



## Welcome to Diabetes in the 21st Century

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[www.DiabetesEd.net](http://www.DiabetesEd.net)



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### Diabetes in the 21st Century:

A Clinical and Educational Update

1. Describe impact of diabetes
2. Discuss prevention, management strategies
3. Discuss different types of diabetes
4. Describe insulin therapy
5. Gain understanding of Type 2 Meds.
6. Review glucose patterns and determine how to adjust therapy to improve glucose.
7. Discuss gut bacteria and healthy eating
8. Demonstrate successful teaching strategies



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### CDC Announces



35% of  
Americans will  
have Diabetes  
by 2050

Boyle, Thompson, Barker, Williamson  
2010, Oct 22:8(1)29  
[www.pophealthmetrics.com](http://www.pophealthmetrics.com)



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## Diabetes in America 2018

- ▶ 30.3 million or > 9.4%
- ▶ 24% don't know they have it
- ▶ 34 % of US adults have pre diabetes (84 mil)
- ▶ Increasing rates 3 key factors
  - ▶ Aging of U.S. Population
  - ▶ Increasing size of higher-risk minority populations
  - ▶ Declining mortality among those with diabetes



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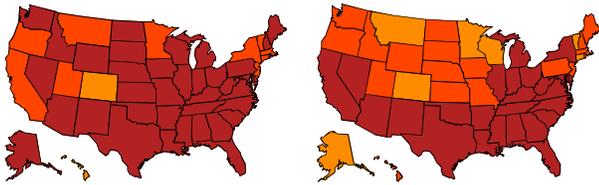
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## Age-Adjusted Prevalence of Obesity and Diagnosed Diabetes Among US Adults

2013



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## Global Epidemic

- ▶ Every 10 seconds
  - ▶ 1 person dies with diabetes
  - ▶ 2 people develop diabetes
- ▶ Every year
  - ▶ 3 million deaths
  - ▶ 6 million new cases
- ▶ World Diabetes Day is November 14
- ▶ March is ADA Sound the Alert Day "find people w/ undetected diabetes"



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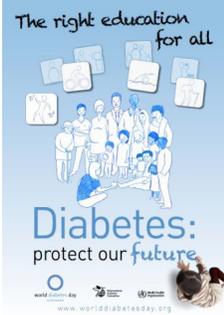
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## World Diabetes Day November 14



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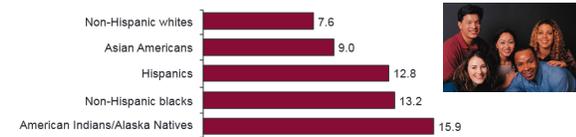
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## Age-adjusted Diabetes Prevalence 20 yrs or older, by race/ethnicity— U.S. 2014

Age-adjusted\* percentage of people aged 20 years or older with diagnosed diabetes, by race/ethnicity, United States, 2010–2012



\*Based on the 2000 U.S. standard population.  
Source: 2010–2012 National Health Interview Survey and 2012 Indian Health Service's National Patient Information Reporting System.

- Among Hispanic adults, the age-adjusted rate of diagnosed diabetes was 8.5% for Central and South Americans, 9.3% for Cubans, 13.9% for Mexican Americans, and 14.8% for Puerto Ricans.
- Among Asian American adults, the age-adjusted rate of diagnosed diabetes was 4.4% for Chinese, 11.3% for Filipinos, 13.0% for Asian Indians, and 8.8% for other Asians.
- Among American Indian and Alaska Native adults, the age-adjusted rate of diagnosed diabetes varied by region from 6.0% among Alaska Natives to 24.1% among American Indians in southern Arizona.



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## Now, let's get to the Nitty Gritty



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## Hormones Effect on Glucose

Hormone	Effect
▶ Glucagon (pancreas)	↑
▶ Stress hormones (kidney)	↑
▶ Epinephrine (kidney)	↑
▶ Insulin (pancreas)	↓
▶ Amylin (pancreas)	↓
▶ Gut hormones - incretins (GLP-1) released by L cells of intestinal mucosa, beta cell has receptors	↓




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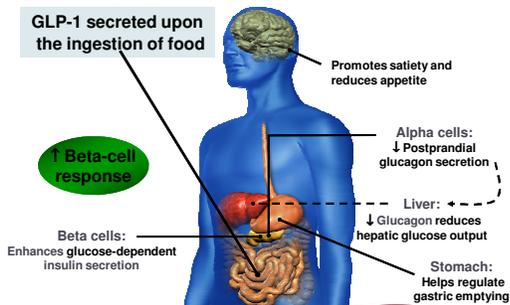
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## GLP-1 Effects in Humans Understanding the Natural Role of Incretins



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




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## Injectables that Lower Glucose

Class/Main Action	Name	Dose Range	Considerations
<b>GLP-1 Receptor Agonist (GLP-1 RA)</b>  <b>"Incretin Mimetic"</b> <ul style="list-style-type: none"> <li>Increases insulin release with food</li> <li>Slows gastric emptying</li> <li>Promotes satiety</li> <li>Suppresses glucagon</li> </ul>	exenatide (Byetta)	5 and 10 mcg BID	Side effects for all: Nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. Renally excreted.  <b>Black box warning:</b> Thyroid C-cell tumor warning for exenatide XR, liraglutide, dulaglutide, and semaglutide (avoid if family history of medullary thyroid tumor). * Victoza significantly reduces risk of CV death, heart attack, and stroke. Lowers A1c 0.5 – 1.6% Weight loss of 1.6 to 6.0kg†
	exenatide XR (Bydureon)	2mg 1x a week	
	Pen injector - Bydureon BCise		
	liraglutide (Victoza)*	0.6 and 1.8 mg daily	
	dulaglutide (Trulicity)	0.75 and 1.5 mg 1x a week pen injector	
	semaglutide (Ozempic)†	0.5 and 1.0 mg 1x a week pen injector	
lixisenatide (Adlyxin)	(Only available in combo with glargine, IGLarLixi, see below)		




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**Bariatric Surgery**

- ▶ Consider on diabetes pts w/ BMI >35, esp with comorbidities
- ▶ Remission (BG normalized)
  - ▶ rates range from 40 – 95%
  - ▶ Better results with newer diabetes (more beta cell mass)
  - ▶ Due to increase incretins (gut hormones)
- ▶ Still researching long term benefits, cost effectiveness and risk

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**Natural History of Diabetes**

<p><b>Normal</b> FBG &lt;100 Random &lt;140 A1c &lt;5.7%</p>	<p>Yes!</p> <p><b>Prediabetes</b> FBG 100-125 Random 140 - 199 A1c ~ 5.7- 6.4% 50% working pancreas</p>	<p>NO</p> <p><b>Diabetes</b> FBG 126 + Random 200 + A1c 6.5% or + 20% working pancreas</p>
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Development of type 2 diabetes happens over years or decades

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## Signs of Diabetes



- ▶ Polyuria
- ▶ Polydipsia
- ▶ Polyphasia
- ▶ Weight loss
- ▶ Fatigue
- ▶ Skin and other infections
- ▶ Blurry vision
- ▶ Glycosuria, H<sub>2</sub>O losses
- ▶ Dehydration
- ▶ Fuel Depletion
- ▶ Loss of body tissue, H<sub>2</sub>O
- ▶ Poor energy utilization
- ▶ Hyperglycemia increases incidence of infection
- ▶ Osmotic changes



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## Diabetes Classifications

- ▶ Type 1
- ▶ Type 2
- ▶ Gestational
- ▶ Secondary



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## Case Study

**1. Pt profile: 5'8", 192 lb male**  
Diabetes 12 years, on insulin 3 yrs  
*What type of DM and how do you know?*



**2. 5'6", 108 lb female**  
On insulin 3u Lispro before meals, 10u Lantus at bedtime  
*What type of DM and how do you know?*



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## Type 1 Rates Increasing Globally

- ▶ 23% rise in type 1 diabetes incidence from 2001-2009
- ▶ Why?
  - ▶ Autoimmune disease rates increasing over all
  - ▶ Changes in environmental exposure and gut bacteria?
  - ▶ Hygiene hypothesis
  - ▶ Obesity?



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## Incidence of Type 1 in Youth



- ▶ **General Pop 0.3%**
- ▶ **Sibling 4%**
- ▶ **Mother 2-3%**
- ▶ **Father 6-8%**
- ▶ Rate doubling every 20 yrs
- ▶ Many trials underway to detect and prevent (Trial Net)



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## Type 1 – 10% of all Diabetes Genetics and Risk Factors

- ▶ Auto-immune pancreatic beta cells destruction
- ▶ Most commonly expressed at age 10-14
- ▶ Insulin sensitive (require 0.5 - 1.0 units/kg/day)
- ◆ Combo of genes and environment:
  - ◆ Autoimmunity tends to run in families
  - ◆ Higher rates in non breastfed infants
  - Ⓜ Viral triggers: congenital rubella, coxsackie virus B, cytomegalovirus, adenovirus and mumps.



