Diabetes Education SERVICES

CELEBRATING 20 YEARS

Welcome to Diabetes in the 21st Century

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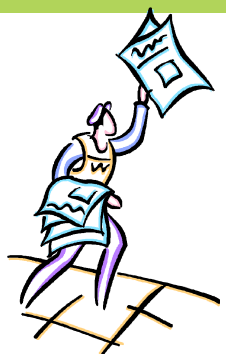
www.DiabetesEd.net

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

CDC Announces



35% of Americans will have Diabetes by 2050

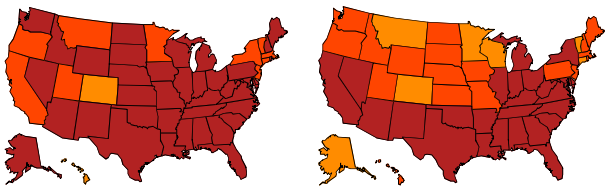
Boyle, Thompson, Barker, Williamson
2010, Oct 22:8(1)29
www.pophealthmetrics.com

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

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

2013



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"

World Diabetes Day
November 14

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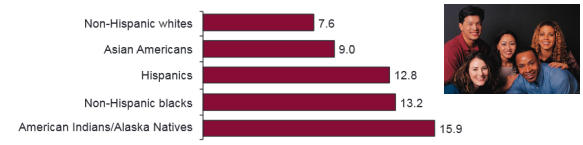
Age-adjusted Diabetes Prevalence
20 yrs or older, by race/ethnicity— U.S. 2014

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

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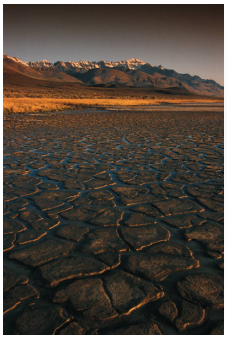
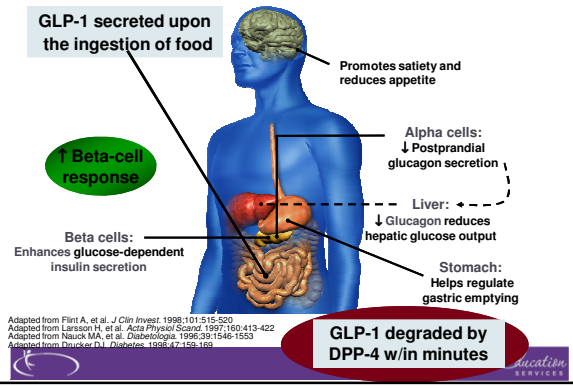
Now, let's get to the Nitty Gritty



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)	↓

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 H, 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

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) 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†
	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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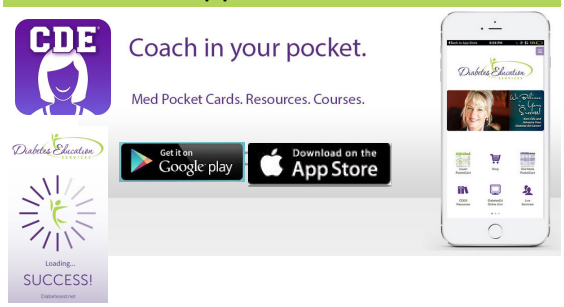
CDE® Coach App – Download Success



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Bariatric Surgery

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

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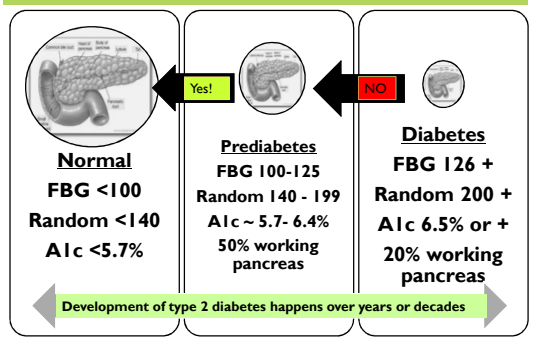
Natural History of Diabetes



Signs of Diabetes

- Polyuria
- Polydipsia
- Polyphasia
- Weight loss
- Fatigue
- Skin and other infections
- Blurry vision

- Glycosuria, H_2O losses
- Dehydration
- Fuel Depletion
- Loss of body tissue, H_2O
- Poor energy utilization
- Hyperglycemia increases incidence of infection
- Osmotic changes

Diabetes Classifications

- Type 1
- Type 2
- Gestational
- Secondary

Case Study

1. Pt profile: 5'8", 192 lb male

Diabetes 12 years, on insulin 3 yrs

What type of DM and how do you know?

