



Welcome to Diabetes in the 21st Century

Beverly Dyck Thomassian, RN, MPH, BC-ADM, CDE
President, Diabetes Education Services
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



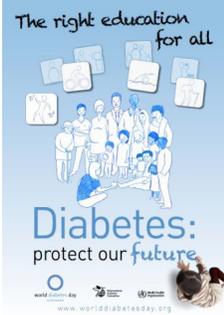
35% of
Americans will
have Diabetes
by 2050

Boyle, Thompson, Barker, Williamson
2010, Oct 22-8(1)29
www.pophealthmetrics.com



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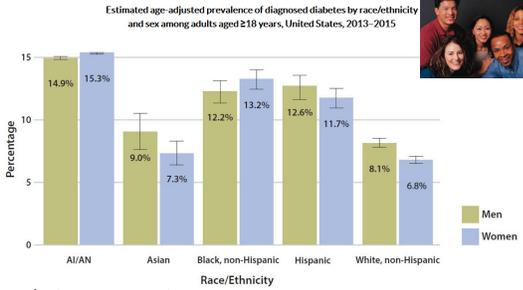
World Diabetes Day November 14



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Age-adjusted Diabetes Prevalence 18 yrs or older, by race/ethnicity— U.S. 2015

New CDC report: More than 100 million Americans have diabetes or prediabetes



• 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



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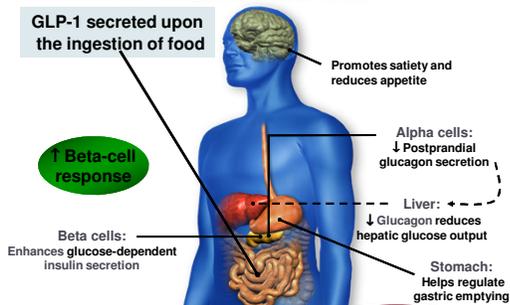
Hormones Effect on Glucose

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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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 Rivarola D. *Diabetes*. 1988;37:159-169

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)	exenatide (Byetta) exenatide XR (Bydureon)	5 and 10 mcg BID 2mg 1x a week Pen injector - Bydureon BCise	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†
"Incretin Mimetic" • Increases insulin release with food • Slows gastric emptying • Promotes satiety • Suppresses glucagon	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)	



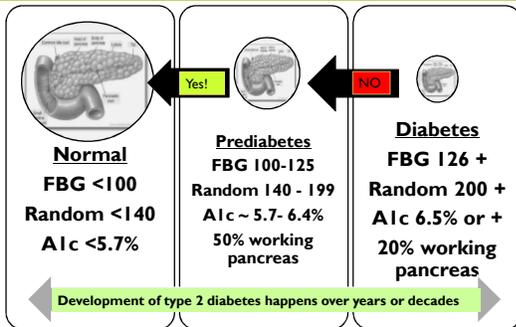
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Bariatric Surgery

- ▶ 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



Natural History of Diabetes



Signs of Diabetes



- ▶ Polyuria
- ▶ Polydipsia
- ▶ Polyphasia
- ▶ Weight loss
- ▶ Fatigue
- ▶ Skin and other infections
- ▶ Blurry vision
- ▶ Glycosuria, H₂O losses
- ▶ Dehydration
- ▶ Fuel Depletion
- ▶ Loss of body tissue, H₂O
- ▶ Poor energy utilization
- ▶ Hyperglycemia increases incidence of infection
- ▶ Osmotic changes



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 NPH 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.

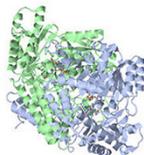


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Autoantibodies Assoc w/ Type 1

Panel of autoantibodies –

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



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What Does Type 1 Look Like?

A NEW YORK TIMES BESTSELLER

Life, Loves, and Oh Yeah, Diabetes



Mary Tyler Moore



Justice Sonia Sotomayor



Nick Jonas



Bret Michaels

From Debbie Nagata's slide collection



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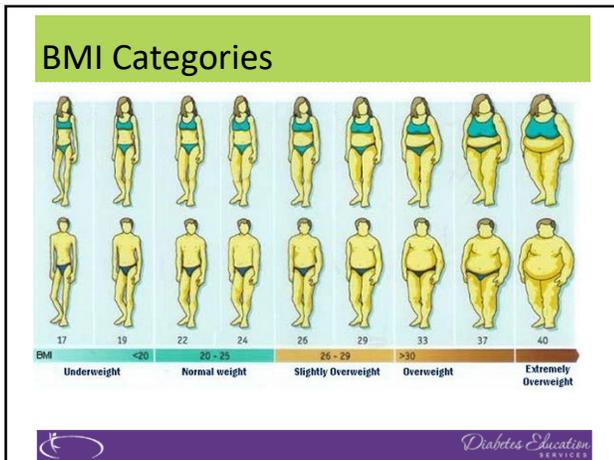
Patti LaBelle
"divabetic"
"I have diabetes, it doesn't have me"

