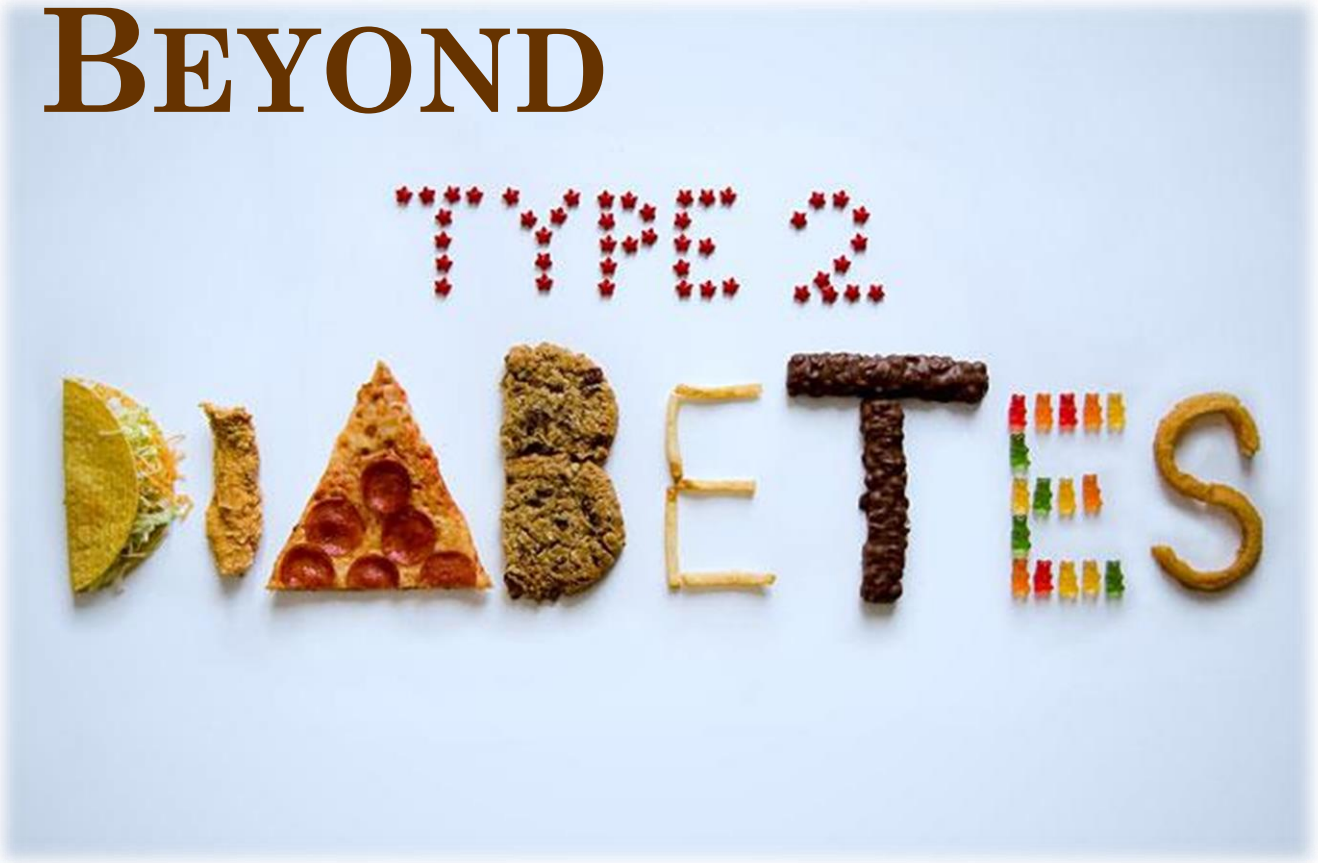
Beyond



CDE Exam Preparation

by Wendy Graham RD CDE

May 2, 2017

WaterlooWellington DIABETES

Type 1

Children

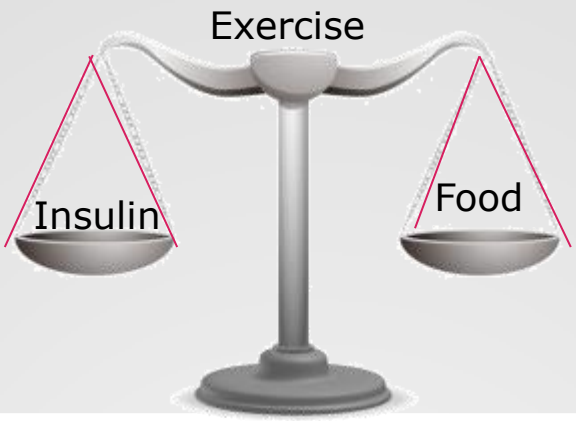
Pregnancy

Type 1

- Autoimmune disorder
- No insulin secretion
- Require insulin administration either by injections or pump

Type 1

Blood Glucose control is based on reaching target
and
controlling the risk of
Hypoglycemia



Treatment

- Insulin to match carbohydrate
- Prevent hypoglycemia
- Adjust insulin or food for activity
- Sick day management

Type 1

- 10 %
- Autoimmune