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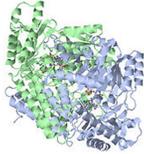
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## Autoantibodies Assoc w/ Type 1

Panel of autoantibodies –

- ▶ GAD65 - Glutamic acid decarboxylase –
- ▶ ICA - Islet Cell Cytoplasmic Autoantibodies
- ▶ IAA - Insulin Autoantibodies



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## Type 1 Diabetes Associated with other immune conditions

- ▶ Celiac disease (gluten intolerance)
- ▶ Thyroid disease
- ▶ Addison's Disease
- ▶ Rheumatoid arthritis
- ▶ Other



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## Type 1 in Hospital

- ▶ 43 yr old admitted to treat DKA secondary to severe flu.
- ▶ Insulin drip stopped and blood sugar is 92.
- ▶ Based on Regular insulin sliding scale, no insulin required.
- ▶ Breakfast tray shows up and patient says, I need my insulin shot before I eat.



**What do you say?**



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### BMI Categories

BMI	Category
17	Underweight
19	Underweight
<20	Underweight
22	Normal weight
24	Normal weight
20 - 25	Normal weight
26	Slightly Overweight
29	Slightly Overweight
26 - 29	Slightly Overweight
33	Overweight
37	Overweight
>30	Overweight
40	Extremely Overweight

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### Visceral Fat and Subcutaneous Fat

- subcutaneous fat
- abdominal muscle layer
- visceral fat
- intestines

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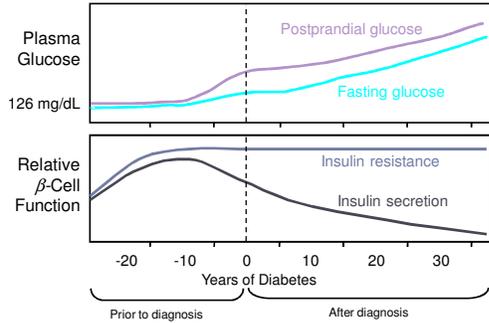
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## Natural Progression of Type 2 Diabetes



Adapted from Berghorst et al. 2000, International Diabetes Center.

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## Cardio Metabolic Risk - 5 Hypers -

- ▶ Hyperinsulinemia (resistance)
- ▶ Hyperglycemia
- ▶ Hyperlipidemia
- ▶ Hypertension
- ▶ Hyper"waistline"emia (35" women, 40" men)



*Manifestations of Insulin Resistance*



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## 2. Classification and DM Diagnosis

- ▶ Pre Diabetes & Type 2- Screening Guidelines
- ▶ Start screening **at age 45** or for **anyone** who is **overweight** (BMI  $\geq 25$ , Asians BMI  $\geq 23$ ) with one or > additional **risk factor**:
  - ▶ First-degree relative w/ diabetes
  - ▶ Member of a high-risk ethnic population
  - ▶ Habitual physical inactivity
  - ▶ PreDiabetes
  - ▶ History of heart disease



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## Diabetes 2 - Who is at Risk?

(ADA Clinical Practice Guidelines)



### Risk factors cont'd

- ▶ HTN - BP > 140/90
- ▶ HDL < 35 or triglycerides > 250
- ▶ history of Gestational Diabetes
- ▶ Polycystic ovary syndrome (PCOS)
- ▶ Other conditions assoc w/ insulin resistance:
  - ▶ Severe obesity, acanthosis nigricans (AN)
- ▶ Recheck every 3 years



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## Acanthosis Nigricans (AN)

- ▶ Signals high insulin levels in bloodstream
- ▶ Patches of darkened skin over parts of body that bend or rub against each other
  - ▶ Neck, underarm, waistline, groin, knuckles, elbows, toes
  - ▶ Skin tags on neck and darkened areas around eyes, nose and cheeks.
- ▶ No cure, lesions regress with treatment of insulin resistance



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## Diabetes Detectives Needed



- ▶ On average – takes 6.5 years to diagnose diabetes
- ▶ 1/4 of all people with diabetes don't know they have it
- ▶ 50% of Latino and Asians are undiagnosed



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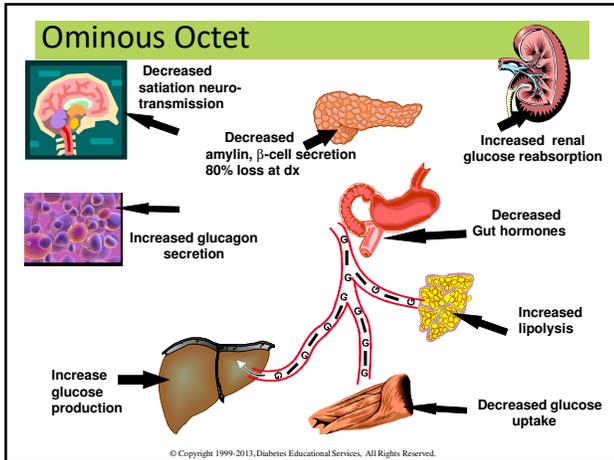
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### SGLT2 Inhibitors- "Glucoetics"

▶ **Action:** "Glucoetic" decreases renal glucose reabsorption (resets renal threshold and increases glucosuria)  
 ▶ **Expensive**

Class/Main Action	Name(s)	Daily Dose Range	Considerations
SGLT2 Inhibitors "Glucoetic" • Decreases glucose reabsorption in kidneys	Canagliflozin (Invokana)	100 - 300 mg 1x daily Don't start if GFR <45.	Side effects: hypotension, UTIs, increased urination, genital infections, ketoacidosis. <b>Monitor GFR and other considerations:</b> See package insert for dosing adjustment based on GFR.
	Dapagliflozin (Farxiga)	5 - 10 mg 1x daily Don't start if GFR <60.	- Canagliflozin increases risk of amputation.
	Empagliflozin (Jardiance)	10 - 25 mg 1x daily Don't start if GFR <45.	- Dapagliflozin, don't use in pts w/ bladder cancer.
	Ertugliflozin (Steglatro)	5 - 15 mg 1x daily Don't start if GFR <60.	- Empagliflozin & canagliflozin decrease risk of death from CV disease. <b>Benefits:</b> no hypo or weight gain. Lowers A1c 1.0%-2.0%. Lowers wt 1-3 lbs.

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### Jardiance gets special FDA CV approval

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 Published by Beverly Thomassian [?] · December 2, 2016 ·

Jardiance decreases CV Mortality by 38%. The (FDA) has approved empagliflozin (Jardiance) for the new indication of improving survival in adults with type 2 diabetes and cardiovascular disease (CVD). Important info to share!

**FDA Approves Empagliflozin for Reducing CVD Death**  
 The new indication follows the landmark EMPA-REG trial, the first to show that a diabetes drug could reduce death as well as lower blood glucose.

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## Comparison of Type 1 and Type 2

Feature	Type 1	Type 2
▶ Obesity	x	xxx
▶ Insulin dependence	xxx	30%
▶ Respond to oral agents	x	xxx
▶ Antibodies present	xxx	0
▶ Typical age of onset	puberty	40-65
▶ Insulin Resistance	x	xxx



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## Gestational DM ~ 7% of all Pregnancies

- ▶ GDM prevalence increased by
  - ▶ ~10–100% during the past 20 yrs
- ▶ Native Americans, Asians, Hispanics, African-American women at highest risk
- ▶ Immediately after pregnancy, 5% to 10% of GDM diagnosed with type 2 diabetes
- ▶ Within 5 years, 50% chance of developing DM in next 5 years.



