



## Welcome to Diabetes in the 21st Century

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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



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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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## 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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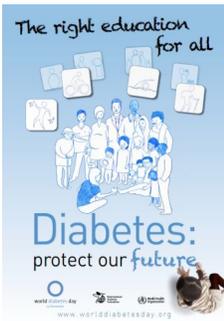
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## World Diabetes Day

November 14



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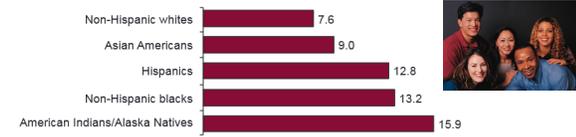
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## Age-adjusted Diabetes Prevalence

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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## Why Should Zip Code Determine Life Expectancy?



California Endowment – look up your zip code at [www.measureofamerica.org](http://www.measureofamerica.org)



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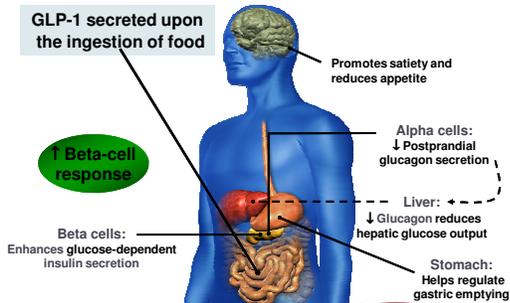
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## GLP-1 Effects in Humans Understanding the Natural Role of Incretins



Adapted from Flint A, et al. *J Clin Invest*. 1998;101:515-520  
Adapted from Larsson N, 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

GLP-1 degraded by DPP-4 w/in minutes



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## Injectables that Lower Glucose

Class/Main Action	Name	Dose Range	Considerations
GLP-1 Receptor Agonist (GLP-1 RA) "Incretin Mimetic" • Increases insulin release with food • Slows gastric emptying • Promotes satiety • Suppresses glucagon	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. Black box warning: 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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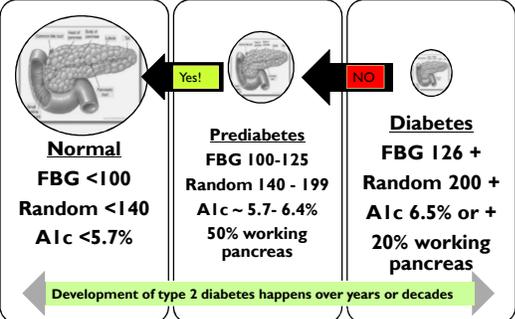
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**Natural History of Diabetes**



 <b>Normal</b> FBG <100 Random <140 A1c <5.7%	 <b>Prediabetes</b> FBG 100-125 Random 140 - 199 A1c ~ 5.7- 6.4% 50% working pancreas	 <b>Diabetes</b> FBG 126 + Random 200 + A1c 6.5% or + 20% working pancreas
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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 Regular 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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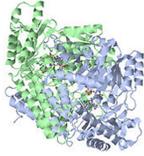
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## Autoantibodies Assoc w/ Type 1

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 Summary

- ▶ Autoimmune pancreatic destruction
- ▶ Need insulin replacement therapy
- ▶ Often first present in DKA
- ▶ At risk for other autoimmune diseases
- ▶ Eval coping strategies



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**Patti LaBelle**  
**"divabetic"**  
**"I have diabetes, it doesn't have me"**

"I don't want diabetes to steal one more life."  
 - Patti LaBelle

Join Patti LaBelle to Stop Diabetes®  
 Donate now and give hope

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### BMI Categories

17	19	<20	22	24	26	29	33	37	40
Underweight	Normal weight		Slightly Overweight		Overweight		Extremely Overweight		

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### Visceral Fat and Subcutaneous Fat

subcutaneous fat  
 abdominal muscle layer  
 visceral fat  
 intestines

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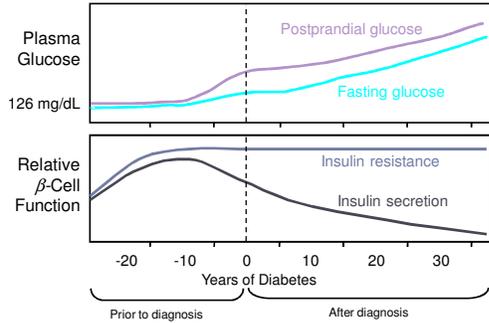
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## Natural Progression of Type 2 Diabetes