2. 5'6", 108 lb female

On insulin 3u Lispro before meals, 10u Lantus at bedtime

What type of DM and how do you know?

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?

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)

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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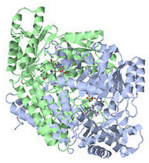
Autoantibodies Assoc w/ Type 1

Panel of autoantibodies –

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



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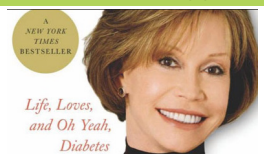
What Does Type 1 Look Like?



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

Type 1 Summary

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

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

BMI Categories

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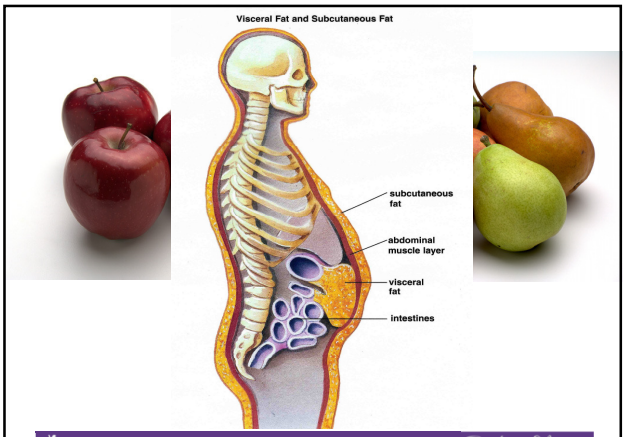
Visceral Fat and Subcutaneous Fat



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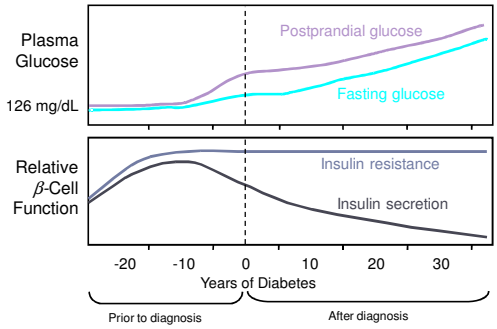
Natural Progression of Type 2 Diabetes



Adapted from Bergenstal et al. 2000; International Diabetes Center.

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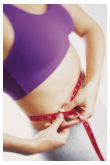
Cardio Metabolic Risk - 5 Hypers -



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

Manifestations of Insulin Resistance

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

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

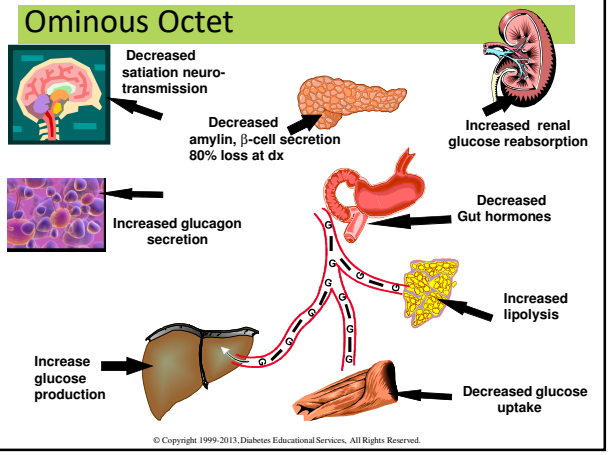
Acanthosis Nigricans (AN)

- 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

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

Ominous Octet



SGLT2 Inhibitors- "Glucoretics"

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

Class/Main Action	Name(s)	Daily Dose Range	Considerations
SGLT2 Inhibitors "Glucoretic" • Decreases glucose reabsorption in kidneys	Canagliflozin (Invokana) Dapagliflozin (Farxiga) Empagliflozin (Jardiance) Ertugliflozin (Steglatro)	100 - 300 mg 1x daily Don't start if GFR <45. 5 - 10 mg 1x daily Don't start if GFR<60. 10 - 25 mg 1x daily Don't start if GFR <45. 5 – 15 mg 1x daily Don't start if GFR <60.	**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.

