 or 90 may be too low.
- Per ADA Standards of Care 2017 serious Clinically low blood sugar is <54.

2017

Symptoms of Low Blood Sugar



What should your patient do?

15-15 Rule

- Eat or drink something equal to 15 grams of fast-acting carbohydrate
- Wait for 15 minutes, then re-check your blood glucose. If it is still low, (below 70), repeat step above.

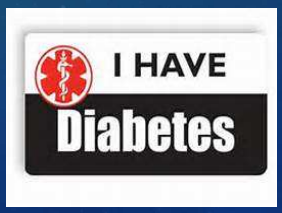
2017

One quick acting carbohydrate choice of 15 gm

2017

Hypoglycemia Follow-up

- Your patient will need to eat at least one carbohydrate AND one protein choice as a snack, or meal to keep blood glucose from going low again.
- Recommend they carry glucose with them to treat a low blood sugar reaction.
- Carry or wear medical id



2017

Snack examples

One slice of bread with:
- Meat
- Cheese
- Peanut butter

Crackers with:
- Cheese
- Peanut butter

Nuts & Crackers

2017

Help your patient figure it out…

- Did they?:

- skip a meal or eat the meal later than usual?
- eat fewer carbs than usual?
- take too much of their diabetes medicine?
- diabetes medicine just change?
- exercise more than usual?
- fast for a test or procedure?

2017

Benefits of exercise

2017

RECOMMENDATIONS: PHYSICAL ACTIVITY

- Adults with diabetes: at least 150 min/wk of moderate-intensity aerobic activity over at least 3 days/week with no more than 2 consecutive days without exercise A
- All individuals, including those with diabetes, should reduce sedentary time ;
  prolonged sitting should be interrupted every 30 minutes with short bouts of physical activity.
- Adults with type 2 diabetes should perform resistance training at least twice weekly A

American Diabetes Association.

American Diabetes Association Standards of Medical Care in Diabetes. Foundations of care and the comprehensive medical evaluation. Diabetes Care 2016; 39 (Suppl 1): S23-S35

- Use a pedometer and work up to 10,000 steps a day
- Warm up and cool down to prevent injuries
- **Wear good shoes and stay hydrated**
- **Wear medical alert when exercising**
- **Have glucose in case of low blood sugar**

Walk away a winner!

2017

Overcoming Barriers

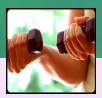
- I don't have the time
- I'm too tired
- It hurts to exercise
- It's too expensive to exercise
- I can't in this weather
- Exercise is boring

2017

Types of Exercise

Aerobic

- Aim for 30 minutes/day at least 5 days a week
- Work your muscles, increase your breathing and heart rate,



Strength Training

- Aim for 2-3 times a week
- Build strong bones and muscles and burn more calories

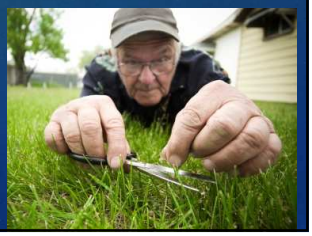
Flexibility

- Aim for 5-10 minutes of stretching/day as warm up
- Keep joints flexible and reduce chances of injury

Balance Training

- ADA 2017 Section 4 - Recommendation to highlight importance of balance and flexibility training in older adults