- Presence of antibodies

GAD(glutamic acid decarboxylase)
ICA (islet cell antibodies)

- RAPID
- Symptomatic
- Weight Loss
- Lean, Younger
- Ketosis prone

Type 2

- 80-90 %
- Genetic predisposition
- Insulin resistance
- +/- Insulin deficiency

- SLOW "Almost silent"

Can have diabetes 10 years prior to DX, already have complications

- Symptomatic-vague
- Obese 70-80% at Dx

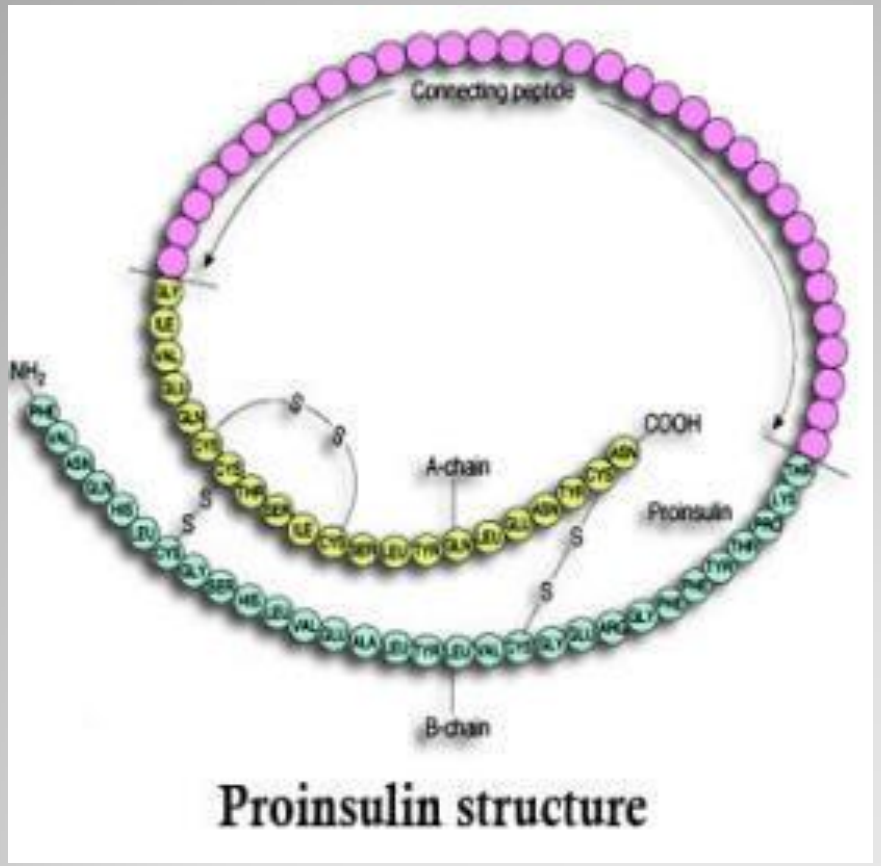
Type 1 ½ LADA

Latent Autoimmune Diabetes in Adults

- Diagnosis Difficult
- Estimated that 10-20% of Type 2's are LADA
- Autoimmune
- Presence of antibodies