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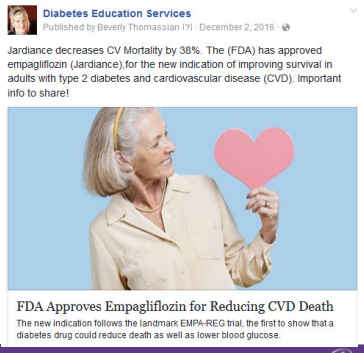
Jardiance gets special FDA CV approval



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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
Biguanides • Decreases hepatic glucose output • First line med at diagnosis of type 2	metformin (Glucophage) Riomet (liquid metformin)	500 - 2500 mg (usually BID w/ meal) 500 - 2500mg 500mg/5mL	**Side effects:** nausea, bloating, diarrhea, B12 deficiency. To minimize GI Side effects, use XR and take w/ meals. **Obtain GFR before starting.** • If GFR <30, do not use. • If GFR <45, don't start Meformin • 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%.
	Extended Release-XR (Glucophage XR) (Glumetza) (Fortamet)	(1x daily w/dinner) 500 – 2000 mg 500 – 2000 mg 500 – 2500 mg	

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

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Biguanides – Metformin (Glucophage)

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

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Biguanides - Metformin

- Benefits
  - Decrease LDL cholesterol and triglycerides
  - No weight gain, possible modest weight loss
  - Cancer protective?
- Concerns
  - Diarrhea and abdominal discomfort – Use XR (may see pill shell in stool – okay)
  - Lactic acidosis if improperly prescribed
  - Watch for B12 deficiency
  - Special considerations for IV contrast dye studies. Resume when kidney function adequate.

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Other Causes of Hyperglycemia

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

Regardless of cause, requires treatment
- Insulin always works
- Sign of pancreatic malfunction

Diabetes is also associated with

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

DiaBingo

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

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

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

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

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

Terminology matters in medical communication about obesity

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

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

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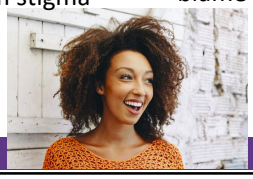
Let's use language that (is)

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



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Guiding Language Principles

Strength Based

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

Person-first

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

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Quick Question

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

A. John is non-adherent to his insulin regimen and is not taking his insulin as prescribed

B. John is in denial about his diabetes and frequently skips his insulin

C. John is taking his insulin about 50% of the time

D. John doesn't seem to care about his diabetes control at this time

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.

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?

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

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.

Traditional vs Empowerment Based

Traditional	Empowerment
DM is a physical illness	DM is biopsychosocial
HCP is viewed as teacher responsible for outcomes	PWD is viewed as problem solver /self manager
Emotional issues are separate components	Experiences are integral with clinical content
Lack of goal attainment is viewed as failure	Lack of goal attainment is a learning experience
Behavior change are externally	Behavior change is internally motivated

Quick Question

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

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Adaptation to the Emotional Stress of Chronic Disease

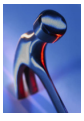
(Kubler-Ross, Rubin RR, WHPolonsky)

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

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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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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How Often Should I Check?

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

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When Treatment Goals Aren't Met

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

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Overcoming barriers

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

Bill Polonsky, PhD, CDE

"Mindfulness-based Interventions"

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

Complications - Why?

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

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

Control Matters

- **Prevention**
- **Trials**
- **Practice Recommendations**

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?

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

NATIONAL Diabetes PREVENTION PROGRAM

Diabetes Education SERVICES

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)

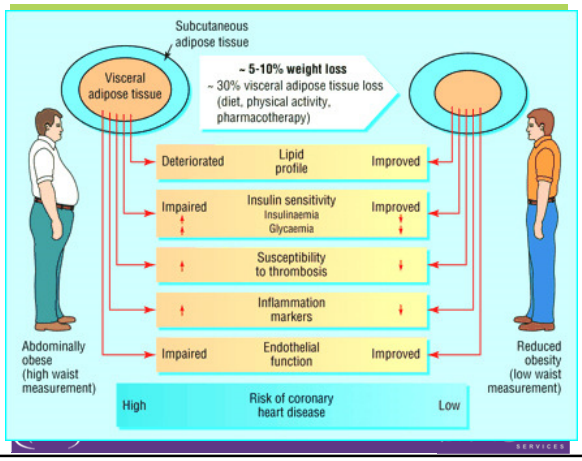
Diabetes Education SERVICES

Weight loss and Prevention

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

NATIONAL Diabetes PREVENTION PROGRAM

Diabetes Education SERVICES

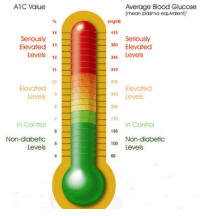


ABCs of Diabetes –

- 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
- E xercise, Education
- H ealthy Eating

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.