2017



Meals & Diabetes

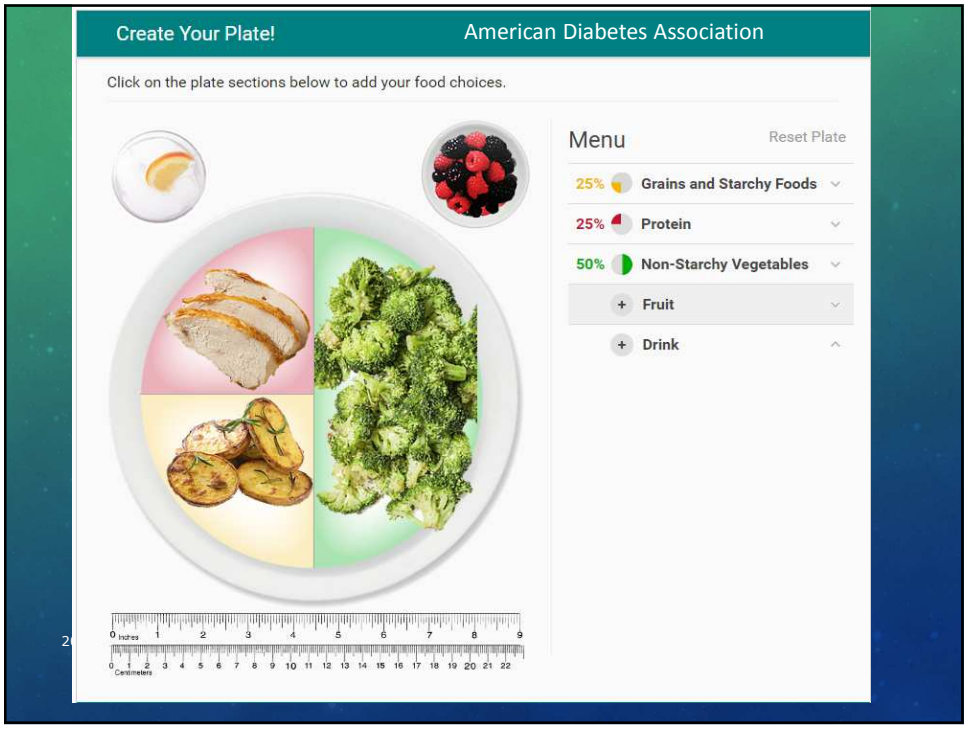
ADA Recommends individualized MNT program provided by registered dietitian.

2017

Meal Planning

- Eat 3 balanced meals per day
- Eat at the same time each day
- Eat meals 4-5 hours apart
- Avoid high-sugar drinks

2017



One carbohydrate choice = 15 grams

1 milk serving

1 fruit serving
1 starch and grain serving
1 sweet

2017

Old carbohydrate goals

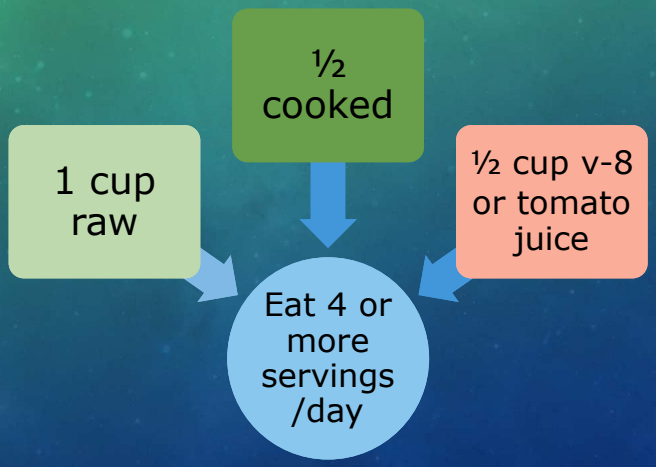
Women

- **3-4 Carbohydrate choices/meal**
  OR
- **45-60 grams of carbohydrate per meal**

Men

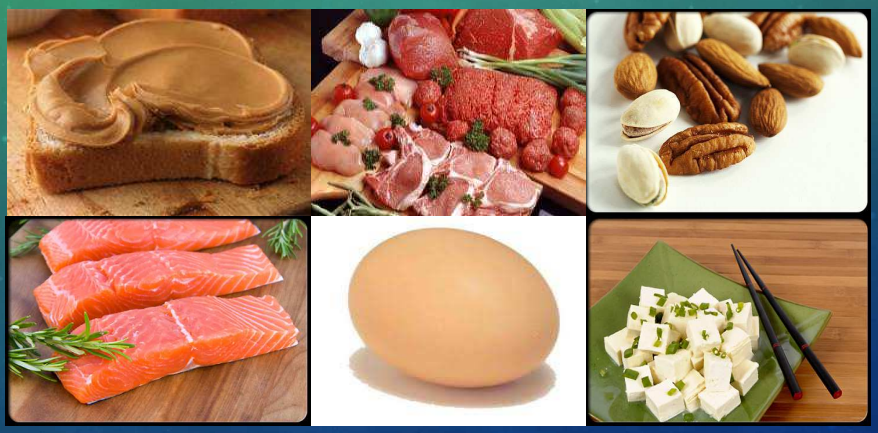
- **4-5 Carbohydrate choices/meal**
  OR
- **60-75 grams of carbohydrate per meal**

