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CELEBRATING 20 YEARS

# Welcome to Diabetes in the 21st Century

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## Diabetes in the 21st Century:
A Clinical and Educational Update

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

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## CDC Announces

35% of Americans will have Diabetes by 2050

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

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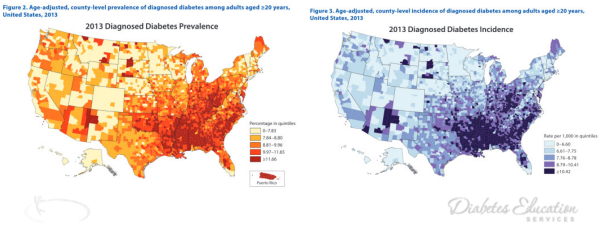
## Diabetes in America 2019

- 30.3 million or > 9.4%
- 27% don't know they have it
- 37% of US adults have pre diabetes (846mil)




## Global Epidemic

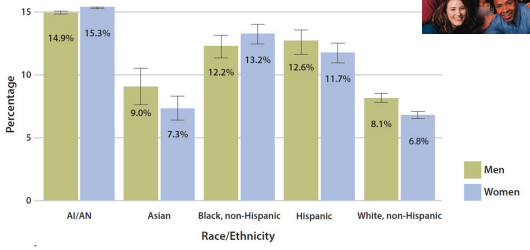
- Every 10 seconds
  - 1 person dies with diabetes
  - 2 people develop diabetes
- Every year
  - 3 million deaths
  - 6 million new cases
- World Diabetes Day is November 14
- March is ADA Sound the Alert Day "find people w/ undetected diabetes"

## World Diabetes Day

November 14


## 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

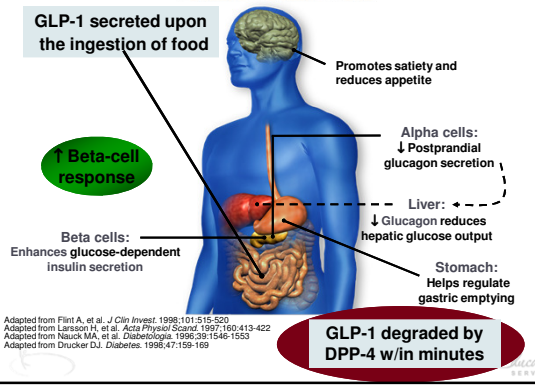



- Among American Indian and Alaska Native adults, the age-adjusted rate of diagnosed diabetes varied by region from 6.0% among Alaska Natives to 24.1% among American Indians in southern Arizona.

## 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

## Incretin Mimetics – GLP-1 Receptor Agonists

### Injectables that Lower Glucose

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| Class/Main Action | Name | Dose Range | Considerations |
|---|---|---|---|
| **GLP-1 Receptor Agonist (GLP-1 RA)**<br>**"Incretin Mimetic"**<br>• Increases insulin release with food<br>• Slows gastric emptying<br>• Promotes satiety<br>• Suppresses glucagon | exenatide (Byetta) | 5 and 10 mcg BID | **Side effects for all:** Nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. Renally excreted.<br>**Black box warning:** Thyroid C-cell tumor warning for exenatide XR, liraglutide, dulaglutide, and semaglutide (avoid if family history of medullary thyroid tumor).<br>*Significantly reduces risk of CV death, heart attack, and stroke.<br>Lowers A1c 0.5 – 1.6%<br>Weight loss of 1.6 to 6.0kg† |
| | exenatide XR (Bydureon) | 2mg 1x a week<br>Pen injector - Bydureon BCise | |
| | liraglutide (Victoza)* | 0.6, 1.2 and 1.8 mg daily | |
| | dulaglutide (Trulicity) | 0.75 and 1.5 mg<br>1x a week pen injector | |
| | semaglutide (Ozempic)*† | 0.5 and 1.0 mg<br>1x a week pen injector | |
| | lixisenatide (Adlyxin) | (Only available in combo with glargine, iGlarLixi, see below) | |

Liraglutide and semaglutide ADA recommended as helpful agents to slow progression of CKD (chronic kidney disease).