"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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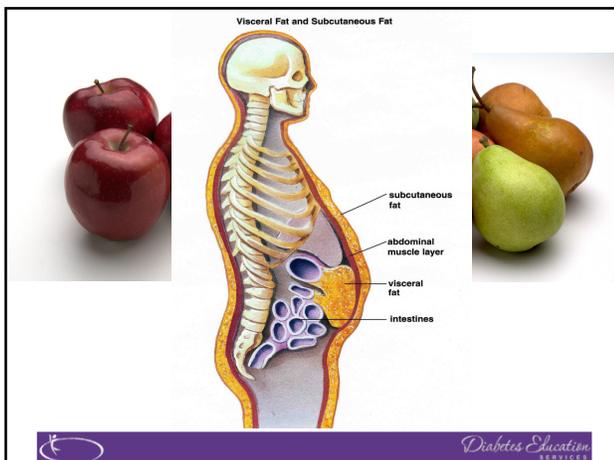
BMI Categories



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

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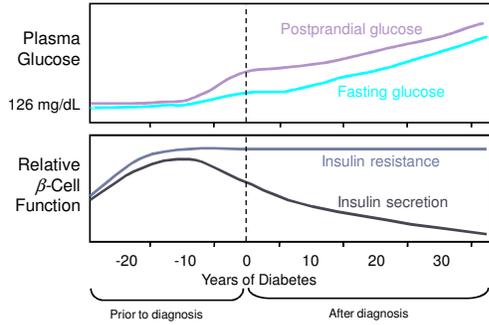
Visceral Fat and Subcutaneous Fat



subcutaneous fat
 abdominal muscle layer
 visceral fat
 intestines

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Natural Progression of Type 2 Diabetes



Adapted from Bengtsson 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 ≥ 25 , Asians BMI ≥ 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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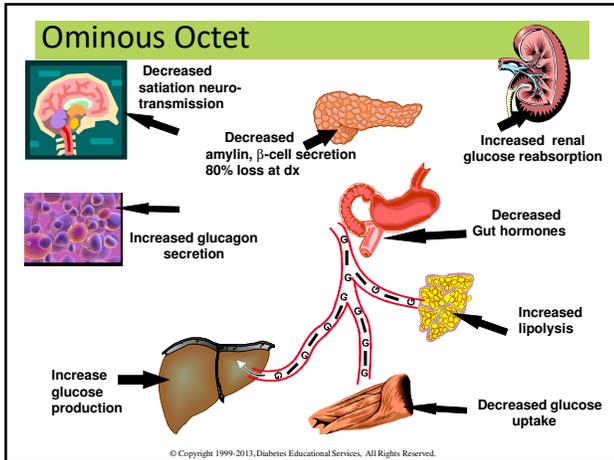
Diabetes Detectives Needed



- ▶ 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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SGLT2 Inhibitors- "Glucretics"

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

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

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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
- ▶ Consider metformin for women with PreDiabetes and History of GDM



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Metformin & GFR Guidelines

Class/Main Action	Name(s)	Daily Dose Range	Considerations
Biguanides • Decreases hepatic glucose output • First line med at diagnosis of type 2	metformin (Glucophage)	500 - 2500 mg (usually BID w/ meal)	Side effects: nausea, bloating, diarrhea, B12 deficiency. To minimize GI Side effects, use XR and take w/ meals. Obtain GFR before starting. <ul style="list-style-type: none"> • If GFR <30, do not use. • If GFR <45, don't start Metformin • If pt on Metformin and GFR falls to 30-45, eval risk vs. benefit; consider decreasing dose. For dye study, if GFR <60, liver disease, alcoholism or heart failure, restart metformin after 48 hours if renal function stable. Benefits: 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%



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.