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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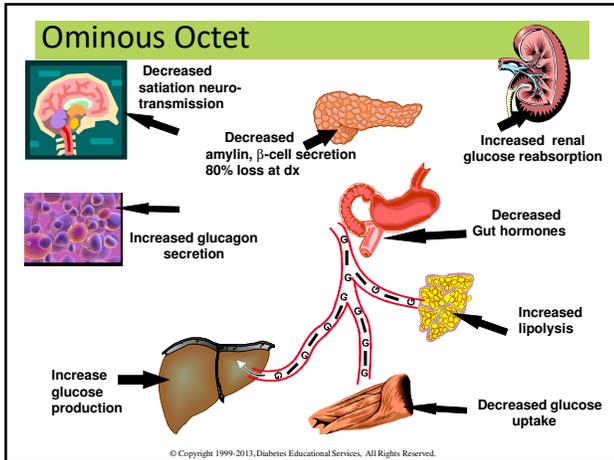
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### SGLT2 Inhibitors- "Glucoetics"

▶ **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 (P) · 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 – 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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## Life Study – Mrs. Jones

Mrs. Jones is 62 years old, overweight and complaining of feeling tired and urinating several times a night. She is admitted with a urinary tract Infection. Her WBC is 12.3, glucose 237. She is hypertensive with a history of gestational diabetes. No ketones in urine.

- ▶ What are her risk factors, signs of diabetes
- ▶ What type of diabetes does she have?
- ▶ Does she have insulin resistance?



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## Strategies – One Step at a Time Everyone can be a Diabetes Advocate



Look for  
“teaching moment”  
opportunities



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

- ▶ What is type 2 diabetes?
- ▶ Will this go away?
- ▶ Will I get complications?
- ▶ Will I need to take diabetes medication for the rest of my life?
- ▶ How come I got diabetes?
- ▶ Do I have to check my blood sugars?



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## Patient Centered Approach

- ▶ Support informed decision making
- ▶ Problem solving
- ▶ Active collaboration to improve clinical outcomes and quality of life
- ▶ Avoid judgmental words that increase feelings of shame and/or guilt
- ▶ Choose words and phrases that put people first
- ▶ Avoid shame and blame



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## Overcoming barriers

- ▶ Focus on pt's strengths
- ▶ Offer pts evidence based hope message
- ▶ Frequent contact
- ▶ Paired glucose testing
- ▶ Ask pt, "Tell me 1 thing that is driving you crazy about your diabetes"
- ▶ Discuss medication beliefs

Bill Polonsky, PhD, CDE



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## How will blood glucose testing help me?

- ▶ See if your treatment plan is working
- ▶ Make decisions regarding food and/or med adjustment when exercising
- ▶ Find out how that pizza affected your BG
- ▶ Avoid unwanted weight gain
- ▶ Enhanced athletic performance
- ▶ Find patterns
- ▶ Manage illness



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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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## 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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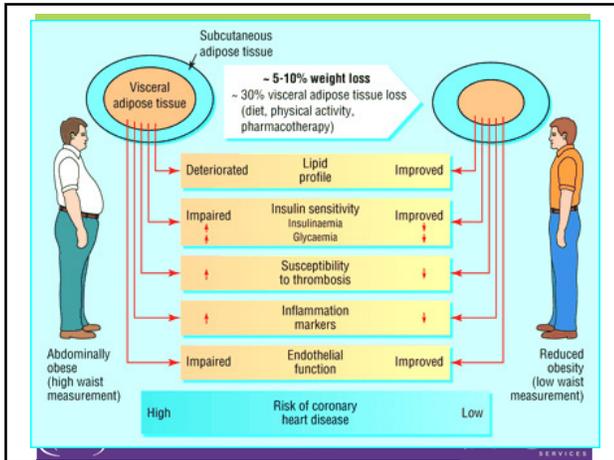
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## Goals of Care

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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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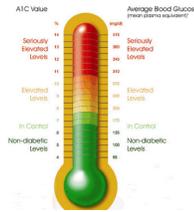
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## 6. Glycemic Targets

### ▶ 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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## 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](http://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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## 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 your patients 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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## Each minute of activity lowers BG by 1 point

- ▶ Each minute of exercise lowers BG 1 point
  - ▶ 15 minutes of walking drops BG 15 points
  - ▶ 30 minutes of biking drops BG 30 points
  - ▶ 40 minutes of housework drops BG 40 points
  - ▶ 50 minutes of walking and window shopping lowers BG 50 points



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## Best Shake For People with Diabetes



"The only diet shake I recommend is the shake your booty makes when you exercise."