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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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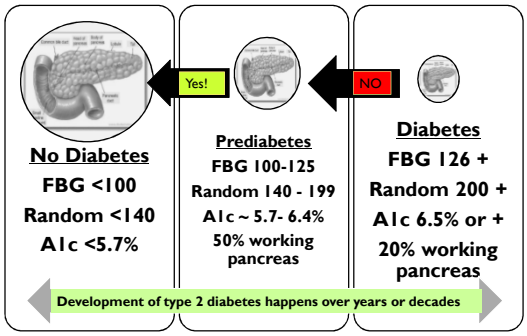
## Natural History of Diabetes



## 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 Regular before meals, 10u NPH 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

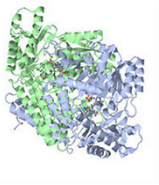
- Auto-immune pancreatic beta cells destruction
- Most commonly expressed at age 10-14
- Insulin sensitive (require 0.5 - 1.0 units/kg/day)

- 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.

## Autoantibodies Assoc w/ Type 1

Panel of autoantibodies –

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



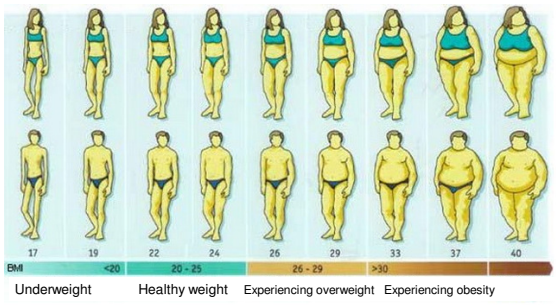
## Type 1 Diabetes Associated with other immune conditions

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

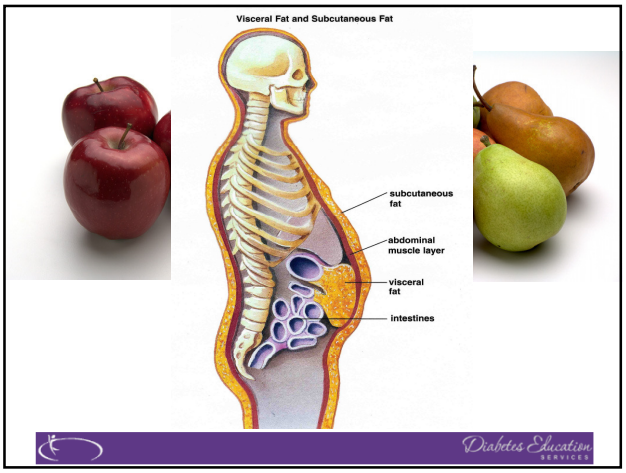
## Type 1 Summary

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

## BMI Categories

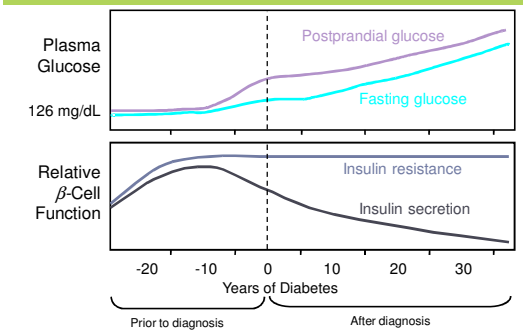




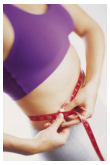



## Natural Progression of Type 2 Diabetes




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

## 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 with excess weight (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

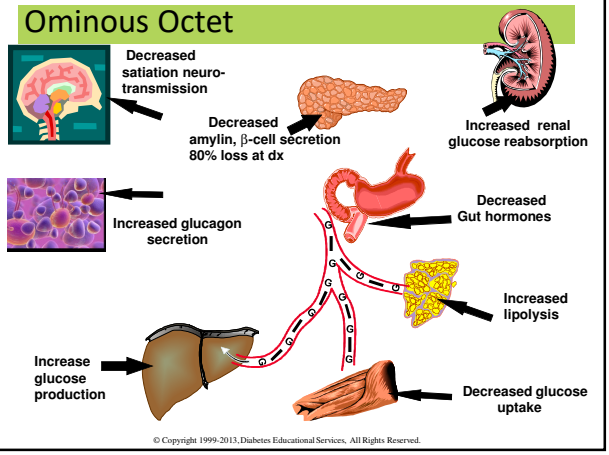
## Acanthosis Nigricans (AN)

- 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 reabsorption in the proximal tubule of the kidneys (reset renal threshold and increase glucosuria)
- Side effects: hypotension, UTIs, increased urination, genital infections, ketoacidosis, Fournier's gangrene
- Canagliflozin and Empagliflozin ADA indicated in CKD