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



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, 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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Language of Diabetes Education

Old Way

New Way

- | | |
|---------------------------|--|
| ▶ Control diabetes | ▶ Manage |
| ▶ Test BG | ▶ Check |
| ▶ Patient | ▶ Participant |
| ▶ Normal BG | ▶ BG in target range |
| ▶ Non-adherent, compliant | ▶ Focus on what they are accomplishing |
| ▶ Refuse | ▶ Decided, chose |

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



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Language of Diabetes Education

Old Way

New Way

- | | |
|------------------------------------|-------------------------------|
| ▶ Can't, shouldn't, don't, have to | ▶ Have you tried..." |
| | ▶ What about..." |
| | ▶ May I make a suggestion..." |
| ▶ Regimen | ▶ Plan, choices |
| ▶ Refused | ▶ Declined, Chose not to |
| ▶ Victim, suffer, stricken | ▶ ...lives with diabetes |
| | ▶ ...has diabetes |

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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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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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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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 x A1c - 46.7 ~ 29 pts per 1%

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



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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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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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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)



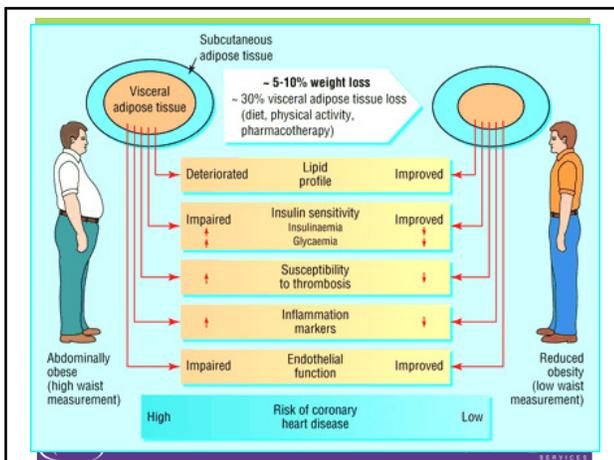
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Weight loss and Prevention

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



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Goals of Care



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ABCs of Diabetes –

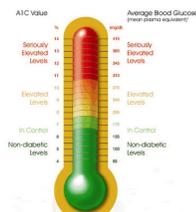
- ▶ **A1c less than 7%** (avg 3 month BG)
 - ▶ Pre-meal BG 80-130
 - ▶ Post meal BG <180
- ▶ **Blood Pressure < 140/90**
 - ▶ (If 10 year CVD risk > 15%, consider B/P target of 130/80) google ASCVD Risk Estimator
- ▶ **Cholesterol**
 - ▶ DM and 40 yrs, start statin
 - ▶ HDL >40
 - ▶ Triglyceride < 150



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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”. Creat 1.4.
- ▶ Concerns
- ▶ Meds?



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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%



Diabetes Education SERVICES

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



Diabetes Education SERVICES

A hard truth

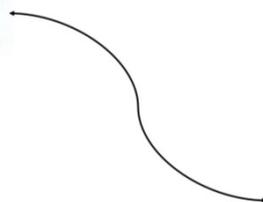
- ▶ Exercise alone doesn't cause weight loss
- ▶ But...
 - ▶ It helps keep weight off
 - ▶ Decreases visceral fat
 - ▶ Decreases CV Risk
- ▶ To combat obesity, we need to change the food environment
- ▶ "You cannot outrun a bad diet"

IT TAKES 524 BURPEES
TO BURN OFF 1 LARGE FRIES
BURPEES SICK, SO CHOOSE WISELY!
@16 HEALTH



Diabetes Education SERVICES

Where are your patients on this continuum?



Diabetes Education SERVICES

Good Exercise Info / Quotes



▶ “Passagiata” – 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

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



Diabetes Education
SERVICES

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



Diabetes Education
SERVICES

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



Diabetes Education SERVICES

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*



Diabetes Education SERVICES

Foot Wounds



Blisters
Calluses

Ulcers

Bone infection



Diabetes Education SERVICES

No Bathroom Surgery

Diabetes Education SERVICES

5.07 monofilament = 10gms linear pressure

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

Diabetes Education SERVICES

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?

Diabetes Education SERVICES

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.