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## Postnatal Health: Maternal Behavior

- ▶ Encourage breastfeeding for at least 6 mos
  - ▶ (Decreases risk of maternal diabetes 48%)
- ▶ Screening 6-12 weeks post partum using non-pregnant OGTT criteria (50%)
- ▶ Repeat at 3 yr intervals or signs of DM
- ▶ Encourage weight control and exercise
- ▶ Make sure connected with health care
- ▶ Preconception counseling



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## Start Metformin therapy

- ▶ For women with PreDiabetes and History of GDM




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## Metformin – New GFR Guidelines

Class/Main Action	Name(s)	Daily Dose Range	Considerations
<b>Biguanides</b> • Decreases hepatic glucose output • First line med at diagnosis of type 2	metformin (Glucophage)	500 - 2500 mg (usually BID w/ meal)	<b>Side effects:</b> nausea, bloating, diarrhea, B12 deficiency. To minimize GI Side effects, use XR and take w/ meals. <b>Obtain GFR before starting.</b> <ul style="list-style-type: none"> <li>• If GFR &lt;30, do not use.</li> <li>• If GFR &lt;45, don't start Metformin</li> <li>• If pt on Metformin and GFR falls to 30-45, eval risk vs. benefit; consider decreasing dose.</li> </ul> <b>For dye study, if GFR &lt;60, liver disease, alcoholism or heart failure, restart metformin after 48 hours if renal function stable.</b>  <b>Benefits:</b> lowers cholesterol, no hypo or weight gain, cheap. Approved for pediatrics, 10 yrs + Lowers A1c 1.0%-2.0%.
	Riomet (liquid metformin)	500 - 2500mg 500mg/5mL	
	Extended Release-XR (Glucophage XR) (Glumetza) (Fortamet)	(1x daily w/dinner) 500 – 2000 mg 500 – 2000 mg 500 – 2500 mg	



Biguanide derived from:  
Goat's Rue *Galega officinalis*,  
French Lilac




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## Biguanides – Metformin (Glucophage)

- ▶ **Action:** decrease hepatic glucose (glycogen)
- ▶ **Names:**
  - ▶ Metformin (Glucophage)
    - ▶ Starting dose: 500 BID, max 2500mg daily
  - ▶ Metformin extended release (3 different versions)
    - ▶ Starting dose 500mg at dinner, max dose 2000 to 2500 mg daily
- ▶ **Efficacy:**
  - ▶ Decrease fasting plasma glucose 60-70 mg/dl
  - ▶ Reduce A1C 1.0-2.0%




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## Biguanides - Metformin

### ▶ Benefits

- ▶ Decrease LDL cholesterol and triglycerides
- ▶ No weight gain, possible modest weight loss
- ▶ Cancer protective?

### ▶ Concerns

- ▶ Diarrhea and abdominal discomfort – Use XR  
(**may see pill shell in stool – okay**)
- ▶ Lactic acidosis if improperly prescribed
- ▶ Watch for B12 deficiency
- ▶ **Special considerations for IV contrast dye studies.** Resume when kidney function adequate.



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## Other Causes of Hyperglycemia

- ▶ Steroids
- ▶ Agent Orange
- ▶ Tube feedings / TPN
- ▶ Transplant medications
- ▶ Cystic Fibrosis

Regardless of cause, requires treatment

- ▶ Insulin always works
- ▶ Sign of pancreatic malfunction



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## Diabetes is also associated with

- ▶ Fatty liver disease
- ▶ Obstructive sleep apnea
- ▶ Alzheimer's
- ▶ Depression
- ▶ Cancer; pancreas, liver, breast



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## DiaBingo

- ▶ Frequent skin and yeast infections
- ▶ A BMI of \_\_\_\_ or greater is considered overweight
- ▶ To reduce complications, control **A1c**, **B**lood pressure, **C**holesterol
- ▶ PreDiabetes – fasting glucose level of \_\_\_\_ to \_\_\_\_
- ▶ Erectile dysfunction indicates greater risk for \_\_\_\_
- ▶ Diabetes – fasting glucose level \_\_\_\_ or greater
- ▶ Type 1 diabetes is best described as an \_\_\_\_\_ disease
- ▶ People with diabetes are \_\_\_\_\_ times more likely to die of heart dx
- ▶ Elevated triglycerides, < HDL, smaller dense LDL
- ▶ Each percentage point of A1c = \_\_\_\_\_ mg/dl glucose
- ▶ At dx of type 2, about \_\_% of the beta cell function is lost
- ▶ Diabetes – random glucose \_\_\_\_ or greater



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## Self Reflective Question

- ▶ A patient shows up to appointment, forgets their log book and meter and tells you they are only taking their daily insulin injection about 4 times a week.
- ▶ What feelings would that evoke?
  - ▶ Patient doesn't care
  - ▶ Non-compliant
  - ▶ Lazy
  - ▶ Better scare them
  - ▶ Exasperation

curiosity



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## What negative words / phrases have you heard regarding people with diabetes?

- ▶ Cheat(er)
- ▶ No will power
- ▶ Diabetic
- ▶ Lazy, weak
- ▶ Non-compliant
- ▶ Train wreck
- ▶ Frequent Flyer
- ▶ Non-adherent
- ▶ Refuses to check blood sugar
- ▶ Forgot log book again
- ▶ Refuses to take their meds as directed
- ▶ Eats junk food
- ▶ Loves sugar
- ▶ They brought it on themselves



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## Language of Diabetes Education

### Old Way

- ▶ Control diabetes
- ▶ Test BG
- ▶ Patient
- ▶ Normal BG
- ▶ Non-adherent, compliant
- ▶ Refuse

### New Way

- ▶ Manage
- ▶ Check
- ▶ Participant
- ▶ BG in target range
- ▶ Focus on what they are accomplishing
- ▶ Decided, chose

American Diabetes Association, *Diabetes Care*  
The Use of Language in Diabetes Care and Education, 2017



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## Terminology matters in medical communication about obesity

- ▶ For people with BMI >30, preferred terms
  - ▶ “person with elevated BMI”.
  - ▶ “person with obesity”
  - ▶ “person with excess weight”
- ▶ For descriptions of BMI >40
  - ▶ “class III obesity”
  - ▶ “severe BMI” and
  - ▶ “extreme BMI”



Pearl RL, et al. *JAMA Surg.* Sept2018; doi:10.1001/jamasurg.2018.2702



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## Let's use language that (is)

- ▶ Imparts hope
- ▶ Neutral, nonjudgmental
- ▶ Based on fact, actions or biology
- ▶ Free from stigma
- ▶ Respectful, inclusive
- ▶ Fosters collaboration between person and provider
- ▶ Avoids shame and blame



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## Guiding Language Principles

### Strength Based

- ▶ Emphasize what people know, what they *can* do.
- ▶ Focus on strengths that empower people

### Person-first

- ▶ Words that indicate awareness
- ▶ Sense of dignity
- ▶ Positive attitude toward person with disability



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## Quick Question

Which phrase best represents the principles for communicating with and about people living with diabetes.

- A. John is non-adherent to his insulin regimen and is not taking his insulin as prescribed
- B. John is in denial about his diabetes and frequently skips his insulin
- C. John is taking his insulin about 50% of the time
- D. John doesn't seem to care about his diabetes control at this time



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## Life Study – Mrs. Jones

Mrs. Jones is 62 years old, with a BMI of 36 and complains of feeling tired and urinating several times a night. She has an urinary tract infection. Her A1c is 8.3%, glucose 237.

She is hypertensive with a history of gestational diabetes. No ketones in urine.

- ▶ What are her risk factors and signs of diabetes?
- ▶ You find a few moments to teach and she asks you some questions.



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## Mrs. Jones asks you What Do You Say?

- ▶ What is diabetes?
- ▶ They say I am a diabetic because I am obese?
- ▶ How am I going to control this?
- ▶ What is a normal blood sugar?
- ▶ Do I have to test my blood sugars?
- ▶ My doctor told me to stay away from white foods. Is that true?



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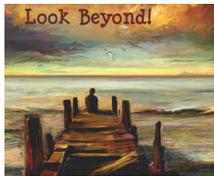
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## Look Beyond Diabetes

- ▶ ACE – Adverse Childhood Experiences
- ▶ Feelings around their diabetes
- ▶ Cultural traditions, family system.
- ▶ Social, religious and employment influences
- ▶ Personal factors: attitudes, cognitive factors, literacy, learning styles, health beliefs
- ▶ Depression, anxiety
- ▶ Mental illness
- ▶ Addiction issues



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## Empowerment Defined

- ▶ “Helping people discover and develop their inherent capacity to be responsible for their own lives and gain mastery over their diabetes”.
- ▶ Posits:
  - ▶ Choices made by the person (not HCPs) have greatest impact.
  - ▶ PWD are in control of their self-management
  - ▶ The consequences of self-management decisions affect PWD most. It is their right and responsibility to be the primary decision makers.



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## Traditional vs Empowerment Based

### Traditional

- ▶ DM is a physical illness
- ▶ HCP is viewed as teacher responsible for outcomes
- ▶ Emotional issues are separate components
- ▶ Lack of goal attainment is viewed as failure
- ▶ Behavior change are externally

### Empowerment

- ▶ DM is biopsychosocial
- ▶ PWD is viewed as problem solver /self manager
- ▶ Experiences are integral with clinical content
- ▶ Lack of goal attainment is a learning experience
- ▶ Behavior change is internally motivated



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## Quick Question

- ▶ A 82 year old enters your office and says, "the doctor and my wife made me come here. I don't have diabetes."
- ▶ A1c is 7.5%. What is the most appropriate response?
  - A. Based on your A1c level, it looks like you have diabetes.
  - B. Your wife and doctor know what is best for you.
  - C. Let's just start with carb counting.
  - D. Thank you for coming today even though you didn't want to.