From Debbie Nagata's slide collection



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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	Yearly
● Dental Care	At least twice a year
● Comprehensive Foot Exam	Yearly (more if high risk)
● Physical Activity Plan	As needed to meet goals
● Preconception counseling	As needed



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## Mr. Jones - What are Your Recommendations?

### Patient Profile

64 yr old with type 2 for 11 yrs. Hx of CVD.

### Labs:

- ▶ A1c 9.3%
- ▶ HDL 37 mg/dl
- ▶ Triglyceride 260mg/dl
- ▶ Proteinuria - neg
- ▶ B/P 152/94

### Self-Care Skills

- ▶ Walks dog around block 3 x's a week
- ▶ Bowls every Friday
- ▶ 3 beers daily
- ▶ *What meds?*
- ▶ *What referrals?*
- ▶ *My foot hurts*



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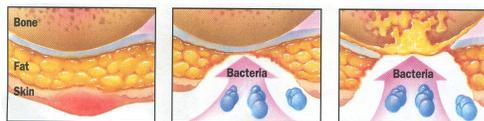
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## Foot Wounds



Blisters  
Calluses

Ulcers

Bone infection



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**No Bathroom Surgery**

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**5.07 monofilament = 10gms linear pressure**

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

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**Mr. Jones - What are Your Recommendations?**

**Patient Profile**  
 64 yr old with type 2 for 11 yrs. Hx of CVD.

**Current Status:**

- ▶ A1c 9.3%
- ▶ On Metformin 500mg BID
- ▶ Partial foot amputation
- ▶ Lives alone
- ▶ What resources, teaching?

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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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## "Getting diabetes saved my life." ~ Sherri Sheperd

**PLAN D**

That's  
**LOSE WEIGHT**  
AND  
**DIABETES**  
(EVEN IF YOU DON'T HAVE IT)  
**SHERRI SHEPHERD**



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



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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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## Insulin Therapy From Ants to Analogs:



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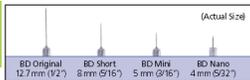
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## Needle Size often a Barrier Size *Does* Matter



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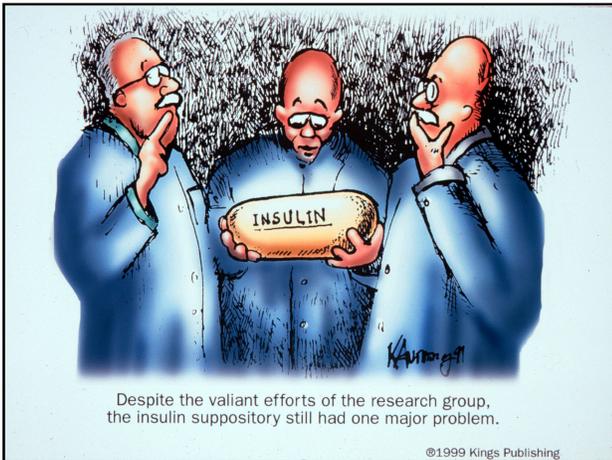
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## Bolus Insulins (½ of total daily dose ÷ meals)

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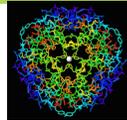
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## Lispro (Admelog) - bolus Glargine (Basaglar) – basal

- ▶ 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




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## Next Steps – Switch from 40 units basal to 70/30 Insulin

- ▶ Switch to 70/30 Insulin
- ▶ Take current dose and give 2/3 in am and 1/3 in pm.
  - ▶ 2/3 of basal in am
    - ▶ 40 units x 0.6 = 24 units 70/30
  - ▶ 1/3 of basal in \*pm
    - ▶ 40 units x 0.4 = 16 units 70/30
- ▶ \*pm = before dinner



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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<sup>®</sup>, Diabeta<sup>®</sup>
- ▶ 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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## Basal Bolus – Using 50/50 Rule - Pt weighs 80kg

	Break	Lunch	Dinner	HS
Day 1	84 6H	89 7H	145 7H	190 20 u Det
Day 2	81 6H	97 7H	107 7H	133 20u Det
Day 3	79 6H	104 7H	124 7H	110 20u Det
Day 4	69 6H	103 7H	208 7H	193 20u Det



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## More than 200 units a day?



Your patients injecting more than 200 units of insulin per day may be ready for a change

LEARN MORE >

UNITS OF INSULIN **210** 260 336

- Maria\* has type 2 diabetes with severe insulin resistance
- Her A1C is not at goal
- She is taking multiple insulin injections per day
- Approximately half of her current TDD of insulin is mealtime insulin and half is long-acting insulin



### Indication for Humulin® R U-500

Humulin R U-500 (Concentrated) is indicated as an adjunct to diet and exercise to improve glycemic control in adults and children with type 1 and type 2 diabetes mellitus.