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.

DPP-4 Inhibitors – "Incretin Enhancers"

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

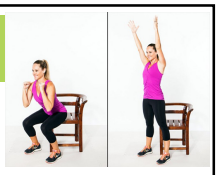
- **Action:**
  - Increase insulin release w/ meals
  - Suppress glucagon
- **Dosing**: Januvia – 100mg a day
  Onglyza* – up to 5mg a day
  Tradjenta – 5mg a day
  Nesina* – up to 25 mg a day
- **Efficacy:** Decreases A1c by 0.6 -0.8%
- **Benefits/ Issues**: weight neutral, no hypo, few side effects. Expensive

DPP-IV Inhibitor Updates

- Can cause severe, disabling join 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%

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

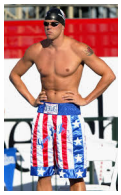
Diabetes Education SERVICES

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"

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

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
Weight	each diabetes visit
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:

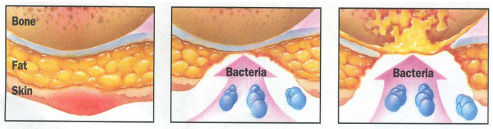
- A1c 9.3%
- HDL 37 mg/dl
- Triglyceride 260mg/dl
- Proteinuria - neg
- B/P 152/94

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

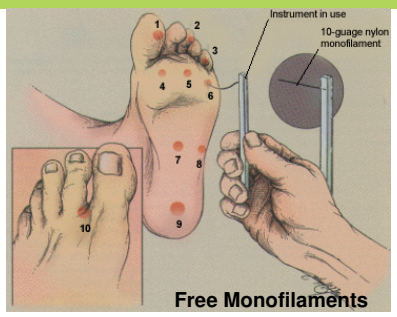
Bone infection

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?

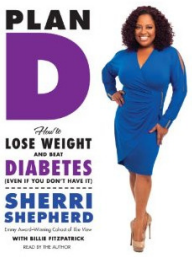
Diabetes Education SERVICES

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



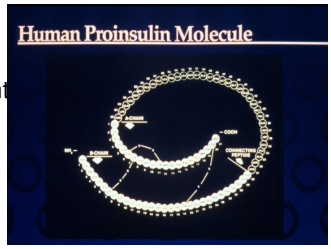
Sherri Shepard decided to embrace diabetes and use it as a motivator to improve her health.

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

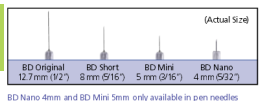
Psychological Insulin Resistance (PIR)

- 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

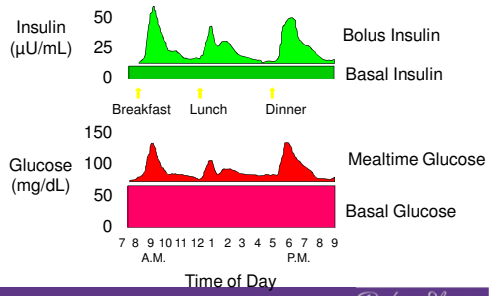
Needle Size often a Barrier Size *Does* Matter



- 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

Cost Per Vial in Northern CA

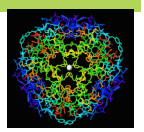
Per vial cost	Walmart	Walgreens	Costco
Regular Insulin	$25*	$92	$99
NPH	$25*	$92	$99
70/30	$25*	$92	$101
Humalog	$200	$220	$178
Novolog	$197	$217	$178
Apidra	$180	$246	$178
Levemir	$300	$300	$300
Lantus	$226	$221	$206

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

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

- "biosimilar" insulins
- 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



Insulin – Large Molecule

Aspirin – Small Molecule

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

- 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)

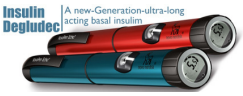
Intermediate Acting	Peak Action	Duration
NPH	4-12 hrs	12-24

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

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

Diabetes Education SERVICES

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 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?				