Vegetable group



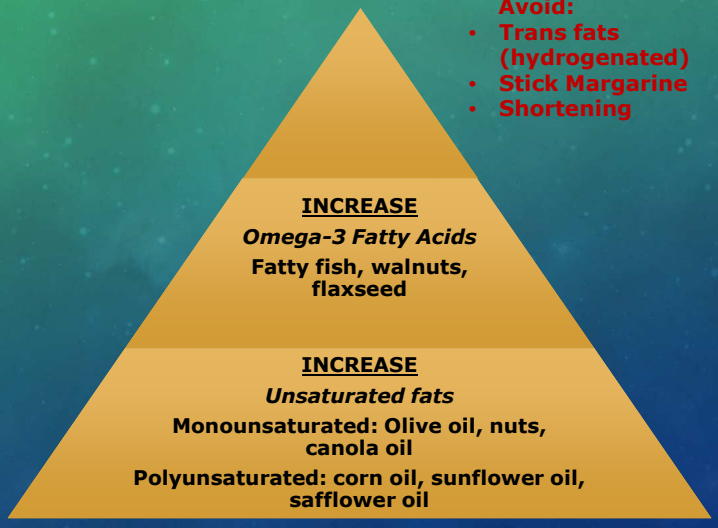
2017

Protein group



2017

Types of fats



2017

Label reading

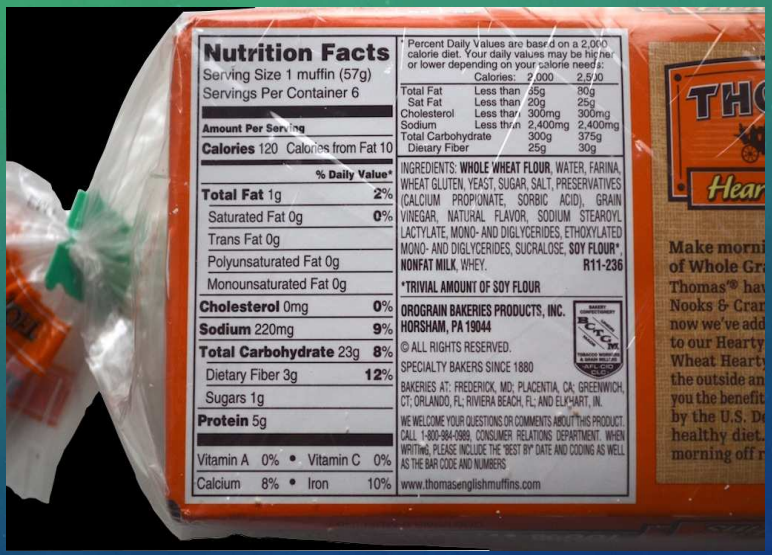
Nutrition Facts

Serving Size 1/2 cup (115g)
Servings Per Container About 4

Amount Per Serving	
Calories 250	**Calories from Fat** 130
	% Daily Value*
Total Fat 14g	**22%**
Saturated Fat 9g	**45%**
Cholesterol 55mg	**18%**
Sodium 75mg	**3%**
Total Carbohydrate 26g	**9%**
Dietary Fiber 0g	**0%**
Sugars 26g	
Protein 4g	
Vitamin A 10%	Vitamin C 0%
Calcium 10%	Iron 0%

* Percent Daily Values are based on a 2,000 calorie diet.

2017



2017

Alcohol

- Recommend no more than:
  - 1 serving/women per day
  - 1-2 servings/men per day
- One serving = 4 oz wine, 12 oz beer, 1.5 oz liquor
- Drink alcohol with carbs as by itself may cause hypoglycemia
- Contains empty calories

2017

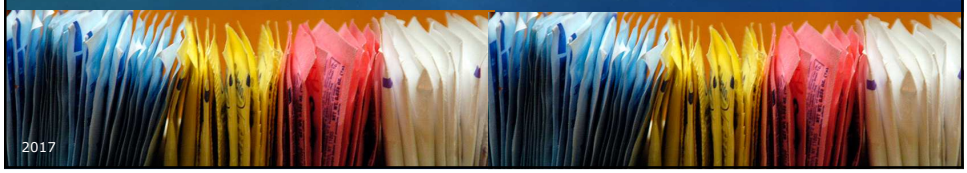
Artificial Sweeteners

SACCHARIN
Pink
Sugar Twin, Sweet-n-low

ASPARTAME
Blue
Equal, Nutrasweet

SUCRALOSE
Yellow
Splenda

STEVIA
White
Truvia, Purevia



2017

Two sodas a day could double Diabetes risk

- Research by the Swedish Karolinska Institute on 2,800 adults found that those who consumed at least two 200ml servings of sugar **OR** diet soft drinks daily were 2.4 times as likely to suffer from a form of Type 2 diabetes.
- The artificial sweeteners in the diet drinks may stimulate and distort appetite, increasing food intake, and encouraging a sweet tooth. Such sweeteners might also affect microbes in the gut leading to glucose intolerance.