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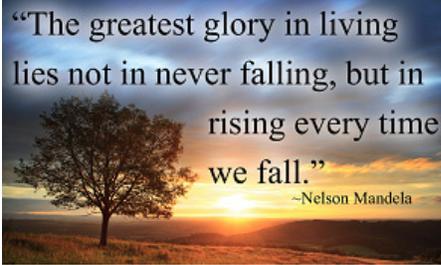
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## Diabetes Vacations



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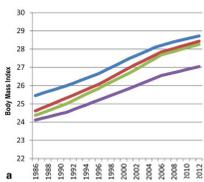
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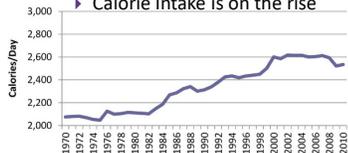
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## U.S. Weight - 68% overweight or obese



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



Average Daily Per Capita Calories Adjusted for Waste. Source: Economic Research Service of the United States Department of Agriculture (Per Capita) Data System.



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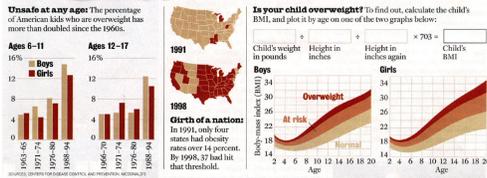
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## Bigger Meals, Bigger Kids

### Bigger Meals, Bigger Kids

It's hard for children to stay lean when portions keep growing. A look at what Americans are eating, and how it's changing the shape of our bodies:




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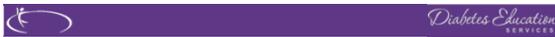
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## Average American Consumes 22 teaspoons of added sugar a day

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




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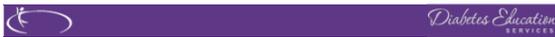
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## Reduce refined Carbs, Added Sugars - ADA

- ▶ 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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## 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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## 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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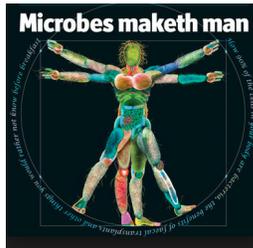
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## Gut Microbiome

- ▶ 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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## C-Section – Consider Gauze in Vagina

- ▶ Eat a healthy, balanced diet during pregnancy.
  - ▶ Avoid unnecessary antibiotics.
  - ▶ Breast-feed baby for the first 12 months.
  - ▶ If possible, avoid a C-section delivery.
  - ▶ If you need a C-section, try the "gauze-in-the-vagina technique."
- ▶ early research by Dr. Maria Gloria Dominguez-Bello, an associate professor in the Human Microbiome Program at the NYU School of Medicine. She is testing a fast and easy work-around called the "gauze-in-the-vagina technique."



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## Human Intestine Friends

▶ The majority belong 2 major phyla:

▶ Firmicutes

▶ includes *Clostridium*, *Enterococcus*, *Lactobacillus* and *Ruminococcus*

▶ Bacteroidetes

▶ includes *Bacteroides* and *Prevotella*

in proportions determined in part by birth, breastfeeding, diet



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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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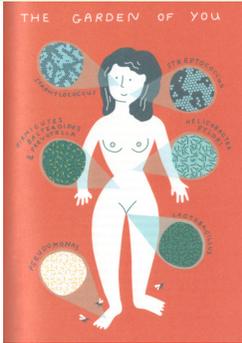
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## Follow Your Gut – Dr. Rob Knight



### Check out Dr. Knight's:

- ▶ TED Talk
- ▶ Website – [AmericanFoodProject.org](http://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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## 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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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](#)  
Peter Menzel, from the book, "Hungry Planet: What the World Eats"

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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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## Healthy Eating Patterns

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



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## Move toward the Tomato



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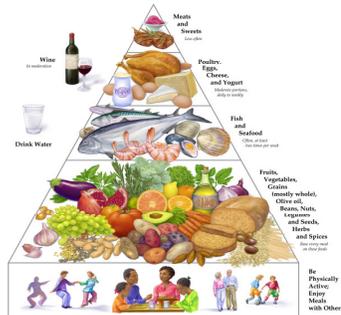
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## Mediterranean Diet Pyramid



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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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## 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](http://diabetes.org) website



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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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## 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 usar largas listas de alimentos. Todo lo que necesita es un plato de 9 pulgadas.

3/4 de proteína, 1/4 de almidón, 1/2 de vegetales.