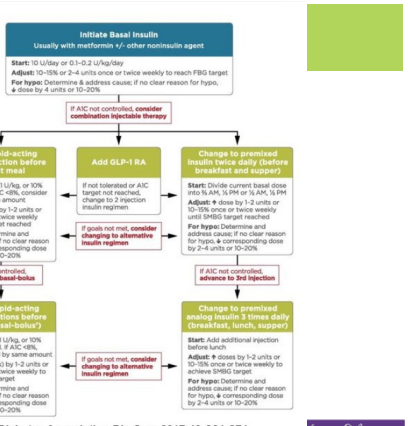
Diabetes Education SERVICES

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

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

Next Steps

- When is it too much basal insulin?
  - If basal insulin is >0.5 units/kg day, advance to combination injectable therapy
    - Add bolus, switch premixed 70/30 or to Basal + GLP-RA
- Pt is at max basal dose
  - 80 x 0.5 = 40 units



American Diabetes Association Dia Care 2017;40:S64-S74

Combo Sub-Q Insulin

Insulin Type	Onset	Peak
Humalog Mix 75/25: 75% NPL, 25% lispro 50/50: 50% NPL, 50% lispro	0.25 - 0.5 hr	0.5-6.5 hrs
NovoLog Mix 70/30: 70% NPA, 30% aspart	0.25 - 0.5 hr	1 – 4 hrs
NPH + Reg Combo 70/30: 70%N /30%R 50/50: 50%N /50%R	0.5 – 1.0 hr	2 - 16 hrs

Considerations:

- Pre-mixed, difficult to fine tune therapy

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

Hypoglycemia = "Limiting Factor"

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

Hypoglycemic Symptoms

- Autonomic
  - Anxiety
  - Palpitations
  - Sweating
  - Tingling
  - Trembling
  - Hypoglycemic Unawareness

- Neuroglycopenia
  - Irritability
  - Drowsiness
  - Dizziness
  - Blurred Vision
  - Difficulty with speech
  - Confusion
  - Feeling faint

Treatment of Hypoglycemia

- If blood glucose **70**mg/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

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

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

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

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

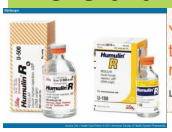
Diabetes Education SERVICES

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

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

- 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.

Diabetes Education SERVICES

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

Diabetes Education SERVICES

Candidates for pump therapy:

- Hx of hypoglycemia unawareness
- Pregnancy
- Elevated A1c
- Labile BG levels
- Athletes
- Gastroparesis
- Tight control/fine tuning

Diabetes Education SERVICES

Insulin pumps

- What do patients say about insulin pumps
- What is an insulin pump
- What can a pump do / what can't a pump do?

Sensor augmented pumps

Just pump, no sensor augmentation (yet)

Diabetes Education Services

Omnipod with PDM/Tubeless

Diabetes Education Services

Medtronic 670G insulin pump system

SmartGuard™ features:

AUTO MODE[1]

- Automatically adjusts your basal (background) insulin every five minutes based on your CGM readings.[1,2]
- Helps keep your sugar levels in your target range for fewer lows and highs — day and night.[1,2,3]

See how Auto Mode works

SUSPEND BEFORE LOW[1]

- Stops insulin up to 30 minutes before reaching your preset low limits.
- Automatically restarts insulin when your levels recover without bothersome alerts.[2]
- Helps you avoid lows and rebound highs.[1]

See how Suspend Before Low works

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Tandem Insulin Pump

Diabetes Education SERVICES

Valeritas V-Go

Fixed doses for basal/bolus

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Initial Calculations for CSII

TDD: total daily dose

METHOD 1
Pre-pump TDD

Pre-Pump TDD x 0.75

STARTING Pump TDD
Average method 1 & 2

METHOD 2
Patient Weight

Wt (kg) x 0.50

BASAL RATE
Pump TDD x 0.5 / 24

- Start with 1 basal rate, adjust according to glucose trends over 2-3 days
- Adjust to maintain stability in fasting state (between meals & sleep)
- Add additional basals according to diurnal variation (dawn phenomenon)

CARB RATIO
450 / Pump TDD

- Adjust based on low-fat meals with known carbohydrate content
- Acceptable 2-h post-prandial rise is ~60mg/dL above pre-prandial BG
- Adjust carb ratio in 10%-20% increments based on post-prandial BG

CORRECTION RATIO
1700 / Pump TDD

- Sensitivity Factor is correct if BG is within 30 mg/dL of target range within 2 hours after correction
- Make adjustments in 10%-20% increments if 2-hr post-correction BGs are consistently above or below target

Hypoglycemia patients – start at lower value of method 1 & 2
Hyperglycemic, elevated A1C or pregnant – start at higher value of method 1 & 2

Consensus Statement by AACE/ACE Insulin pump management task force. Endocr Pract. 2014 May; 20(5):463-89.