2017

Obesity

Table 7.1—Treatment for overweight and obesity in type 2 diabetes

	BMI category (kg/m^2)				
Treatment	23.0* or 25.0–26.9	27.0–29.9	27.5* or 30.0–34.9	35.0–39.9	≥40
Diet, physical activity, and behavioral therapy	†	†	†	†	†
Pharmacotherapy		†	†	†	†
Metabolic surgery			†	†	†

*Cutoff points for Asian American individuals.
†Treatment may be indicated for selected motivated patients.

- Calculate BMI at each visit
- 1-2 pounds per week
- Subtract 500-1,000 cal/day
- Look at Diabetes meds that may help
- At least monthly contact, often will need more

- If weight loss after 3 months is < 5% or safety or tolerability issues exist, medication should be discontinued and alternative medications or treatment considered per ADA

2017

Obesity

Table 7.2—Medications approved by the FDA for the long-term (more than a few weeks) treatment of obesity

Generic drug name (proprietary name[s]) and dosage strength and form	Adult dosing frequency	Average wholesale price (per month)[1]	1-Year weight change status[2–5]	
			Average weight loss relative to placebo	% Patients with ≥5% loss of baseline weight
Lipase inhibitor				
Orlistat (Alli) 60 mg caps or orlistat (Xenical) 120 mg caps	60 mg or 120 mg t.i.d. (during or up to 1 h after a low-fat meal)	$43–86 (60 mg); $670 (120 mg)	2.5 kg (60 mg); 3.4 kg (120 mg)	35–73%
Selective serotonin (5-HT) 5-HT_{2C} receptor agonist				
Lorcaserin (Belviq) 10 mg tabs	10 mg b.i.d.	$263	3.2 kg	38–48%
Sympathomimetic amine anorectic/antiepileptic combination				
Phentermine/topiramate ER (Qsymia) 3.75 mg/23 mg caps, 7.5 mg/46 mg caps, 11.25 mg/69 mg caps, 15 mg/92 mg caps	Recommended dose: 3.75 mg/23 mg q.d. for 14 days, then increase to 7.5 mg/46 mg q.d. Maximum dose: 15 mg/92 mg q.d.	$239 (maximum dose using the highest strength)	6.7 kg (7.5 mg/46 mg); 8.9 kg (15 mg/92 mg)	45–70%
Opioid antagonist/aminoketone antidepressant combination				
Naltrexone/bupropion (Contrave) 8 mg/90 mg tabs	Maximum dose: two tablets of Contrave b.i.d. for a total daily dosage of naltrexone 32 mg/bupropion 360 mg	$251 (maximum dose)	2.0–4.1 kg (32 mg/360 mg)	36–57%
Acylated human glucagon-like peptide 1 receptor agonist				
Liraglutide (Saxenda) 6 mg/mL prefilled pen	Maintenance dose: 3 mg s.c. q.d.	$1,385	5.8–5.9 kg	51–73%

RECOMMENDATIONS: DIABETIC RETINOPATHY (3)

Screening (2):

- If no evidence of retinopathy for one or more eye exam, exams every 2 years may be considered. B
- If diabetic retinopathy if present subsequent examinations for type 1 and type 2 diabetic patients should be repeated annually by an ophthalmologist or optometrist. B
- If retinopathy is progressing or sight-threatening, more frequent exams required. B

American Diabetes Association.

American Diabetes Association Standards of Medical Care in Diabetes. Microvascular complications and foot care. *Diabetes Care* 2016; 39 (Suppl. 1): S72-S80

RECOMMENDATIONS: ANTIPLATELET AGENTS

Consider aspirin therapy (75–162 mg/day) C

- As a primary prevention strategy in those with type 1 or type 2 diabetes at increased cardiovascular risk (10-year risk >10%)
- Includes most men or women with diabetes age ≥50 years who have at least one additional major risk factor, including:
  - Family history of premature ASCVD
  - Hypertension
  - Smoking
  - Dyslipidemia
  - Albuminuria

American Diabetes Association

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. *Diabetes Care* 2016; 39 (Suppl. 1): S60-S71

Who should not use Aspirin?