Plato de 9 pulgadas



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## Successful weight loss strategies include

- ▶ Weekly self-weighing
- ▶ Eat breakfast
- ▶ Reduce fast food intake.
- ▶ Decrease portion size
- ▶ Increase physical activity
- ▶ Use meal replacements
- ▶ Eat healthy foods
- ▶ Drink Water
- ▶ Sleep



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## Diabetes Prevention Program Focus on fat = wt loss success

To help you lose weight and improve your health, stay as close as possible to your fat and calorie goals. Find your starting weight below. Your fat and calorie goals are in the same row. Circle your fat and calorie goals.

Weight (lb)	Fat Goal (grams)	Calorie Goal
120-174	33	1,200
175-219	42	1,500
220-249	50	1,800
>250	55	2,000

<http://www.cdc.gov/diabetes/prevention/recognition/curriculum.htm>



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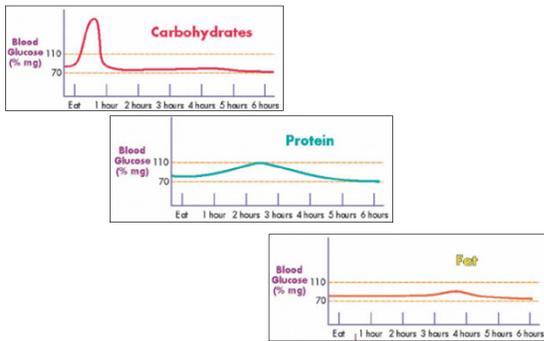
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## How nutrients affect blood sugar



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## Carbohydrate Needs for Most Adults

	Grams	Servings
Each Meal	45-60 gm	3 - 4
Snacks	15-30 gm	1- 2



Carbs affect Post Meal Blood Glucose



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## Ms. Gonzales' Daily Meal plan

Break	Lunch	Dinner	Night
5 corn tortillas, 1/2 c. beans, salsa, peppers, egg beaters	Sandwich, low fat potato chips, 1c. juice, 2-4 lowfat cookies	Lg bowl low salt soup, 1c. rice, BBQ meat, salad & cooked vevs 1 glass wine	1 bowl of cereal
<b>Avg BG 120's</b>	<b>Avg BG 200's</b>	<b>Avg BG 200's</b>	<b>Avg BG 180's</b>



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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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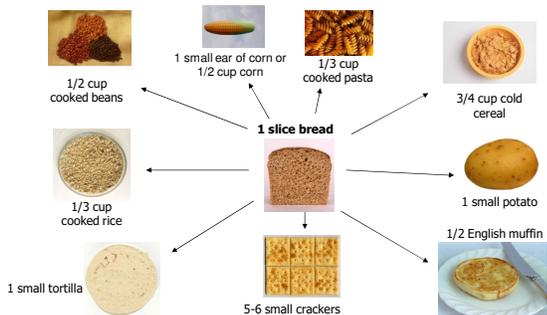
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## Carb Counting - Starch

Each Food has:  
80 Calories  
15 grams carb



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### Carb counting- fruit

Each Food has:  
60 Calories  
15 grams carb

1 slice bread is equivalent to:

- 1 small fresh fruit
- 17 small grapes
- ¼ cup dried fruit
- 2 tsp raisins
- 1 1/4 cup strawberries
- ½ cup fruit juice
- ½ banana
- ½ cup unsweetened apple sauce
- 1 cup melon

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### Carb Counting - Milk

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

1 slice bread is equivalent to:

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

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### Carb Counting - Sweets

Each Food has:  
Calories vary  
15 grams carb

1 slice bread is equivalent to:

- 2 inch square cake or brownie, unfrosted
- 2 small cookies
- ½ cup ice cream or frozen yogurt
- ½ cup sherbet
- ¼ cup sorbet
- 1 tsp syrup, jam, jelly, table sugar, honey
- 2 tsp light syrup
- ½ cup regular jello
- ½ cup diet pudding

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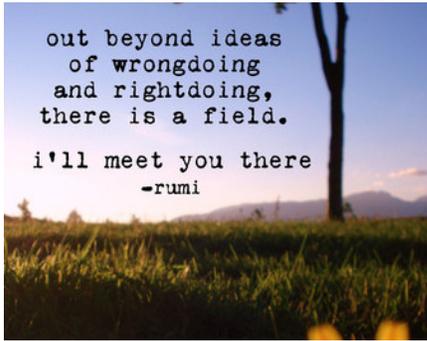
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## Give the gift of Non-Judgment



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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, CDE, BC-ADM to the tune "Yeah" in the style of Usher.

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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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