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## Adaptation to the Emotional Stress of Chronic Disease

(Kubler-Ross, Rubin RR, WHPolonsky)

Denial	Listen and acknowledge. Focus on essential skills.
Anger	Indicates awareness. Learning Begins Be clear, concise. Harness anger.
Bargaining	May identify with others. Group classes helpful.
Depression & Frustration	Realize permanency of diabetes. Emphasize positive changes.
Accept & Adapt	Sense of responsibility for self-care. Provide ongoing coaching

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## A1c and Estimated Avg Glucose (eAG) 2008

A1c (%)	eAG
5	97
6	126
7	154
8	183
9	212
10	240
11	269
12	298

Order  
teaching tool  
kit free at  
diabetes.org



$eAG = 28.7 \times A1c - 46.7 \sim 29 \text{ pts per } 1\%$

*Translating the A1c Assay Into Estimated Average Glucose Values – ADAG Study*  
Diabetes Care: 31, #8, August 2008



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## Language of Diabetes Education

### Old Way

- ▶ Can't, shouldn't, don't, have to
- ▶ Regimen
- ▶ Refused
- ▶ Victim, suffer, stricken

### New Way

- ▶ Have you tried..."
- ▶ What about..."
- ▶ May I make a suggestion..."
- ▶ Plan, choices
- ▶ Declined, Chose not to
- ▶ ..lives with diabetes
- ▶ ...has diabetes

American Diabetes Association, Diabetes Care  
The Use of Language in Diabetes Care and Education, 2017



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## How Often Should I Check?

- ▶ Be realistic!!
- ▶ Type 2 on orals – Medicare covers 100 strips for 3 months
- ▶ Based on individual - Consider:
  - ▶ Types and timing of meds
  - ▶ Goals
  - ▶ Ability (physical and emotional)
  - ▶ Finances / Insurance



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## When Treatment Goals Aren't Met

- ▶ Reassess treatment regimen and barriers
  - ▶ Competing demands including family responsibilities and dynamics
  - ▶ Literacy
  - ▶ Diabetes related distress or depression
  - ▶ Poverty
  - ▶ Culturally appropriate education?
  - ▶ Referral to social worker for assistance with insurance coverage
  - ▶ Medication taking behavior and regimen
  - ▶ Other?



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## Overcoming barriers

- ▶ Identify barriers and help with problem solving
- ▶ Offer patients evidence based hope message
- ▶ Frequent contact – phone, support group, letter, etc.
- ▶ Have a list of mental health professionals ready
- ▶ Ask pt, “Tell me 1 thing that is driving you crazy about your diabetes”
- ▶ Discuss medication beliefs, ask ask ask!
- ▶ To improve outcomes, see PWD more often
- ▶ Create realistic goals

Bill Polonsky, PhD, CDE



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## “Mindfulness-based Interventions”

- ▶ Avoid compliance model
- ▶ Focus on empowerment and acceptance
- ▶ Mindfulness
  - ▶ “Pay attention-on purpose “
  - ▶ Non-judgmental
  - ▶ In-the-present
  - ▶ Better chance to be present to life and become less reactive to the tides of distraction.
  - ▶ Really HEAR your clients!



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## Complications - Why?



- ▶ Degree of hyperglycemia  
"glucose toxicity"
- ▶ Duration of hyperglycemia
- ▶ Genes
- ▶ Multiple risk factors: smoking, vascular disease, dyslipidemia, hypertension, other



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## Diabetes Complications

- ▶ Heart disease leading cause of death.
- ▶ CAD death rates are about 2 -4x's as high as adults without diabetes (it's not getting better)
- ▶ Risk of stroke is 2 - 4 times higher
- ▶ 60% - 65% of people with DM have HTN.
- ▶ DM accounts for 40% of new cases of ESRD
- ▶ 60 - 70% have mild - severe forms of neuropathy
- ▶ Diabetes is the leading cause of blindness
- ▶ Accounts for 50% of lower limb amputations



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## Control Matters

- ▶ Prevention
- ▶ Trials
- ▶ Practice Recommendations



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## Financial Advisor

- ▶ Mid 30s, friendly, he smiles to greet you and you notice his gums are inflamed. You'd guess a BMI of 26 or so, with most of the extra weight in the waist area.
- ▶ If you could give him some health related suggestions, what would they be?



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## Can we stop pre diabetes from progressing?

3, 234 people w/ Pre-Diabetes randomized:

- ▶ Placebo
- ▶ Diet/Exercise or
- ▶ Metformin

over a three year period



Diabetes Prevention Program (DPP) 2001



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## Diabetes Prevention Program

- ▶ Standard Group - 29% developed DM
- ▶ Lifestyle Results - 14% developed DM
  - ▶ 58% (71% for 60yrs +) Risk reduction
    - ▶ 30 mins daily activity
    - ▶ 5-7% of body wt loss
- ▶ Metformin 850 BID - 22% developed DM
  - ▶ 31% risk reduction (less effective with elderly and thinner pt's)



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## Weight loss and Prevention

- ▶ For every 2.2 pounds of weight loss, risk of type 2 diabetes was reduced by 13%.



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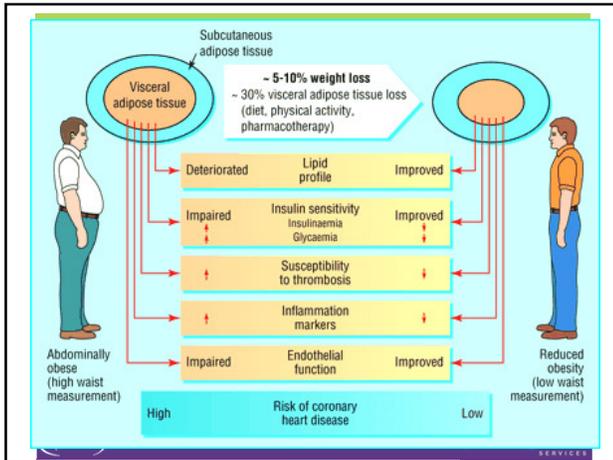
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## Goals of Care



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## ABCs of Diabetes –

- ▶ A1c less than 7% (avg 3 month BG)
  - ▶ Pre-meal BG 80-130
  - ▶ Post meal BG <180
- ▶ Blood Pressure < 140/90
- ▶ Cholesterol
  - ▶ DM and 40 yrs, start statin
  - ▶ HDL >40
  - ▶ Triglyceride < 150
- ▶ Exercise, Education
- ▶ Healthy Eating



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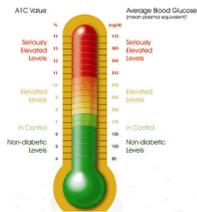
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## 6. Glycemic Targets

### ▶ Adult non pregnant A1c goals

- ▶ A1c < 7% - a reasonable goal for adults.
- ▶ A1c < 6.5% - may be appropriate for those without significant risk of hypoglycemia or other adverse effects of treatment.
- ▶ A1c < 8% - may be appropriate for patients with history of hypoglycemia, limited life expectancy, or those with longstanding diabetes and vascular complications.



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## What are next steps?

- ▶ 72 yr old, thin, lives alone, A1c 7.3%. History of MI, stroke. DM for 12 yrs, “diet controlled”. Good Insurance. Creat 1.4.



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## DPP-4 Inhibitors – “Incretin Enhancers”

Januvia (sitagliptin) – Tradjenta (linagliptin)  
Onglyza (saxagliptin) Nesina (alogliptin)

### ▶ Action:

- ▶ Increase insulin release w/ meals
- ▶ Suppress glucagon

### ▶ Dosing:

Januvia – 100mg a day  
Onglyza\* – up to 5mg a day  
Tradjenta – 5mg a day  
Nesina\* – up to 25 mg a day

### ▶ Efficacy:

- Decreases A1c by 0.6 -0.8%
- ▶ **Benefits/ Issues:** weight neutral, no hypo, few side effects. Expensive



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## DPP-IV Inhibitor Updates

### ▶ Can cause severe, disabling joint pain.

- ▶ Contact Provider, Stop Medication

### ▶ Saxagliptin (Onglyza) and Alogliptin (Nesina) can increase risk of heart failure.

- ▶ Notify provider for shortness of breath, edema, weakness, etc.



### ▶ Side effects: headache and flu-like symptoms

- ▶ Report signs of pancreatitis
- ▶ No wt gain or hypoglycemia
- ▶ Lowers A1c 0.6% - 0.8%



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## Exercise Standards

### ▶ Adults – 150 min/wk moderate intensity

- ▶ over 3 days a week.
- ▶ Don't miss > 2 consecutive days w/out exercise
- ▶ Get up every 30 mins - Reduce sedentary time
- ▶ Flexibility and balance training 2-3 xs a week (Yoga and Tai Chi)
- ▶ T1 and T2 – resistance training 2 -3 xs a week



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## A hard truth

- ▶ Exercise alone doesn't cause weight loss
- ▶ But...
  - ▶ It helps keep weight off
  - ▶ Decreases visceral fat
  - ▶ Decreases CV Risk
- ▶ To combat obesity, we need to change the food environment
- ▶ "You cannot outrun a bad diet"

**IT TAKES 524 BURPEES**  
TO BURN OFF 1 LARGE FRIES  
BURPEES SUCK, SO CHOOSE WISELY  
@NHEALTH



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## Where are we on this continuum?