- Aspirin Allergy
- Bleeding disorders including recent gastrointestinal bleeding
- Taking other blood thinners
- Always discuss new medications including OTC and supplements/herbs with health care provider

2017

RECOMMENDATIONS: HYPERTENSION/ BLOOD PRESSURE CONTROL

People with Diabetes and Hypertension should be treated to a blood pressure goal of <140/90 mmHG
Lower targets such as <130/80 mmHG may be appropriate for certain individuals such as younger patients if it can be achieved without undue treatment burden

American Diabetes Association.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. *Diabetes Care* 2016; 39 (Suppl. 1): S60-S71

High Blood Pressure Medications

*__Reduced CV events and mortality if at least one anti-hypertensive med given at bedtime__

Patients with albuminuria (protein in urine):
ACE inhibitors (Lisinopril) OR ARBs (losartan)
reduce ASCVD outcomes and albuminuria.

Patients without albuminuria:
ACE inhibitors (lisinopril)
ARB's (losartan)
thiazide diuretics (hydrochlorothiazide)
calcium channel blockers (amlodipine)

ADA 2017 Standards of Care

RECOMMENDATIONS FOR STATIN TREATMENT IN PEOPLE WITH DIABETES

Age	Risk Factors	Statin Intensity*
<40 years	None	None
	ASCVD risk factor(s)**	Moderate or high
	ASCVD	High
40–75 years	None	Moderate
	ASCVD risk factors	High
	ACS & LDL >50 who can't tolerate high dose statin	Moderate + ezetimibe
>75 years	None	Moderate
	ASCVD risk factors	Moderate or high
	ASCVD	High
	ACS & LDL >50 who can't tolerate high dose statin	Moderate + ezetimibe

* In addition to lifestyle therapy. ** ASCVD risk factors include LDL cholesterol ≥100 mg/dL (2.6 mmol/L), high blood pressure, smoking, overweight and obesity, and family history of premature ASCVD.

American Diabetes Association.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. *Diabetes Care* 2016; 39 (Suppl. 1): S60-S71

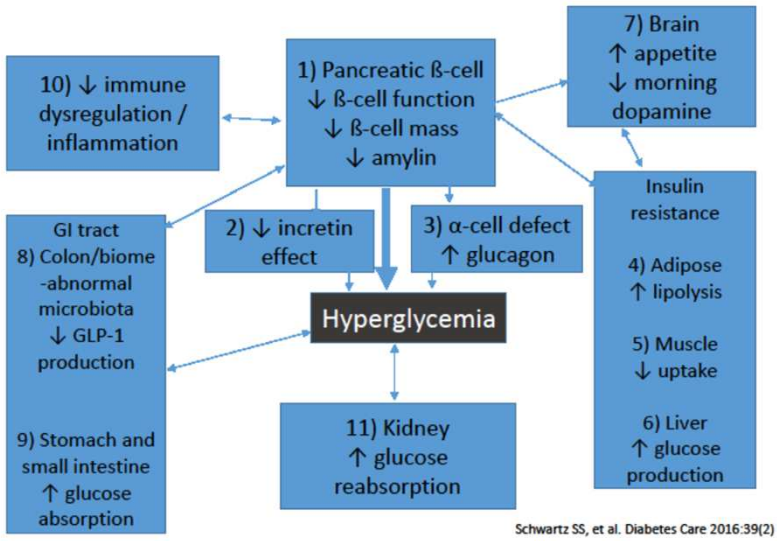
RECOMMENDATIONS: PSYCHOSOCIAL CARE

- Routinely screen for depression, diabetes-related distress, anxiety, eating disorders & cognitive impairment. B
- Adults aged ≥65 years with DM should be considered for evaluation of cognitive function, depression screening and treatment. B
- Patients with diabetes and depression should receive a collaborative care approach for depression mgmt. A

American Diabetes Association.

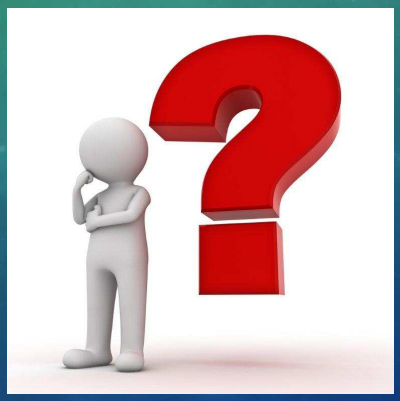
American Diabetes Association Standards of Medical Care in Diabetes. Foundations of care and the comprehensive medical evaluation. *Diabetes Care* 2016; 39 (Suppl. 1): S23-S35

Egregious Eleven – Circa 2016



Schwartz SS, et al. Diabetes Care 2016:39(2)

QUESTIONS



2017