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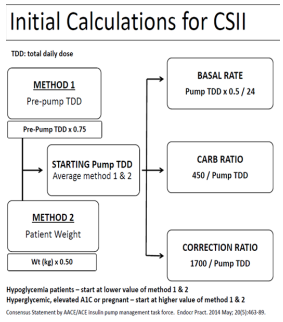
Initial Calculations



- Method 1
  - TDD x 0.75
  - 30 units x 0.75 = 22.5

Method 2

- Pt wt kg x 0.50
- 70kg x 0.50 = 35

- Final dose
  - A1c 6.3% - Method 1
  - A1c 9.2% - Method 2
  - A1c 7.0 – Avg 1&2

Bolus Rates

- Bolus rates
- CHO Ratio
  - Start with 1:15 or
  - 450 divide by TDD= CHO Ratio
- Correction/sensitivity
  - 1700 divided by TDD
- Target Range: 95-140 mg/dl
- Active insulin/insulin On Board
  - 3-6 hours

Example – JR injects 30 units a day

- 30 divided by 2= 15 units for basal
- 15 divided by 24 = 0.625 units/hr (basal rate)
- 450 divided by 30 = 15/ CHO Ratio
- 1700 divided by 30 = 56 / correction
  - 1:15 CHO Ratio
  - 1:55 Correction

Insulin Teaching Keys

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

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Sharps Disposal: Product and Info

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

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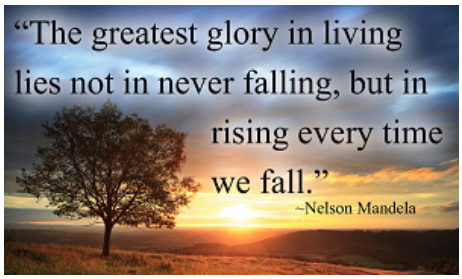
Diabetes Vacations



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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 behavio
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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In the Beginning

- Earth
- Human
- Spirit

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

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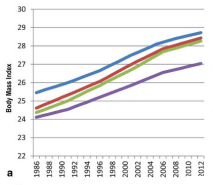
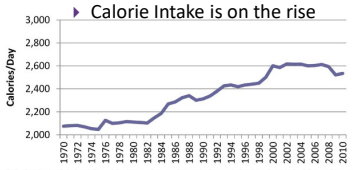
U.S. Weight - 68% overweight or obese



- 34% BMI 25-29
- 34% BMI 30 +
- 1/3 of all overwt people don't get diabetes
- We burn 100 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 ...ility (Per Capita) Data System.

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HEALTH

Just Months of American Life Change the Microbiome

Immigrants' gut bacteria "westernize" soon after they move to the U.S., which might influence obesity in immigrants and Americans alike.

OLGA KHAZAN NOV 1, 2018 Atlantic.com Nov 2018

A Hmong woman carries grass in Vietnam. (NGUYEN HUY KHAM / REUTERS)

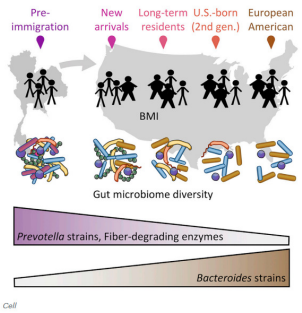
Diabetes Education SERVICES

From Vietnam to America – Hmong immigrants microbiome shifts associated with worse health

- In Minneapolis—scientists followed a group of Hmong immigrants for 9 months.
- Increased intake of protein, sugar, and fat and processed food.
- Researchers found that the immigrants' gut microbiomes "westernized" and became less diverse
- Within a generation, Hmong women have an obesity rate that went from 5% to 30%

Diabetes Education SERVICES

Moving to America isn't good for your health

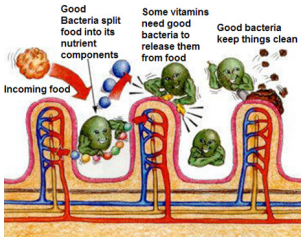


Researchers don't know if eating a less-healthy diet makes people obese *and* changes the microbiome, or if a less healthy diet changes the microbiome *so* it makes people obese.