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## Good Exercise Info / Quotes

- ▶ "Passaggiata" – take an after meal stroll
- ▶ Exercise decreases A1c 0.7%
- ▶ No change in body wt, but 48% loss in visceral fat
  - ▶ ADA PostGrad 2010



"Every minute of activity lowers blood sugar one point."

"I don't have time to exercise, I MAKE time." Mike Huckabee

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## DiaBingo- G

- G ADA goal for A1c is less than \_\_\_\_%
- G People with DM need to see their provider at least every month
- G Blood pressure goal is less than \_\_\_\_\_
- G People with DM should see eye doctor (ophthalmologist) at least \_\_\_\_\_
- G The goal for triglyceride level is less than \_\_\_\_\_
- G Goal for my HDL cholesterol is more than \_\_\_\_\_
- G The goal for blood sugars 1-2 hours after a meal is less than: \_\_\_\_\_
- G People with DM should get this shot every year \_\_\_\_\_
- G People with DM need to get urine tested yearly for \_\_\_\_\_
- G Periodontal disease indicates increased risk for heart disease
- G The goal for blood sugar levels before meals is: \_\_\_\_\_
- G The activity goal is to do \_\_\_ minutes on most days




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## Diabetes Care Guidelines- ADA

Test / Exam	Frequency
▶ A1c	At least twice a year
▶ B/P	Each diabetes visit
▶ Cholesterol (LDL, HDL, Tri)	Yearly (less if normal)
▶ Vaccinations	Flu yearly, pneumonia each diabetes visit
▶ Weight	Yearly
▶ Microalbumin/GFR/Creat	Yearly
● Eye exam	At least twice a year
● Dental Care	Yearly (more if high risk)
● Comprehensive Foot Exam	As needed to meet goals
● Physical Activity Plan	As needed
● Preconception counseling	As needed




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## Mr. Jones - What are Your Recommendations?

Patient Profile	Self-Care Skills
64 yr old with type 2 for 11 yrs. Hx of CVD.	▶ Walks dog around block 3 x's a week
Labs:	▶ Bowls every Friday
▶ A1c 9.3%	▶ 3 beers daily
▶ HDL 37 mg/dl	▶ <i>What meds?</i>
▶ Triglyceride 260mg/dl	▶ <i>What referrals?</i>
▶ Proteinuria - neg	▶ <i>My foot hurts</i>
▶ B/P 152/94	




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## Foot Care

# Lift the sheets and look at the Feets!



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## Glucose Management and Hospitalized Patients



▶ In hospitalized patients with critical illness, hyperglycemia is a signal that warrants our attention.



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## Hospitals and Hyperglycemia – What's the Big Deal?

▶ Hyperglycemia is associated with increased morbidity and mortality in hospital settings.

- ▶ Acute Myocardial Infarction
- ▶ Stroke
- ▶ Cardiac Surgery
- ▶ Infection
- ▶ Longer lengths of stay



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## WHAT SHOULD WE AIM FOR?

Critically Ill pts

- BG > 180- Start insulin
- BG goal 140-180



Non Critically Ill patients BG Goals

- Premeal <140
- Post meal <180

• Insulin therapy preferred treatment

Consensus: Inpt Hyperglycemia, Endocr Pract. 2009;15 (No.4)



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## Management of Hyperglycemia and Diabetes

- ▶ Stop oral agents (ie) metformin & sulfonylurea on admission
- ▶ “The sole use of Sliding Scale insulin is discouraged” –
- ▶ For discharge, oral meds can be resumed

Start Basal/bolus therapy

- ▶ NPH and Regular insulin
- ▶ Long-acting and rapid-acting insulin
- ▶ Premixed insulin



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## Now What?

▶ Nurse had an emergency and pt already ate lunch?



▶ Nurse administered insulin and pt only ate a few bites of turkey and drank non sugar tea?

▶ You just gave 3 units of Regular and patient needs to go to OR NOW!

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**No Bathroom Surgery**

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**Foot Wounds**

Blisters  
Calluses

Ulcers

Bone infection

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**5.07 monofilament = 10gms linear pressure**

Free Monofilaments  
<http://www.hrsa.gov/leap/>

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## Three Most Important Foot Care Tips

- ▶ Inspect and apply lotion to your feet every night before you go to bed.
- ▶ Do NOT go barefoot, even in your house. Always wear shoes!
- ▶ Every time you see your doctor, take off your shoes and show your feet.



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## Bottom Line

- ▶ 30-40% of hospitalized patients have diabetes
  - ▶ 10% aren't officially diagnosed
- ▶ Cardiovascular disease is the leading cause of hospitalization for people with diabetes
- ▶ Look for patients with hyperglycemia and cardiometabolic risk factors: smokers, HTN, central obesity, abnormal lipids, Acanthosis.
- ▶ Provide education and promote self-advocacy



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**"Getting diabetes saved my life."  
~ Sherri Shepard**

**PLAN**

**D**

She'll  
**LOSE WEIGHT**  
AND  
**DIABETES**  
(EVEN IF YOU DON'T HAVE IT)  
**SHERRI SHEPHERD**  
First Inspiring Coach of the Year  
WITH BILL FITZPATRICK  
HALL OF FAME



Sherri Shepard decided to embrace diabetes and use it as a motivator to improve her health.



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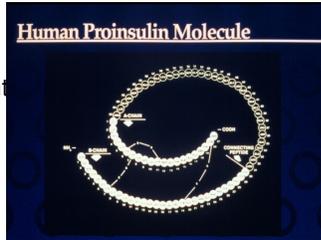
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## Insulin – the Ultimate Hormone Replacement Therapy

### Objectives:

- Discuss the actions of different insulins
- Describe using pattern management as an insulin adjustment tool.



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## Psychological Insulin Resistance (PIR)

- ▶ 50% of providers in study threatened pts “with the needle”.
- ▶ Less than 50% of providers realized insulins’ positive effect on type 2 dm
- ▶ Most pts don’t believe that insulin would “better help them manage their diabetes”.
- ▶ Solutions: Find the root of PIR and address



*Diabetes Attitudes, Wishes, Needs Study - Rubin*



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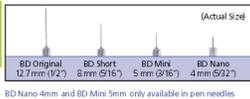
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## Needle Size often a Barrier Size *Does* Matter



- ▶ Use more short needles – 4 mm
- ▶ Effective for pts with BMI of 24- 49
- ▶ Keeps it subq
- ▶ If pt thin, inject at angle
- ▶ To avoid leakage, count to 10 before withdrawing needle
- ▶ ½ the patients who could benefit from insulin are not using it due to needle phobias



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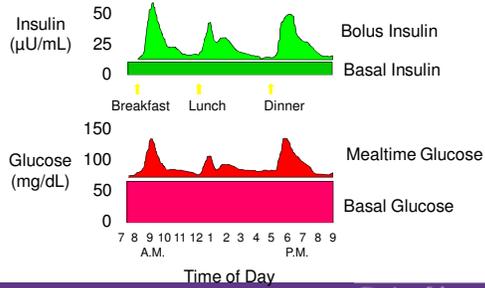
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## Physiologic Insulin Secretion: 24-Hour Profile



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## Insulin Action Teams

- ▶ **Bolus: lowers after meal glucose levels**
  - ▶ Very Rapid Acting – Aspart (Fiasp)
  - ▶ Rapid Acting
    - ▶ Aspart, Lispro, Admelog, Glulisine, Afrezza
  - ▶ Short Acting - Regular
- ▶ **Basal: controls glucose between meals, hs**
  - ▶ Intermediate
    - ▶ NPH
  - ▶ Long Acting
    - ▶ Detemir (Levemir)
    - ▶ Glargine (Lantus, Basaglar)
    - ▶ Degludec (Tresiba)



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## Case Study

- ▶ 70 yr old, weighs 100kg
- ▶ History of CABG, tobacco
- ▶ A1c – 11.3%, BG 400-500 for past weeks
- ▶ Insulin – 100+ units Lantus at hs (solostar)
- ▶ Oral Meds: Metformin, Invokana
- ▶ What is a better insulin dosing strategy?
- ▶ **Pt can't afford insulin pen – what other option**
- ▶ **Diabetes Meds on a Budget - 2014 - provides practical and affordable strategies to manage hyperglycemia**



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## Cost Per Vial in Northern CA

Per vial cost	Walmart	Walgreens	Costco
Regular Insulin	\$25*	\$92	\$99
NPH	\$25*	\$92	\$99
70/30	\$25*	\$92	\$101
Humalog	\$200	\$220	\$178
Novolog	\$197	\$217	\$178
Apidra	\$180	\$246	\$178
Levemir	\$300	\$300	\$300
Lantus	\$226	\$221	\$206



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## Bolus Insulins (½ of total daily dose ÷ meals)

Name	Onset	Peak Action
▶ Aspart (Fiasp)	2.5 min	1 hour
▶ Aspart (NovoLog)	15-30 min	1-1.5 hrs
▶ Lispro (Humalog, Admelog)		
▶ Glulisine (Apidra)		
▶ Afrezza (Inhaled)		
▶ Regular	30 mins	2-4 hrs



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## Aspart (Fiasp)

- ▶ New Aspart formulation, which includes the addition of niacinamide (vitamin B3) to increase absorption speed
- ▶ Appears in blood in ~ 2.5 mins.
- ▶ Faster onset *and* offset.
- ▶ Starts working within minutes
- ▶ Can be taken as long as 20 minutes after starting a meal.
- ▶ Fiasp available in Flex Touch Pens and 10mL vials.