GAD65(glutamic acid decarboxylase)
*ICA

- Slow destruction of Beta cells, Still have some insulin production
- Older
- Often started on oral agents
- Lean
- Don't have high TG or low HDL
- Higher rate in underdeveloped countries



Proinsulin structure

Insulin Molecule

Considerations for Diagnosis beyond Glucose

- Ketones
- Antibodies GAD, ICA
- C-Peptide
- Uric Acid
- High Triglycerides or Low HDL

Considerations for Diagnosis beyond Glucose

- Ketones

Type 1 usually present
Type 2 occasionally

- Antibodies GAD, ICA

Type 1 present
Type 1.5 GAD65

- C-Peptide

Very low- Type 1;
Normal to High Type 2;
Low Normal Type 2 or 1.5

- Uric Acid

Type 2

- High Triglycerides or Low HDL

Type 2

Imbalance in the immune system

+

Exposure to toxin, virus or environmental

<u>Potential Causes:</u>
Vitamin D deficiencies
Virus
Nitrates
Cow's Milk in Infants
?

Autoimmmune

- Gradual destruction of beta cells
- 10% remaining is when blood glucose starts to rise
- **"Honeymoon"**

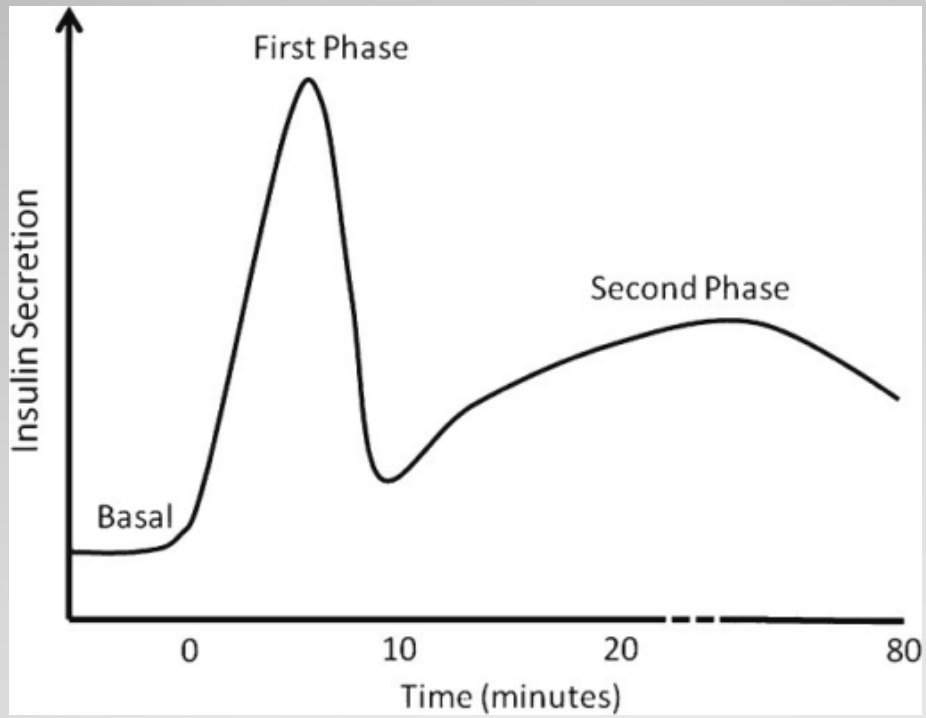
Other Autoimmune Comorbidities

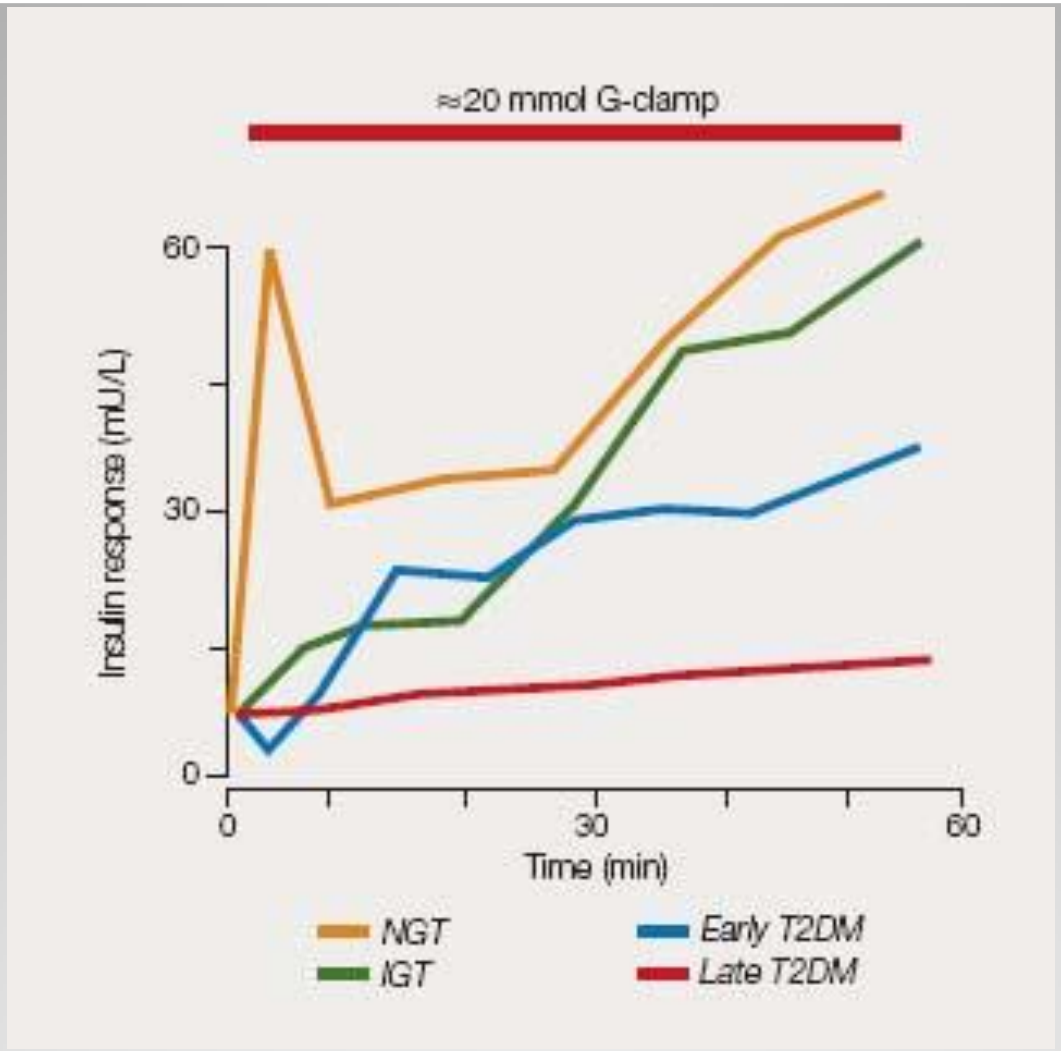
- Thyroid
  - 15-30%
  - Screening is important
- Celiac
  - Silent
  - 4-9 %
- Addison
  - Recurrent hypoglycemia
  - Decreasing insulin needs