**Common Oral Diabetes Meds**

*Download FREE CDE® Coach App for latest PocketCard versions and priority notifications* | DiabetesEd.Net

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

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## Comparison of Type 1 and Type 2

| Feature | Type 1 | Type 2 |
|---|---|---|
| Excess weight | 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**<br>• Decreases hepatic glucose output<br>• First line med at diagnosis of type 2 | metformin (Glucophage)<br><br>Riomet (liquid metformin) | 500 - 2500 mg (usually BID w/ meal)<br><br>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.**<br>• If GFR <30, do not use.<br>• If GFR <45, don't start Meformin<br>• If pt on Metformin and GFR falls to 30-45, eval risk vs. benefit; consider decreasing dose.<br>**For dye study,** if GFR <60, liver disease, alcoholism or heart failure, restart metformin after 48 hours if renal function stable.<br>**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.

## 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

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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

## Self Reflective Question

- JR 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

## 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

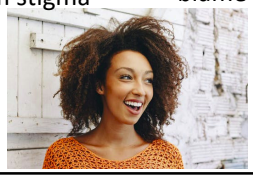
## Terminology matters in medical communication about weight

- For people with BMI >25, preferred terms
  - "person with elevated BMI".
  - "person with overweight or 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

## 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



## 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

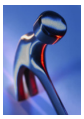
## Look Beyond Diabetes

- 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


## 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

## 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

## 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?

## 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

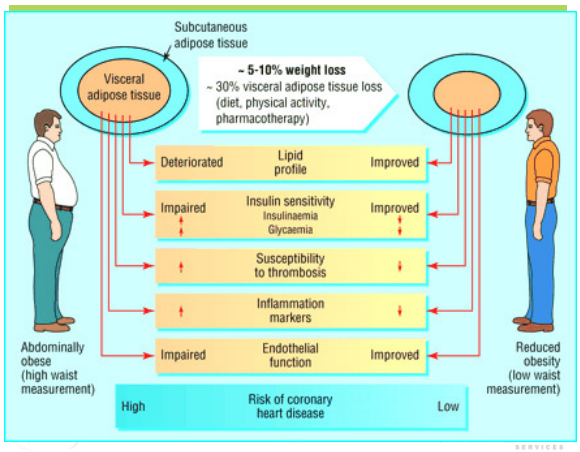
## Diabetes Prevention Program

- 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)

## 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



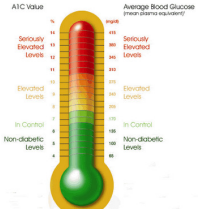
## Goals of Care

## ABCs of Diabetes –

- A1c less than 7% (avg 3 month BG)
  - Pre-meal BG 80-130
  - Post meal BG <180
- Blood Pressure < 140/90
  - Goal 130/90 (If 10 year CVD risk > 15%, or has history of CV event) google ASCVD Risk Estimator
- Cholesterol
  - DM and 40 yrs, start statin
  - HDL >40
  - Triglyceride < 150


## 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". Creat 1.4.
- Concerns
- Meds?

## 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 adiposity
  - Decreases CV Risk


- To combat the rise in body weight, we need to change the food environment
- "You cannot outrun an unhealthy diet".

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

## 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 Care Guidelines- ADA

| Test / Exam | Frequency |
|---|---|
| **A**1c | At least twice a year |
| **B**/P | Each diabetes visit |
| **C**holesterol (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 |

## Mr. Jones - What are Your Recommendations?

**Patient Profile**

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

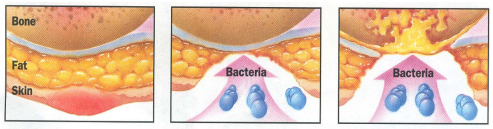
Labs:

- 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*

## Foot Wounds



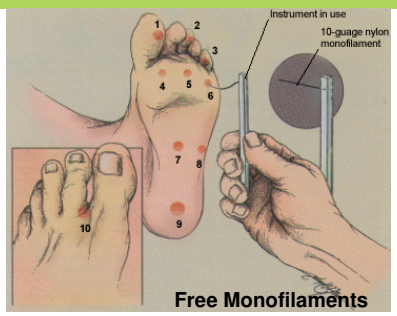

Blisters
Calluses

Ulcers

Bone infection

## No Bathroom Surgery

## 5.07 monofilament = 10gms linear pressure




**Free Monofilaments**
**http://www.hrsa.gov/leap/**

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## Mr. Jones - What are Your Recommendations?