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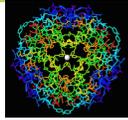
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## Lispro (Admelog) - bolus Glargine (Basaglar) – basal

- ▶ Can't use the term generics for *large* molecule biologicals because they are manufactured in living organisms (bacteria and yeast)
- ▶ Each batch may be slightly different
- ▶ Correct term is "biosimilar"
- ▶ Currently - Pharmacist to contact Provider before switching to biosimilar
  - ▶ Future – may be same as generics



Insulin – Large Molecule



Aspirin – Small Molecule




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## Bolus Insulin Summary

- ▶ Regular, aspart, lispro, glulisine,
- ▶ Starts working fast (15-30 mins)
- ▶ Gets out fast (3-6 hours)
- ▶ Post meal BG reflects effectiveness
- ▶ Should comprise about ½ total daily dose
- ▶ Covers food or hyperglycemia.
- ▶ 1 unit
  - ▶ Covers ≈ 10 -15 gms of carb
  - ▶ Lowers BG ≈ 30 – 50 points




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## Bolus Insulin Timing

- ▶ How is the effectiveness of bolus insulin determined?
  - ▶ 2 hour post meal (if you can get it)
  - ▶ Before next meal blood glucose
- ▶ Glucose goals (ADA) – may be modified by provider/pt
  - ▶ 1-2 hours post meal <180
  - ▶ Before next meal – 80 - 130




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## Pattern Management –AKA

How to think like a pancreas



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## Pattern Management

- ▶ Safety 1st!! - Evaluate 3 day patterns
- ▶ **Hypo:** eval 1st and fix:
  - ▶ If possible, decrease medication dose
  - ▶ Timing of meals, exercise, medications
- ▶ **Hyperglycemia:** evaluate 2nd
  - ▶ Identify patterns
  - ▶ Before increase insulin, make sure not missing something (carbs, exercise, omission)



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## Bolus – Insulin Sliding Scale

Starts at 150, 2 units for every 50 mg/dl >150

	Break	Lunch	Dinner	HS
Day 1	94 no insulin	212 4 uR	148 no insulin	254 6 uR
Day 2	243 4uR	254 6 uR	201 4uR	199 no insulin
Day 3	189 2uR	243 4uR	162 2uR	244 4uR
Day 4	66 No insulin	287 6uR	144 none	272 6uR



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## Basal Insulins (½ of total daily dose)

Intermediate Acting	Peak Action	Duration
▶ NPH	4-12 hrs	12-24

Long Acting	Peak Action	Duration
▶ Detemir (Levemir)	No Peak	20 hrs
▶ Glargine (Lantus)		24 hrs
▶ Glargine (Basaglar)		24 hrs
▶ Degludec (Tresiba)		42 hrs

*Fasting BG reflects efficacy of basal*



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## Degludec

- ▶ Degludec (Tresiba)
  - ▶ An ultra long acting insulin - lasts up to 42 hours
  - ▶ Takes 3-4 days to reach steady state
  - ▶ Available in u-100 and u-200 pens
  - ▶ Seems to cause less hypo
  - ▶ Adjust dose every 3-4 days
  - ▶ Wait at least 8 hours between doses
  - ▶ Good at room temp for 8 wks
- ▶ Ryzodeg 70/30
  - ▶ mixture of insulin degludec and aspart



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## Basal Insulin Summary

- ▶ NPH, Levemir, Lantus, Degludec
- ▶ Covers in between meals, through night
- ▶ Starts working slow (4 hours)
- ▶ Stays in long (12-24 hours)
  - ▶ NPH 12 hrs
  - ▶ Levemir, Lantus 20-24 hrs
  - ▶ Degludec – 42 hours
- ▶ Fasting blood glucose reflects effectiveness



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**Type 2 started on Lantus 10 units hs.  
Newly discovered hyperglycemia.**

▶ Blood Sugars

	AM	Lunch	Dinner	HS
Day 1	137	178	203	193
Day 2	96	154	167	182
Day 3	73	127	153	169
Day 4	61	193	133	152
Day 5?				




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**Basal + Metformin  
Type 2, 80kg – A1c 8.7%**

	Break	Lunch	Dinner	HS
Mo 1	170s			298 10u Lant
Mo 2	160s			233 20u Lant
Mo 4	140s	283	265	206 40u Lant




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**Next Steps**

▶ When is it too much basal insulin?

- ▶ If basal insulin is >0.5 units/kg day, advance to combination injectable therapy
  - ▶ Add bolus, switch premixed 70/30 or to Basal + GLP-RA

▶ Pt is at max basal dose

- ▶  $80 \times 0.5 = 40$  units




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24u 70/30 am, 16 u 70/30 pm  
 Patterns? Changes needed?

	Break	Lunch	Dinner	HS
Day 1	102	63	92	181
Day 2	112	67	106	195
Day 3	98	56	112	201
Day 4	99	71	132	211



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### What Medications Cause Hypoglycemia?

- ▶ Insulin
- ▶ Sulfonylureas
- ▶ Meglitinides
- ▶ Or any combo medication that includes these



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### Sulfonylureas - Squirts

- ▶ Action: Increase endogenous insulin secretion throughout day
- ▶ Efficacy:
  - ▶ Decrease FPG 60-70 mg/dl
  - ▶ Reduce A1C by 1.0-2.0%
- ▶ Side Effects:
  - ▶ Weight gain, hypoglycemia
- ▶ Benefits:
  - ▶ Cheap, effective



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## Hypoglycemia = "Limiting Factor"

- ▶ Defined as glucose of 70mg/dl or below
- ▶ 50% of episodes occur during the night
- ▶ Higher mortality rate with severe hypoglycemia secondary to sulfonylureas
  - ▶ Especially (glyburide) Micronase®, Diabeta®
- ▶ Blood glucose levels don't describe severity, response is individual



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## Hypoglycemic Symptoms

- ▶ Autonomic
  - ▶ Anxiety
  - ▶ Palpitations
  - ▶ Sweating
  - ▶ Tingling
  - ▶ Trembling
  - ▶ Hypoglycemic Unawareness
- ▶ Neuroglycopenia
  - ▶ Irritability
  - ▶ Drowsiness
  - ▶ Dizziness
  - ▶ Blurred Vision
  - ▶ Difficulty with speech
  - ▶ Confusion
  - ▶ Feeling faint



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## Treatment of Hypoglycemia

- ▶ If blood glucose **70mg/dl** or below:
  - 10-15 gms of carb to raise BG 30 - 45mg/dl
- Ⓞ Retest in 15 minutes, if still low, treat again, even without symptoms
- Ⓞ Follow with usual meal or snack
- Ⓞ If non responsive, give D50 IV or glucagon Emergency Kit
- Ⓞ Figure out how to prevent in future



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## 15 - 20 Gms Carb Sources

- ⦿ 4 ounces apple juice
- ⦿ 3 - 4 Glucose Tablets
- ⦿ 8 - 10 Lifesavers candy
- ⦿ 8 - 10 Hard candies
- ⦿ 2 Tablespoons Raisins
- ⦿ 4 - 6 oz's Nondiet soda
- ⦿ 4 - 6 oz's Fruit Juice
- ⦿ 8 oz Milk (non fat)



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## Basal Bolus – What Adjustments?