Diabetes Education SERVICES

"Getting diabetes saved my life."
~ Sherri Sheperd

PLAN D

That's
LOSE WEIGHT
AND
DIABETES
(EVEN IF YOU DON'T HAVE IT)
SHERRI SHEPHERD
WITH DALE HENDRICKS
MADE BY THE AUTHOR



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

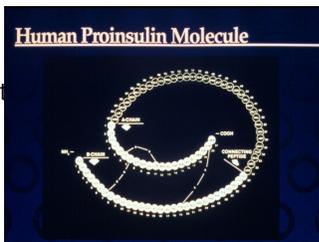


Diabetes Education SERVICES

Insulin – the Ultimate Hormone Replacement Therapy

Objectives:

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



Diabetes Education SERVICES

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



Diabetes Education SERVICES

Needle Size often a Barrier Size *Does* Matter

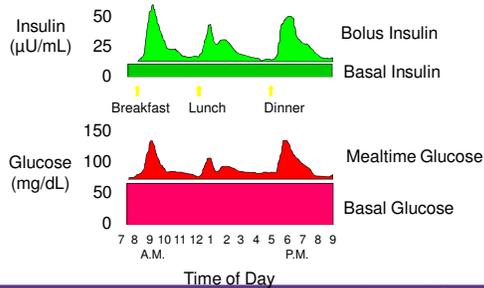


- ▶ Use more short needles – 4 mm
- ▶ Effective for pts with BMI of 24- 49
- ▶ Keeps it subq
- ▶ If pt thin, inject at angle
- ▶ To avoid leakage, count to 10 before withdrawing needle
- ▶ ½ the patients who could benefit from insulin are not using it due to needle phobias



Diabetes Education SERVICES

Physiologic Insulin Secretion: 24-Hour Profile



Diabetes Education SERVICES

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)



Diabetes Education SERVICES

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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Diabetes Education SERVICES

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



Diabetes Education SERVICES

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



Diabetes Education SERVICES

Emergence of “Copy Cat” or “Biosimilar Insulins”

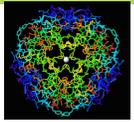
- ▶ Insulin considered a “biological drug product”
- ▶ Patent on “biologicals” last 12 yrs
 - ▶ Insulin patent sold in 1923 for \$1
 - ▶ Patent can be extended by making small improvements
 - ▶ Insulin manufacturer’s have maintained exclusivity for 93 years.. Until now
- ▶ Patents are expiring



Diabetes Education SERVICES

Biosimilar Insulins : Lispro (Admelog) Glargine (Basaglar)

- ▶ 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
- ▶ Currently - Pharmacist to contact Provider before switching to biosimilar
 - ▶ Future – may be same as generics



Diabetes Education SERVICES

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



Diabetes Education SERVICES

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



Diabetes Education SERVICES

Pattern Management –AKA

How to think like a pancreas



Diabetes Education SERVICES

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)



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



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



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



Diabetes Education SERVICES

Type 2 started on NPH 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?				



Diabetes Education SERVICES

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

	Break	Lunch	Dinner	HS
Mo 1	170s			298 10u NPH
Mo 2	160s			233 10u NPH
Mo 4	140s		283	265



Diabetes Education SERVICES

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



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



What Medications Cause Hypoglycemia?

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



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



Diabetes Education SERVICES

Hypoglycemic Symptoms

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



Diabetes Education SERVICES

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



Diabetes Education SERVICES

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)



Diabetes Education SERVICES



Diabetes Education SERVICES

Basal Bolus – What Adjustments? Pt weighs 80kg

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



Diabetes Education SERVICES

**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



Diabetes Education SERVICES

**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



Diabetes Education SERVICES

Basal Bolus – Using 50/50 Rule - Pt weighs 80kg

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



Diabetes Education SERVICES

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** 260 335

- Mona 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.




Concentrated & Inhaled Insulins DiabetesEd.net

Name/Concentration	Insulin/Action	Considerations
Humulin Regular U-500 • 500 units insulin/mL • KwikPen or Vial	Regular Bolus / Basal	5 xs concentration of u-100 insulin. Indicated for pts taking 200+ units insulin daily. 3 mL Pen – Once opened, good for 28 days. 20 mL Vial – Once opened, good for 40 days. Use designated U-500 insulin syringe.
Humalog KwikPen U-200 200 units insulin/mL	Lispro (Humalog) Bolus	2 xs concentration of u-100 insulin. 3 mL Pen. Once opened, good for 28 days
Toujeo Solostar U-300 Pen 300 units insulin/mL	Glargine (Lantus) Basal	3 xs concentration of u-100 insulin 1.5 mL Pen. Once opened, good for 42 days
Tresiba FlexTouch U-200 Pen 200 units insulin/mL	Degludec (Tresiba) Ultra basal	2 xs concentration of u-100 insulin 3 mL Pen. Once opened, good for 8 weeks

All concentrated insulin pens and the U-500 syringe automatically deliver correct dose (in less volume). No conversion, calculation or adjustments required. For example, if order reads 30 units, dial the concentrated pen to 30 units or draw up 30 units on the U-500 syringe. **Important – never withdraw concentrated insulin from the pen using a syringe.**

Inhaled Insulin

Action	Insulin Name	Dose Range	Onset	Peak	Duration	Considerations
Bolus – Rapid-acting	Afrezza Inhaled regular human insulin	4, 8, and 12 unit cartridges before meals	15 min	1 hr	3 hrs	Assess lung function. Avoid in lung disease – bronchospasm risk. Side effects: hypo, cough, throat irritation.