Atlantic.com Nov 2018

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



Average American Consumes 22 teaspoons of added sugar a day

- WHO and AHA – Goal 6 teaspoons a Day
- 1 tsp = 4 gms sugar (15 cals)
- 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

Your health can only get better

Diabetes Education Services

Bacterial Cells Outnumber Human Cells 10 to 1

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Stop Killing All the Bacteria The Hygiene Hypothesis

- In studies, mouse raised in clean environment is higher risk for DM than one raised in dirty one
- "Clean living" may increase risk for autoimmune diseases
- DM risk is higher in urban than rural settings
- Daycare, other early exposures, lower risk for DM
- Children exposed to dirt, farm animals, and other kids have less reactive immune systems

Diabetes Education Services

Household cleaners may alter kid's gut flora

- Canadian Med Association found that **common household disinfectants may increase the risk of obesity in children**.
- However, the children in households that used eco-friendly cleaners were less likely to be overweight.
- More research is needed "to explore the intriguing possibility that use of household disinfectants might contribute to the complex causes of obesity through microbially mediated mechanisms".

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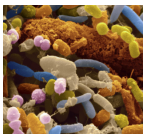
3 lbs of Microbes in our Gut



- 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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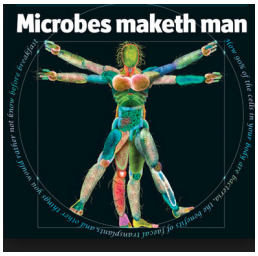
Gut Microbiome

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



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Weight and Gut Bacteria
New and Early Research

- Leaner people appear to have more bacterial diversity and a higher proportion of bacteroidetes
- 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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Follow Your Gut – Dr. Rob Knight

Check out Dr. Knight's:

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

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Take Home Message

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

Diabetes Education SERVICES

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!

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

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

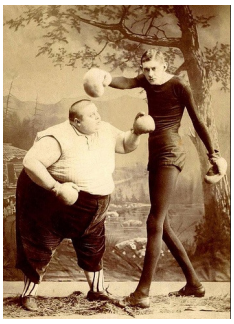
United States: The Revis family of North Carolina. Food expenditure for one week: $341.98. Favorite foods: spaghetti, potatoes, sesame chicken.
Peter Menzel, from the book, "Hungry Planet: What the World Eats."

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

19 of 27

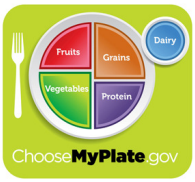
Approach Depends on Patient

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

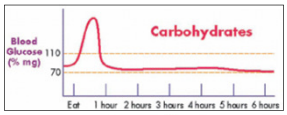


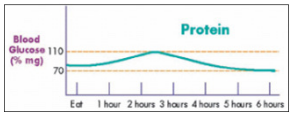
Healthy Eating Patterns

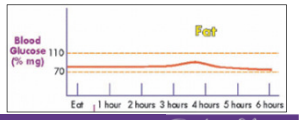
- Mediterranean Diet
- DASH Diet
- Plant based eating
- Diabetes Plate Method
- Weight Watchers or other groups