**Patient Profile**

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

Current Status:

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

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## Three Most Important Foot Care Tips

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

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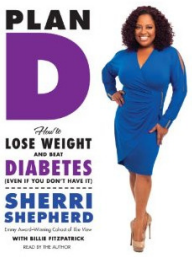
## *"Getting diabetes saved my life."*
## *~ Sherri Sheperd*

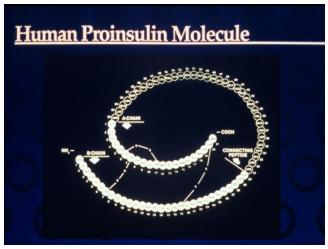



**Sherri Shepard decided to embrace diabetes and use it as a motivator to improve her health.**

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.

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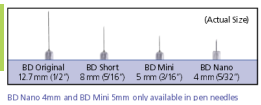
## Psychological Insulin Resistance (PIR)

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

*Diabetes Attitudes, Wishes, Needs Study - Rubin*

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

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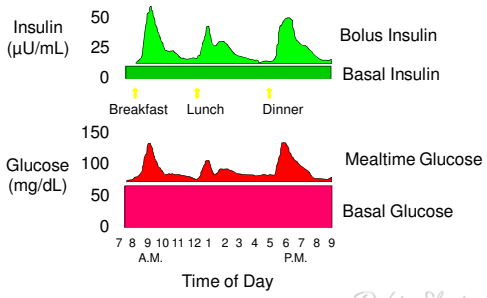
## Physiologic Insulin Secretion: 24-Hour Profile

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## Insulin Action Teams

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

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?
- Can't afford insulin pen – what other option

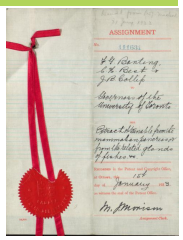
## Cost Per Vial in Northern CA

| Per vial cost | Walmart | Walgreens | Costco |
|---|---|---|---|
| Regular Insulin | $25* | $92 | $99 |
| NPH | $25* | $92 | $99 |
| 70/30 | $25* | $92 | $101 |
| Humalog | $137 | $137 | $137 |
| 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 |

## 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

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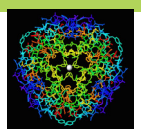
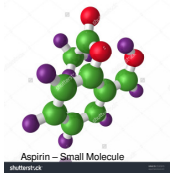
## Biosimilar Insulins : Lispro (Admelog) Glargine (Basaglar)



Insulin – Large Molecule



Aspirin – Small Molecule

- 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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## Bolus Insulin Summary

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

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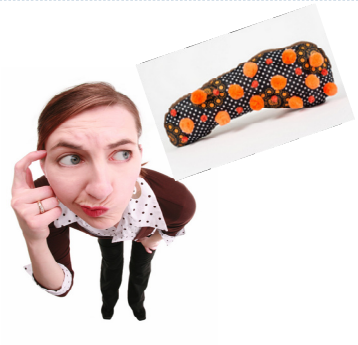
## Bolus Insulin Timing

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

## Pattern Management –AKA

How to think like a pancreas



## 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<br>no insulin | 212<br>4 uR | 148<br>no insulin | 254<br>6 uR |
| Day 2 | 243<br>4uR | 254<br>6 uR | 201<br>4uR | 199<br>no insulin |
| Day 3 | 189<br>2uR | 243<br>4uR | 162<br>2uR | 244<br>4uR |
| Day 4 | 66<br>No insulin | 287<br>6uR | 144<br>none | 272<br>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

## 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? | | | | |

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

| | Break | Lunch | Dinner | HS |
|---|---|---|---|---|
| Mo 1 | 170s |  | | 298<br>10u NPH |
| Mo 2 | 160s | | | 233<br>10u NPH |
| Mo 4 | 140s | 283 | 265 | 206<br>10u NPH |

## 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

## Combo Sub-Q Insulin

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

**Considerations:**

- Pre-mixed, difficult to fine tune therapy

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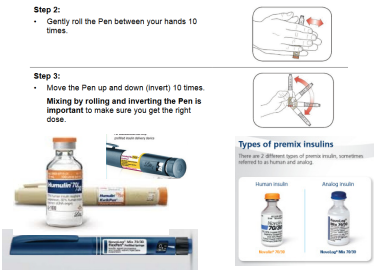
## 70/30 Insulin

- Gently roll to mix insulin
- Prime pens – give 2 unit "air shot" to make sure pen and needle functional
- After injecting insulin, count to 5 before pulling needle out
- Use new needle with each injection