The information listed here are not guidelines. Please consult prescribing information for details. REV 10/2016 © 2016




Insulin Teaching Keys

- ▶ Abdomen preferred injection site
- ▶ Stay 1" away from previous site
- ▶ Don't re-use syringes
- ▶ Keep unopened insulin in refrigerator
- ▶ Look for:
 - ▶ Lipodystrophy
 - ▶ Lipohypertrophy
- ▶ Make sure insulin isn't expired
- ▶ Proper disposal
- ▶ Review patients ability to withdraw and inject.







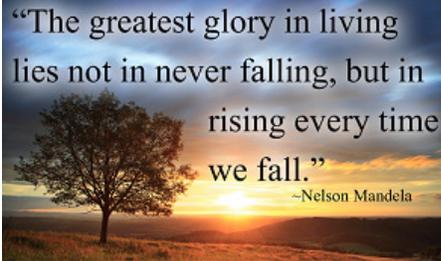
Sharps Disposal: Product and Info

- ▶ 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/>



Diabetes Education SERVICES

Diabetes Vacations



Diabetes Education SERVICES

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



Diabetes Education SERVICES

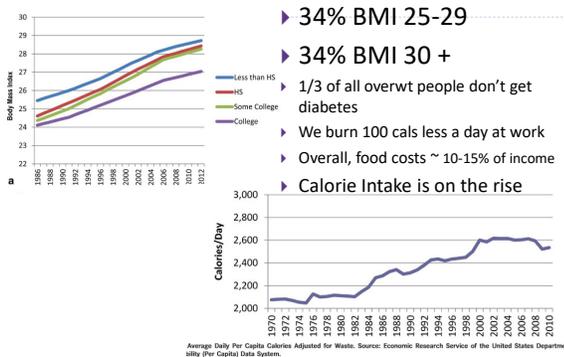
Standard American Diet is SAD

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



Diabetes Education SERVICES

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 cals less a day at work
- ▶ Overall, food costs ~ 10-15% of income
- ▶ Calorie Intake is on the rise



Diabetes Education SERVICES

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)
- ▶ 15cals x 22 teaspoons a day =
 - ▶ 330 cals a day just from added sugars
- ▶ One soda has 12 tsps sugar
- ▶ New labels will list added sugar



Diabetes Education SERVICES

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



Diabetes Education SERVICES

Your health can only get better



Diabetes Education SERVICES

In the Beginning

- ▶ Earth
- ▶ Human
- ▶ Spirit



Diabetes Education SERVICES

Bacterial Cells Outnumber Human Cells 10 to 1



Diabetes Education SERVICES

Poll Question

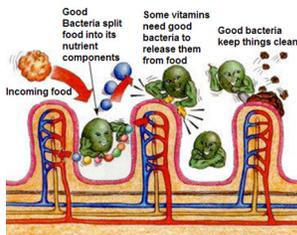
- ▶ How much does your gut bacteria weigh?
 - A. 24 ounces
 - B. 3 pounds
 - C. Less than 1 pound
 - D. 1.5 pounds
 - E. Not sure



Diabetes Education SERVICES

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



3 lbs of Microbes in our Gut

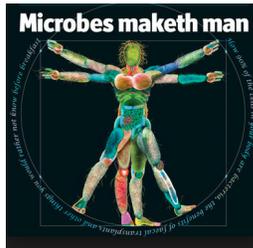
- ▶ This community of bacteria can be thought of as an extra 'organ' "microbiome".
- ▶ We have evolved together with our microbiome over millions of years.
- ▶ Ratios of these communities has changed over the past 30 years
- ▶ Mirrors global spikes in obesity, diabetes, allergic and inflammatory diseases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



Diabetes Education SERVICES

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



Diabetes Education SERVICES

Weight and Gut Bacteria New and Early Research

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



Diabetes Education SERVICES

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

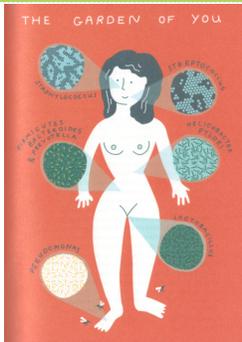
PRObiotics

- ▶ 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



Diabetes Education SERVICES

Follow Your Gut – Dr. Rob Knight



Check out Dr. Knight's:

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



Diabetes Education SERVICES

Take Home Message

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



Diabetes Education SERVICES

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%



Diabetes Education SERVICES



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."