Pt weighs 80kg

	Break	Lunch	Dinner	HS
Day 1	69 7H	79 5H	245 8H	190 22u Det
Day 2	81 7H	87 5H	170 8H	133 22u Det
Day 3	73 7H	94 5H	194 8H	110 22u Det
Day 4	62 7H	83 5H	211 8H	127 22u Det



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**Intensive Diabetes Therapy  
Insulin Dosing Strategy**

**50/50 Rule**

- ▶ 0.5-1.0 units/kg day
- ▶ Basal = 50% of total
  - Glargine QD
  - NPH or Detemir BID
- Bolus = 50% of total
  - usually divided into 3 meals

**Example**

- ▶ Wt 50kg x 0.5 = 25 units of insulin/day
- ▶ Basal dose: 13 units
  - Glargine 13 units QD
  - NPH/Detemir 6u BID
- ▶ Bolus dose: 12 units
  - ▶ 4 units NovoLog, Apidra Humalog, Regular each meal



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**Intensive Diabetes Therapy  
Insulin Dosing Strategy**

**50/50 Rule**

- ▶ 0.5-1.0 units/kg day
- ▶ Basal = 50% of total
  - Glargine QD
  - NPH or Detemir BID
- Bolus = 50% of total
  - usually divided into 3 meals

**Example – You Try**

- ▶ Wt 60 kg x 0.5 = \_\_\_\_ units of insulin/day
- ▶ Basal dose: \_\_\_\_ units
  - Glargine \_\_\_\_ QD
  - NPH/Detemir \_\_ BID
- ▶ Bolus dose: \_\_\_\_ units
  - \_\_\_\_units NovoLog, Apidra Humalog, Reg each meal



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**Intensive Diabetes Therapy  
Insulin Dosing Strategy**

**50/50 Rule**

- ▶ 0.5-1.0 units/kg day
- ▶ Basal = 50% of total
  - Glargine QD
  - NPH or Detemir BID
- Bolus = 50% of total
  - usually divided into 3 meals

**Example – You Try**

- ▶ Wt 60kg x 0.5 = 30 units of insulin/day
- ▶ Basal dose: 15 units
  - Glargine 15 QD or
  - NPH/Detemir 7u BID
- ▶ Bolus dose: 15 units
  - ▶ 5 NovoLog, Apidra, Humalog, Reg each meal



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## Insulin Teaching Keys

- ▶ Bolus insulin with meals
- ▶ Basal 1-2xs daily
- ▶ Abdomen preferred injection site
- ▶ Stay 1" away from previous site
- ▶ Don't re-use ultra fine syringes
- ▶ Keep unopened insulin in refrigerator
- ▶ Toss opened insulin vial after 28 days
- ▶ Proper disposal
- ▶ Review patients ability to withdraw and inject.
- ▶ Side effects include hypoglycemia/wt gain
- ▶ Insulin pens –
  - ▶ Prime needle to assure accurate insulin dose given
  - ▶ Hold needle in for 5 seconds after injection
  - ▶ Roll 70/30 pens



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## Sharps Disposal: Product and Info

- ▶ Look in the Government section white pages for a household hazardous waste listing for your city or county.
- ▶ Call 1-800-CLEANUP (1-800-253-2687)
- ▶ Search for collection centers on the California Integrated Waste Management Board (CIWMB) Web site:  
<http://www.ciwmb.ca.gov/HHW/HealthCare/Collection/>



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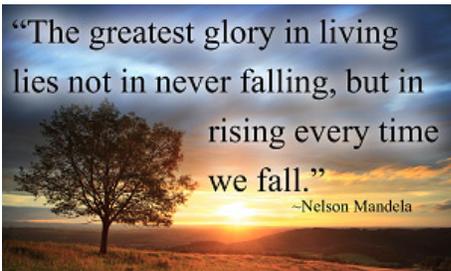
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## Diabetes Vacations

“The greatest glory in living lies not in never falling, but in rising every time we fall.”

—Nelson Mandela



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## Diabetes Bingo "DiaBingo" Shout out Right Answer



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## DiaBingo - N

- N DPP demonstrated that exercise and diet reduced risk of DM by \_\_\_%
- N Average A1c of 7% = Avg BG of \_\_\_\_\_
- N An \_\_\_\_\_ a day can help prevent heart attack and stroke
- N Rebound hyperglycemia
- N Scare tactics are effective at motivating patients to change behavior
- N Losing \_\_\_ % of body weight, can improve blood glucose, BP, lipids
- N Drugs that can cause hyperglycemia
- N 2/3 cups of rice equals \_\_\_\_\_ serving carbohydrate
  
- N One % drop in A1c reduces risk of complications by \_\_\_ %
- N 1 gm of fat equal \_\_\_\_\_ kilo/calories
- N Metabolic syndrome = hyperinsulinemia, hyperlipidemia, hypertension
- N Average American consumes 15 teaspoons of sugar a day.
- N Medication that was derived from the saliva of the Gila Monster



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## Standard American Diet is SAD

- ▶ 70% of food consumed is processed
- ▶ Low fiber, high sugar
- ▶ Intake of fruit and veggies decreasing
- ▶ We are starving our good bacteria



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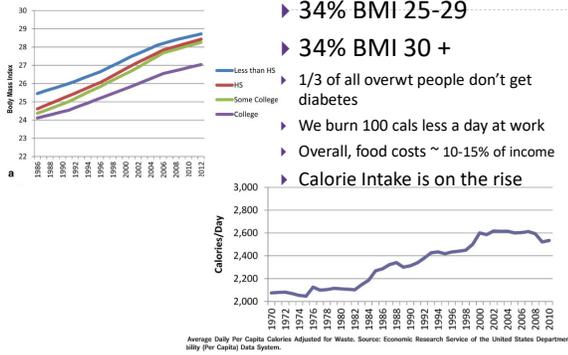
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## U.S. Weight - 68% overweight or obese



- ▶ 34% BMI 25-29
- ▶ 34% BMI 30 +
- ▶ 1/3 of all overwt people don't get diabetes
- ▶ We burn 100 cal's less a day at work
- ▶ Overall, food costs ~ 10-15% of income
- ▶ Calorie Intake is on the rise



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## Average American Consumes 22 teaspoons of added sugar a day

- ▶ WHO and AHA – Goal 6 teaspoons a Day
- ▶ 1 tsp = 4 gms sugar (15 cal's)
- ▶ 15 cal's x 22 teaspoons a day = 330 cal's a day just from added sugars
- ▶ One soda has 12 tps sugar
- ▶ New labels will list added sugar



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## Reduce refined Carbs, Added Sugars - ADA

- ▶ To control wt, reduce risk of CVD and fatty liver disease
- ▶ ADA strongly discourages consumption of:
  - ▶ Sugar sweetened beverages
  - ▶ Processed "low-fat" or "non-fat" foods with high amounts of refined grains & added sugar



*Sugary and processed foods can displace healthier, more nutrient dense food choices*



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## Your health can only get better



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## In the Beginning

- ▶ Earth
- ▶ Human
- ▶ Spirit



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## Bacterial Cells Outnumber Human Cells 10 to 1



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## Poll Question

- ▶ How much does your gut bacteria weigh?
  - A. 24 ounces
  - B. 3 pounds
  - C. Less than 1 pound
  - D. 1.5 pounds
  - E. Not sure



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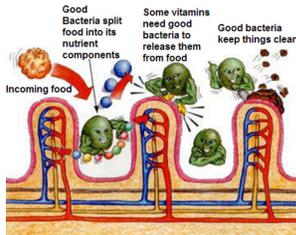
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## How do our bacteria help us?

- ▶ Maintain physiological homeostasis and metabolism.
- ▶ Other benefits
  - ▶ pathogen displacement
  - ▶ immune system development
  - ▶ barrier fortification
  - ▶ vitamin production
  - ▶ nutrient absorption
- ▶ Forgotten organ



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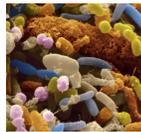
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## 3 lbs of Microbes in our Gut

- ▶ This community of bacteria can be thought of as an extra 'organ' "microbiome".
- ▶ We have evolved together with our microbiome over millions of years.
- ▶ Ratios of these communities has changed over the past 30 years
- ▶ Mirrors global spikes in obesity, diabetes, allergic and inflammatory diseases
- ▶ What are we doing to change these bacteria?



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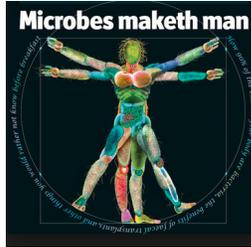
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## Gut Microbiome

- ▶ Part of endocrine axis
- ▶ Stabilized by 3 years of age
- ▶ Influenced by:
  - ▶ Birth method
  - ▶ Breast fed
  - ▶ Early Antibiotic use
  - ▶ Environment
  - ▶ Travel
- ▶ Help us
  - ▶ utilize energy
  - ▶ fight off invaders



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## Weight and Gut Bacteria New and Early Research

- ▶ Leaner people appear to have more bacterial diversity and a higher proportion of **bacteroidetes**
  - ▶ Gut bacteria less efficient at converting food to calories
- ▶ Obese people appear to have higher levels of **firmicutes**
  - ▶ Gut bacteria very efficient at calorie extraction
- ▶ Bacteria tend to run in families



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## Getting to Better Gut Bacterial Health

### Eat more PREbiotics

- ▶ Foods with indigestible fibers that nourish the good bacteria:
  - ▶ High fiber foods like, whole grains, fruits, veggies, nuts
  - ▶ High in prebiotic fibers include: Jerusalem artichokes, onions, kale, Brussels sprouts, bananas, dandelion greens & more

### PRObiotics

- ▶ These foods contain healthy bacteria like *Bifidobacterium* and *lactobacillus*.
  - ▶ Yogurt, Kefir – look for “live or active cultures”
  - ▶ Fermented foods like: Sauerkraut, Kimchi, Miso soup, kombucha



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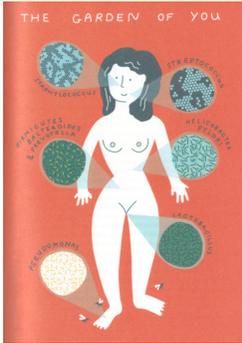
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## Follow Your Gut – Dr. Rob Knight



### Check out Dr. Knight's:

- ▶ TED Talk
- ▶ Website – AmericanFoodProject.org
- ▶ Articles in Nature and all over



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## Take Home Message

- ▶ Get Dirty
- ▶ Limit Unnecessary C-Sections
- ▶ Breastfeed if possible
- ▶ Limit early antibiotics
- ▶ Eat a wide variety of fiber foods



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## 100 Trillion Friends to Call Your Own

From the way back when, to current time man and bacteria have been intertwined.