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

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

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

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

## 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

## 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)


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## Basal Bolus – What Adjustments?
## Pt weighs 80kg

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

## 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<br>6R | 89<br>7R | 145<br>7R | 190<br>20 u NPH |
| Day 2 | 81<br>6R | 97<br>7R | 107<br>7R | 133<br>20u NPH |
| Day 3 | 79<br>6R | 104<br>7R | 124<br>7R | 110<br>20u NPH |
| Day 4 | 69<br>6R | 103<br>7R | 208<br>7R | 193<br>20u NPH |

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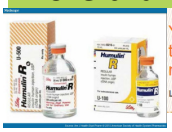
## More than 200 units a day?



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

LEARN MORE >

UNITS OF INSULIN **210** 260 335

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

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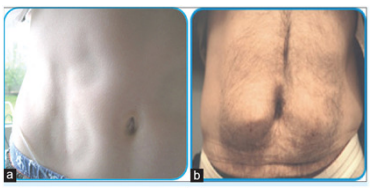
## Insulin Teaching Keys

- 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.

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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/
-

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 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

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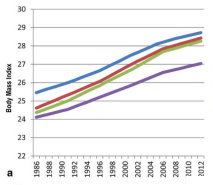
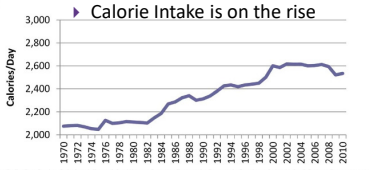
## U.S. Weight - 68% overweight or obese

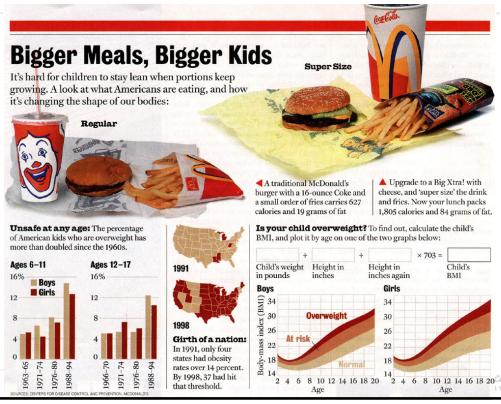



- 34% BMI 25-29
- 34% BMI 30 +
- 1/3 of all overwt people don't get diabetes
- We burn 100 cals less a day at work
- Overall, food costs ~ 10-15% of income
- Calorie Intake is on the rise




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

## Bigger Meals, Bigger Kids




## 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

## Reduce refined Carbs, Added Sugars - ADA

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


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

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## Your health can only get better


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## In the Beginning

- Earth
- Human
- Spirit

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## Bacterial Cells Outnumber Human Cells 10 to 1


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## Poll Question

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

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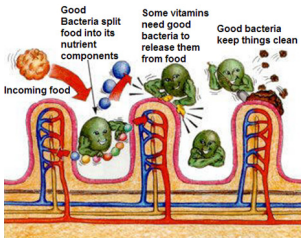
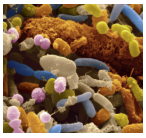
## How do our bacteria help us?

- 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?

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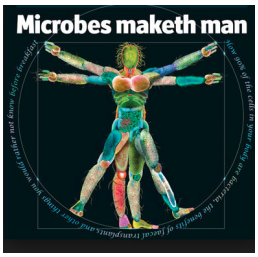
## Gut Microbiome

- 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


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## Medical Nutrition Therapy – ADA

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



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

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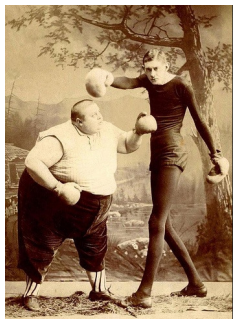
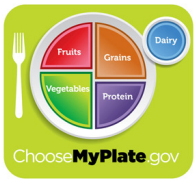
## Approach Depends on Patient

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



## Healthy Eating Patterns

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



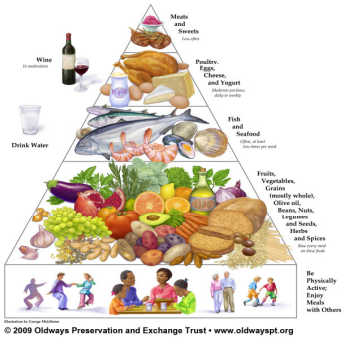

## Successful weight loss strategies include

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

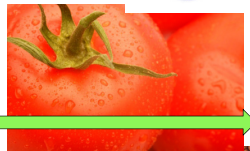
## The Mediterranean diet emphasizes:

- 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

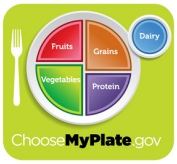
## Mediterranean Diet Pyramid




## Move toward the Tomato

## USDA www.myplate.gov




***Balancing Calories***

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

***Foods to Increase***

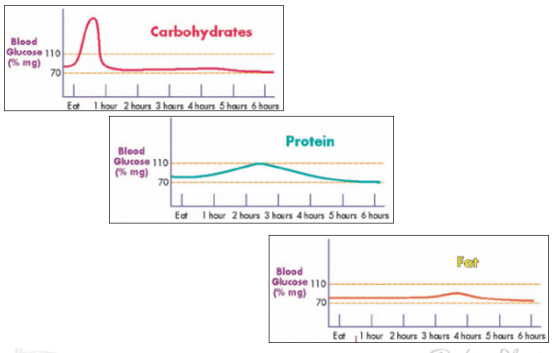
- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Switch to fat-free or low-fat (1%) milk.

***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.

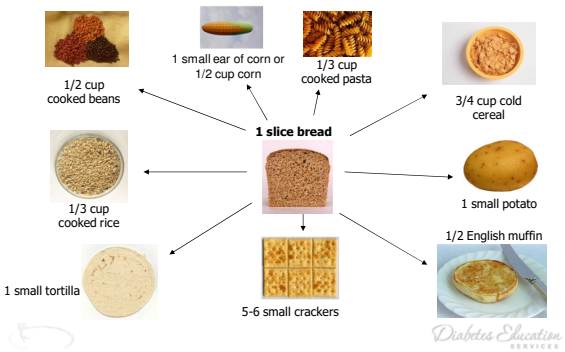
## Another plate example


## How nutrients affect blood sugar



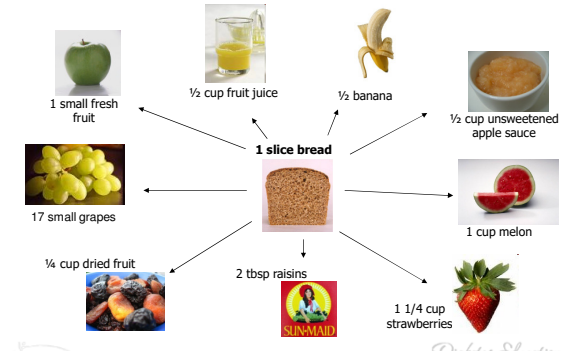
## Carb Counting - Starch

Each Food has:
80 Calories
15 grams carb



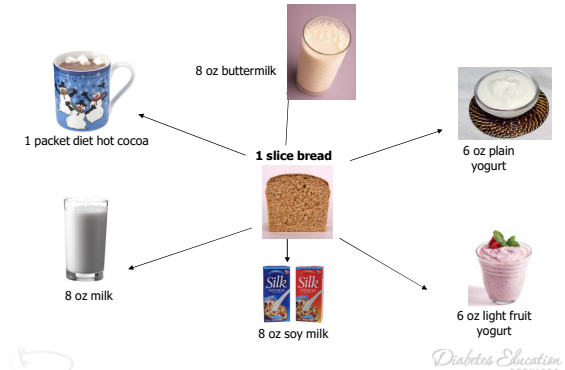

## Carb counting- fruit

Each Food has:
60 Calories
15 grams carb



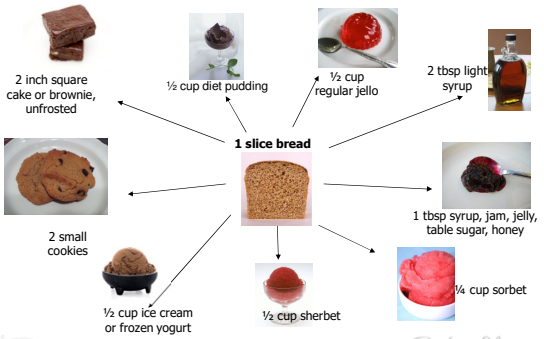

## Carb Counting - Milk

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



## Carb Counting - Sweets

Each Food has:
Calories vary
15 grams carb

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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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## 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

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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

## Our belief in people makes a difference

## Thank You

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