Diabetes Education SERVICES



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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Diabetes Education SERVICES

Approach Depends on Patient

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



Diabetes Education SERVICES

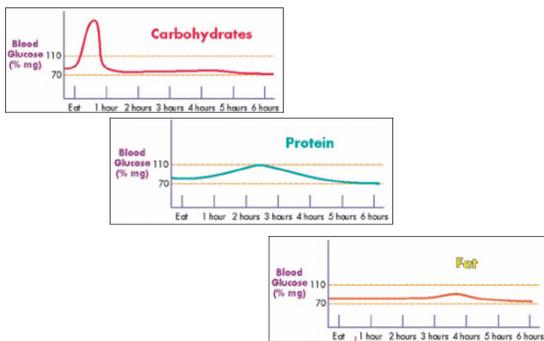
Healthy Eating Patterns

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



Diabetes Education SERVICES

How nutrients affect blood sugar



Diabetes Education SERVICES

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

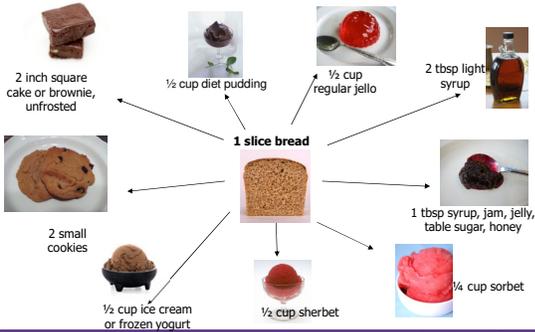
1 slice bread

- 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



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Move toward the Tomato



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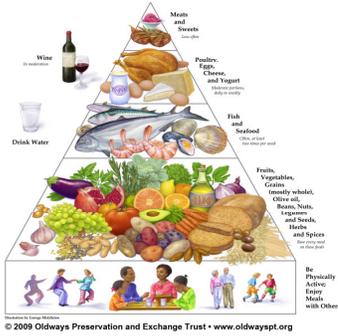
Using Alcohol Safely

- ▶ 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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Mediterranean Diet Pyramid



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



USDA 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.



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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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 leer largas listas de alimentos. Todo lo que necesita es un 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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GREAT DREAM

Ten keys to happier living

Action for Happiness has developed the 10 Keys to Happier Living based on a review of the latest scientific research relating to happiness.

Everyone's path to happiness is different, but the research suggests there are things consistently found to have a positive impact on people's overall happiness and well-being.

The first five relate to how we interact with the outside world in our daily activities. The second five come more from inside us and depend on our attitude to life.

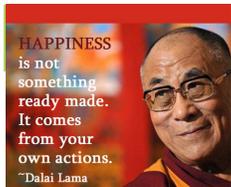
- GIVING** Do things for others
- RELATING** Connect with people
- EXERCISING** Take care of your body
- APPRECIATING** Notice the world around
- TRYING OUT** Keep learning new things
- DIRECTION** Have goals to look forward to
- RESILIENCE** Find ways to bounce back
- EMOTION** Take a positive approach
- ACCEPTANCE** Be comfortable with who you are
- MEANING** Be part of something bigger

ACTION FOR HAPPINESS

Actionforhappiness.org

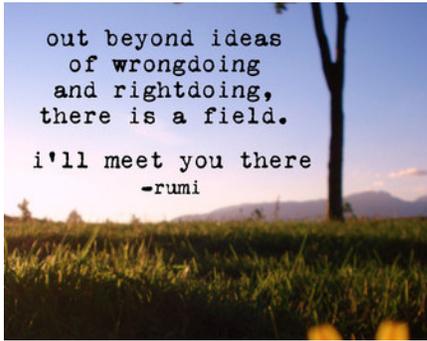


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“ People will forget what you said, people will forget what you did, but people will never forget how you made them feel ?? — Maya Angelou

Give the gift of Non-Judgment



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Thank You



- ▶ Questions?
- ▶ Email bev@diabetesed.net
- ▶ Web www.diabetesed.net



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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.