Insulin Secretion

Insulin secretion is biphasic

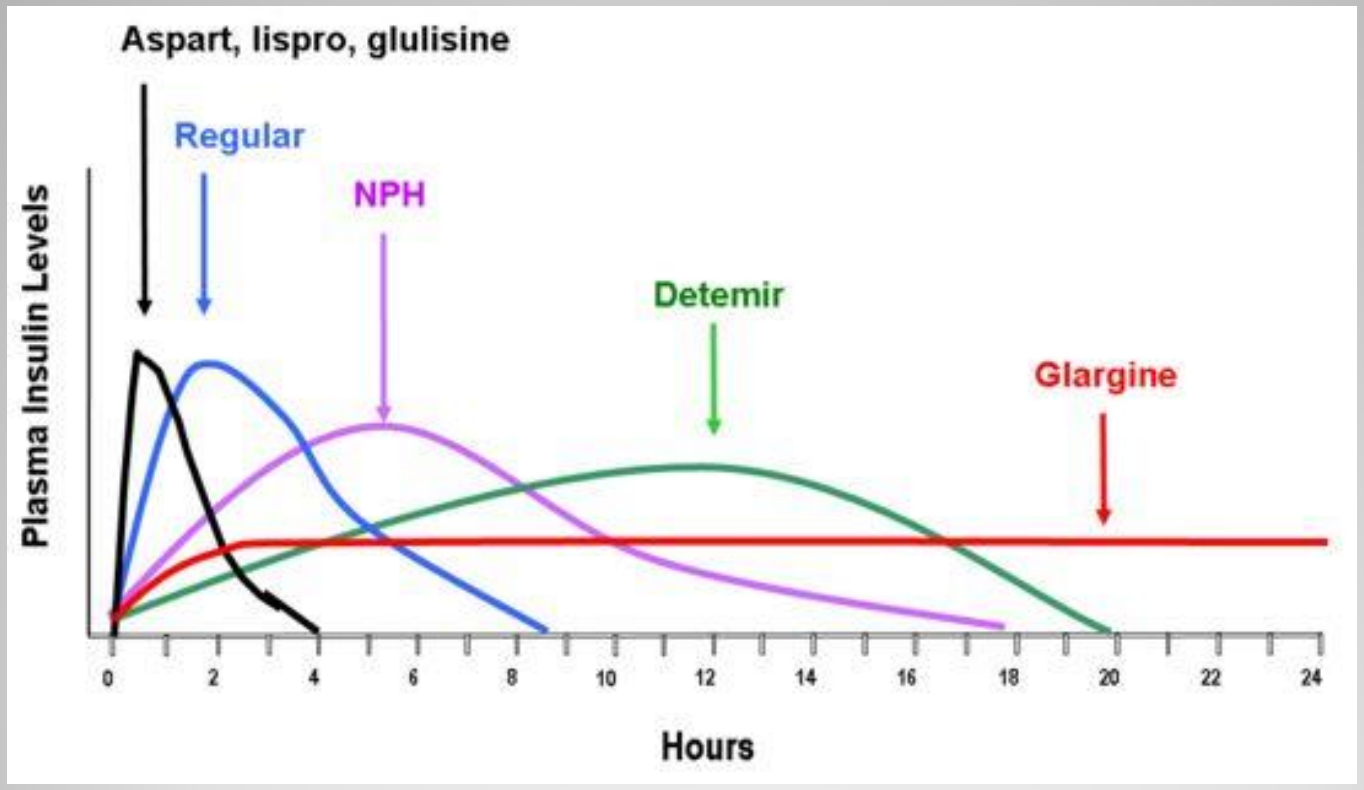
- Large burst with glucose or food (first phase)
- Remainder over 1-2 hours (second phase)