Start with your head, it's a happening place, there's staphylococcus all over your face.

Next up is gums, teeth and mouth, You'll find streptococcus inside and out!

Now to your stomach, to keep the pH, H. pylori is on the case!

Inside the intestines, 30 feet of tube, 3 pounds of bacteria digesting your food.

From Bacteroidetes to keep you lean, to Firmicutes, a junk food digesting machine!

Prevotella another bug on the scene, breaks down fiber, veggies and beans!

Lactobacillus is a newborn's friend, lining birth canal from tip to end.

Down to your feet, in-between the toes, that's where lots of pseudomonas grows!

Short chain fatty acids, you wanna keep them around  
Protects gut mucous lining from breakin' down

So here's my message, always nourish your gut  
With fresh fruit, grains, veggies, beans and nuts

More kefir, miso, sauerkraut, kimchi  
Less sugar and fast foods to keep away disease

Breast feed, get dirty, limit antibiotic use  
Let newborns come out through the natural shoot

Be reassured that you're never alone  
You've got 100 trillion friends to call your own!



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100 Trillion Friends to Call Your Own by Beverly Thomassian, RN, MPH, GDE, BC-ADM to the tune "Yeah" in the style of Usher.

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## Medical Nutrition Therapy – ADA

- ▶ Focus on the Individual
- ▶ Maintain pleasure of eating
- ▶ Provide positive messages about food
- ▶ Limit food choices only when backed by science
- ▶ Provide practical tools
- ▶ Refer to a RD and Diabetes Education – Lowers A1c by 1-2%



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## Approach Depends on Patient

- New Type 2
  - Portion Control
  - Plate Method
  - Record Keeping
  - Education
- On Insulin?
  - Carb counting
  - Post prandial checks



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United States: The Revis family of North Carolina. Food expenditure for one week: \$341.98. Favorite foods: spaghetti, potatoes, sesame chicken. Peter Menzel, from the book, "Hungry Planet: What the World Eats."



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Guatemala: The Mendozas of Todos Santos - Food expenditure for one week: 573 Quetzales or \$75.70. Family Recipe: Turkey... [VIEW MORE](#) 19 of 27 Peter Menzel, from the book, "Hungry Planet: What the World

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## Healthy Eating Patterns

- ▶ Mediterranean Diet
- ▶ DASH Diet
- ▶ Plant based eating
- ▶ Diabetes Plate Method
- ▶ Weight Watchers or other groups




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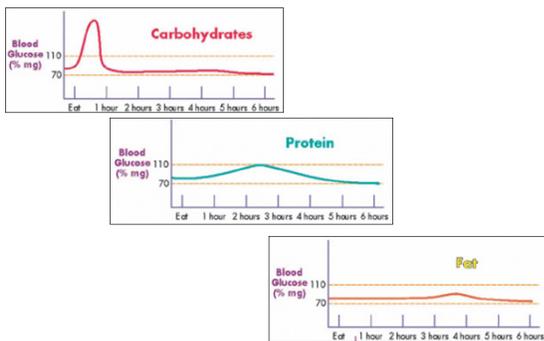
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## How nutrients affect blood sugar




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### Carb Counting - Starch

Each Food has:  
80 Calories  
15 grams carb

1 slice bread

- 1/2 cup cooked beans
- 1 small ear of corn or 1/2 cup corn
- 1/3 cup cooked pasta
- 3/4 cup cold cereal
- 1/3 cup cooked rice
- 1 small potato
- 1 small tortilla
- 5-6 small crackers
- 1/2 English muffin

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### Carb counting- fruit

Each Food has:  
60 Calories  
15 grams carb

1 slice bread

- 1 small fresh fruit
- 1/2 cup fruit juice
- 1/2 banana
- 1/2 cup unsweetened apple sauce
- 17 small grapes
- 1 cup melon
- 1/4 cup dried fruit
- 2 tsp raisins
- 1 1/4 cup strawberries

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### Carb Counting - Milk

Each Food has:  
90-150 calories  
12-15 grams carb

1 slice bread

- 8 oz buttermilk
- 1 packet diet hot cocoa
- 6 oz plain yogurt
- 8 oz milk
- 8 oz soy milk
- 6 oz light fruit yogurt

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## Carb Counting - Sweets

Each Food has:  
Calories vary  
15 grams carb

**1 slice bread**

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## Move toward the Tomato

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## Choose Healthy Carbs

- Carbs have fiber, vitamins, minerals and phytonutrients
- 25 gms of fiber a day
- Power Carbs include:
  - Beans
  - Veggies
  - Fruits
  - Whole grain foods

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## 10 SuperFoods

- ▶ Beans
- ▶ Dark Green Leafy Veggies
- ▶ Citrus Fruit
- ▶ Sweet Potatoes
- ▶ Berries
- ▶ Tomatoes
- ▶ Fish High in Omega-3 Fatty Acids
- ▶ Whole Grains
- ▶ Nuts
- ▶ Fat-Free Milk and Yogurt



As posted on diabetes.org website



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## Using Alcohol Safely

- ▶ Women- 1 or fewer alcoholic drinks a day
- ▶ Men 2 or fewer alcoholic drinks a day
  - ▶ 1 alcoholic drink equals
    - ▶ 12 oz beer, 5 oz glass of wine, or 1.5 oz distilled spirits (vodka, gin etc)
- ▶ If drink, limit amount and drink w/ food.
- ▶ Ask HCP if safe for you to drink. Tell them your usual quantity and frequency.
- ▶ Can cause hypo and worsen neuropathy



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## Another plate example

### Mi planificador de plato

Una comida saludable sabe buenísima



El Método del Plato es una manera simple de planificar las comidas para usted y su familia. No necesita contar nada ni leer largas listas de alimentos. Todo lo que necesita es un plato de 9 pulgadas.

NVC

1/4 de proteína, 1/4 de almidón, 1/2 de vegetales. Plato de 9 pulgadas



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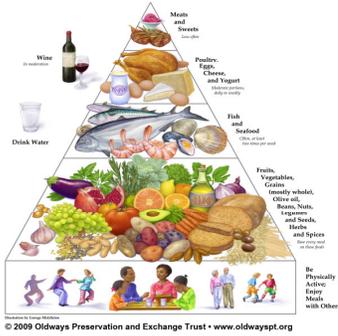
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## Mediterranean Diet Pyramid




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## The Mediterranean diet emphasizes:

- ▶ Eating primarily plant-based foods, such as fruits and vegetables, whole grains, legumes and nuts
- ▶ Replacing butter with healthy fats such as olive oil and canola oil
- ▶ Using herbs and spices instead of salt to flavor foods
- ▶ Limiting red meat to no more than a few times a month
- ▶ Eating fish and poultry at least twice a week
- ▶ Enjoying meals with family and friends
- ▶ Drinking red wine in moderation (optional)
- ▶ Getting plenty of exercise




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## USDA [www.myplate.gov](http://www.myplate.gov)

### Balancing Calories

- ▶ Enjoy your food, but eat less.
- ▶ Avoid oversized portions.

### Foods to Increase

- ▶ Make half your plate fruits and vegetables.
- ▶ Make at least half your grains whole grains.
- ▶ Switch to fat-free or low-fat (1%) milk.

### Foods to Reduce

- ▶ Compare sodium in foods like soup, bread, and frozen meals — and choose the foods with lower numbers.
- Drink water instead of sugary drinks.




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## Optimism and Resilience

- ▶ Our words have the power to create and transform
- ▶ Human connection is healing
- ▶ Tap into local partnerships
- ▶ Together, we can improve the lives of all people.



Diabetes Education SERVICES

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## Thank You



- ▶ Questions?
- ▶ Email [bev@diabetesed.net](mailto:bev@diabetesed.net)
- ▶ Web [www.diabetesed.net](http://www.diabetesed.net)



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