How nutrients affect blood sugar

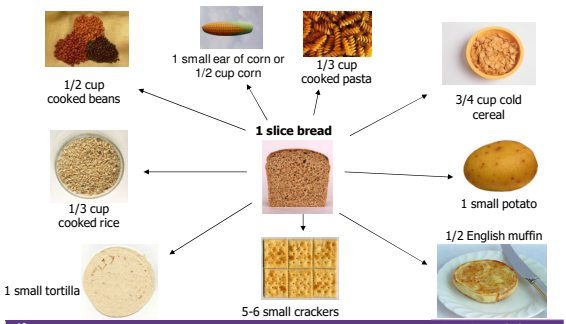






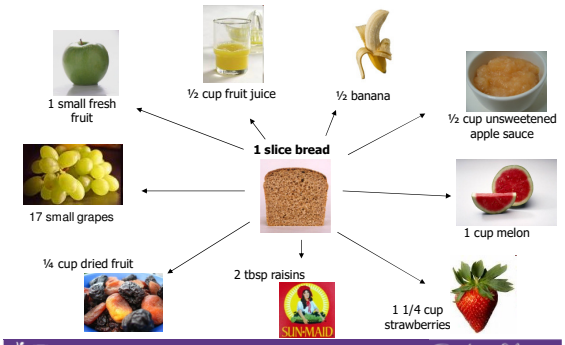
Carb Counting - Starch

Each Food has:
80 Calories
15 grams carb



Carb counting- fruit

Each Food has:
60 Calories
15 grams carb



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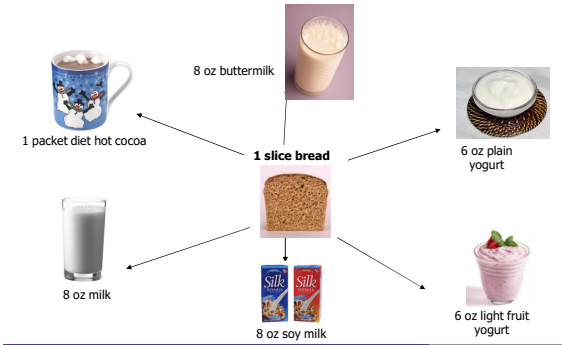
Carb Counting - Milk

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



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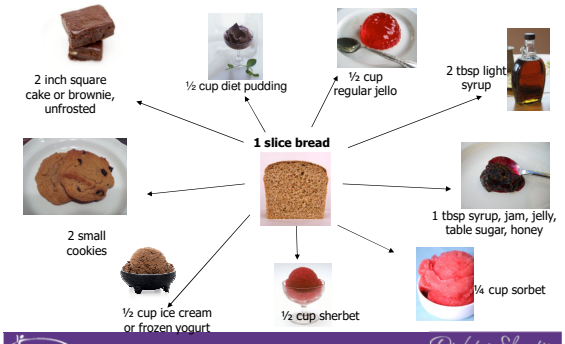
Carb Counting - Sweets

Each Food has:
Calories vary
15 grams carb



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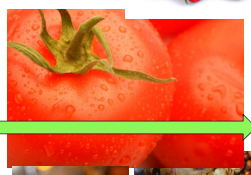
Move toward the Tomato



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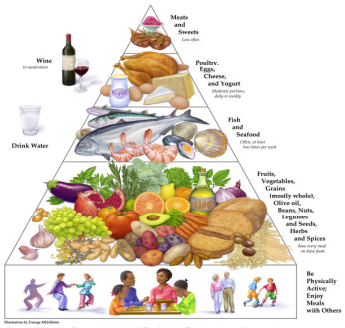
Using Alcohol Safely

- 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

Diabetes Education SERVICES

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

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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.

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10 SuperFoods

- Beans
- Dark Green Leafy Vegs
- 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

Diabetes Education Services

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

Another plate example

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

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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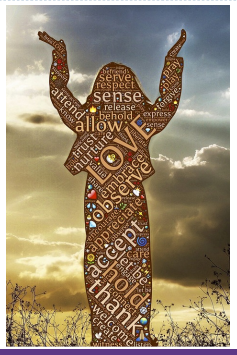
Words Matter – We Matter



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Optimism and Resilience

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

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GREAT DREAM

Ten keys to happier living

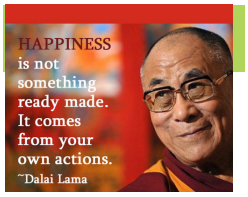
Action for Happiness has developed the 10 Keys to Happier Living based on a review of the latest scientific research relating to happiness.

Everyone's path to happiness is different, but the research suggests these ten things consistently tend 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



"People will forget what you said, people will forget what you did, but people will never forget how you made them feel" ~ Maya Angelou

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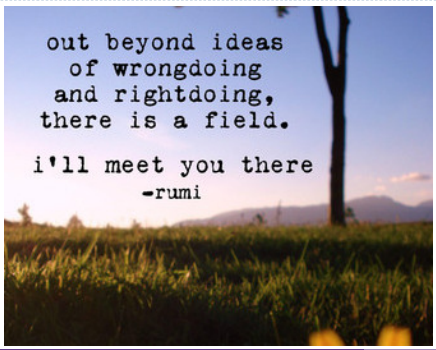
Give the gift of Non-Judgment



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Thank You

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

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