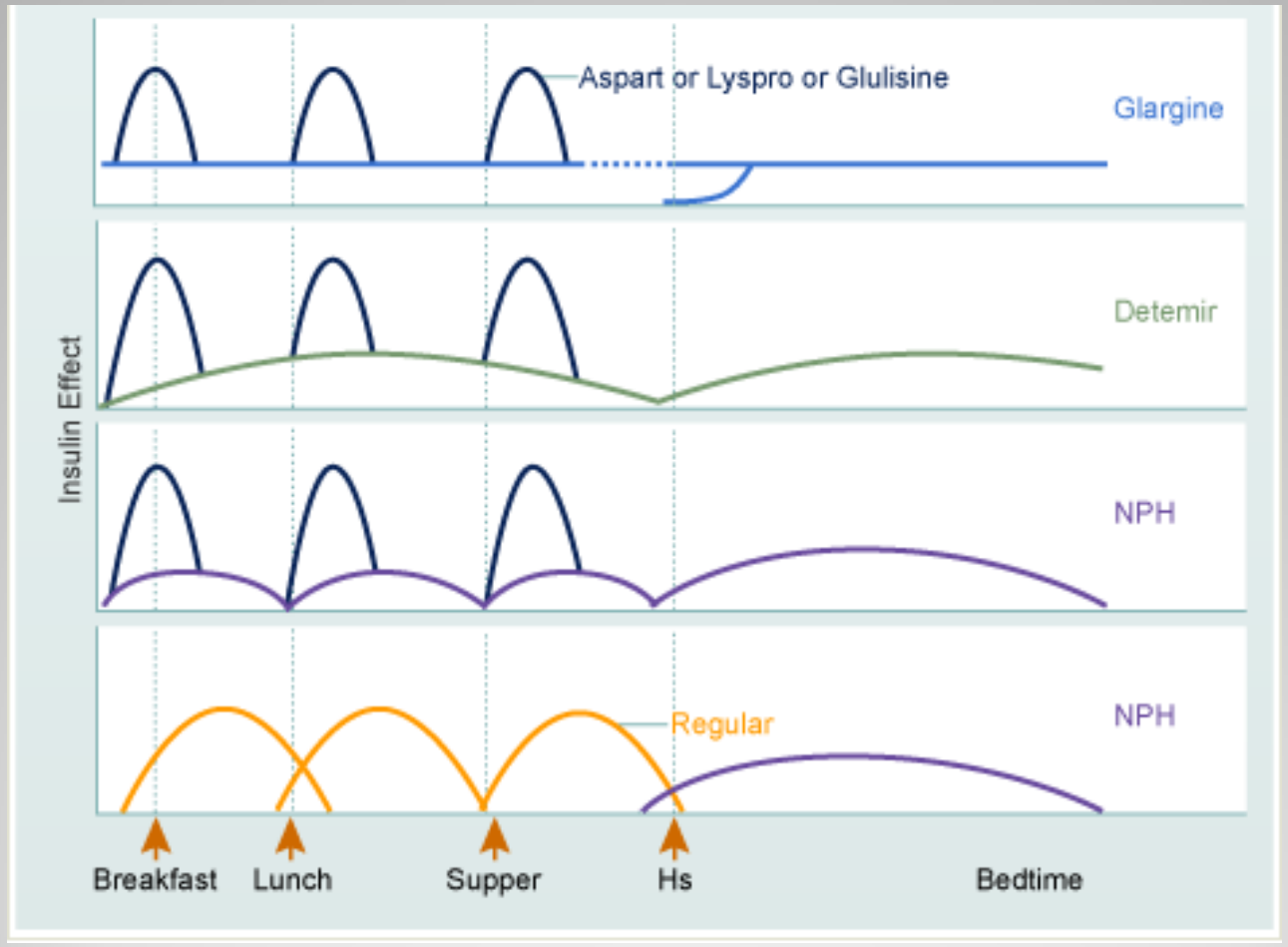


Insulin Response in Diabetes

Insulin Profiles



Insulin Regimens: Basal Bolus



WaterlooWellington DIABETES

Summary of Canadian Insulin Products 2017

Company →	Novo Nordisk		Lilly		sanofi	
↓Category	Generic	Brand	Generic	Brand	Generic	Brand
Fast Acting Onset 4-10 min Duration 3-5 h *Clear solution*	aspart	**Fiasp** 10 mL vial 3 mL cartridge Prefilled Pen (FlexTouch) Expiry after opening: 28 days				
Rapid Onset 10-15 min Duration 4-5 h *Clear solution*	aspart	**Novorapid** 10 mL vial 3 mL cartridge Prefilled Pen (FlexTouch) Expiry after opening: 28 days	lispro	**Humalog** 10 mL vial 3 mL cartridge Prefilled pen (KwikPen) Expiry after opening: 28 days	glulisine	**Apidra** 10 mL vial 3 mL cartridge Prefilled pen (Solostar) Expiry after opening: 28 days
Short Onset 30-60min Duration 5-8 h *Clear solution*	Regular	**Novolin ge Toronto** 10 mL vial 3 mL cartridge Expiry after opening: 30 days	Regular	**Humulin R** 10 mL vial 3 mL cartridge Prefilled Pen (KwikPen) Expiry after opening: 28 days		
Intermediate Onset 1-3 h Duration up to 18 h *Cloudy solution*	NPH	**Novolin ge NPH** 10 mL vial 3 mL cartridge Expiry after opening: 30 days	NPH	**Humulin N** 10 mL vial 3 mL cartridge Prefilled Pen (KwikPen) Expiry after opening: 28 days		
Extended long acting Onset 90 min Duration 24 h *Clear solution*	Detemir	**Levemir** *can not be mixed with any other insulin* Once (or twice) daily admin 3 mL cartridge Prefilled Pen(FlexTouch) Expiry after opening: 42 days	Glargine biosimilar	**Basaglar** *can not be mixed with any other insulin* Once daily admin 3 mL cartridge Prefilled Pen (Kwik pen) Expiry after opening: 28 days	Glargine	**Lantus** *can not be mixed with any other insulin* Once daily admin 10 mL vial 3 mL cartridge Prefilled Pen (SoloStar) Expiry after opening: 28 days
					Glargine (300U/mL)	**Toujeo** Once daily admin Prefilled Pen (SoloStar) *for adults only. Max single injection 80 units Expiry after opening: 42 days
Premixed **Rapid + Intermediate** Onset 10-15 min Duration up to 18 h *Cloudy solution*	Biphasic insulin aspart	**NovoMix 30** 10 mL vial 3 mL cartridge Expiry after opening: 28 days	lispro/ lispro protamine suspension	**Humalog Mix25** 25% Lispro/75% NPL **Humalog Mix50** 50% Lispro/50% NPL 3 mL cartridge, Prefilled Pen (KwikPen) Expiry after opening: 28 days		
Premixed **Short + Intermediate** Onset 30-60 min Duration up to 18 h *Cloudy solution*	Regular + NPH	**Novolin ge** 30/70 30% Reg/70%NPH 10 mL vial 3 mL cartridge 40/60 40% Reg/60%NPH 50/50 50% Reg/50%NPH 3 mL cartridge Expiry after opening: 28 days	Regular + NPH	**Humulin** 30% Reg/ 70% NPH 10 mL vial 3 mL cartridge Expiry after opening: 28 days		

Prepared by: B. Young, Quality Management, March 2003. Reviewed by M. Gingras, Pharmacy, D. Hollahan, DEC, Credit Valley Hospital
Revised by: D. Hollahan, 2015, Waterloo Wellington Diabetes Revised: April 2017 Waterloo Wellington Diabetes

Insulin Requirements

- Type 1 adult 0.5 u/kg

Adjusting insulin in Type 1 requires more caution as small doses can create significant changes

Example:Type 1

FBS on 26u NPH @ HS
9.1
8.7
9.3
7.9

Next Step:
Increase NPH (HS) to 28

NPH (HS) 28

FBS	HS	3 am
7.1	6.8	3.6
7.9	7.3	2.8
11.3	8.1	2.3

Next Step:
Decrease NPH (HS) to 27

NPH (HS) to 27

FBS	HS	3 am
8.6	8.9	5.2
7.2	9.3	6.1
6.9	7.8	3.9

What could you do with this person?

a) Decrease NPH by 2 units
b) Increase NPH by 2 units
c) Switch to long acting analogue
d) Switch to a mixed insulin

What could you do with this person?

a) Decrease NPH by 2 units
b) Increase NPH by 2 units
c) Switch to long acting analogue
d) Switch to a mixed insulin

- Injection Site
- Injection Depth (technique)
- Insulin Dose
- Insulin Type
- Onset, degree of duration of activity
- Insulin Antibodies
- Blood Glucose Levels
- Mixtures with modified insulin
- Physiologic degradation at site
- Intra-patient variations in insulin pharmacokinetics

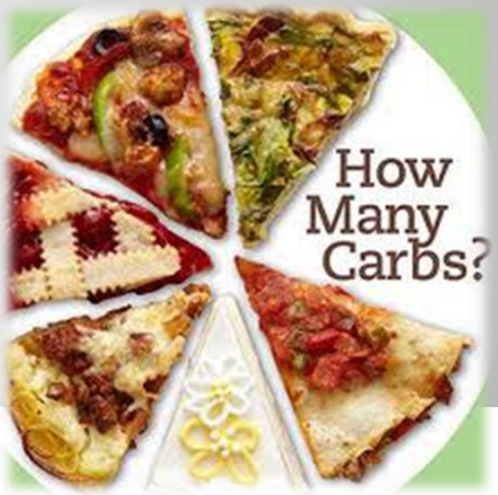
Factors that Influence Insulin Absorption and Bioavailability

Carbohydrate consistency

- Food Choices using Beyond the Basics

Carbohydrate Counting

- Look at the actual amount of carbohydrate to determine the amount of insulin
- Food Labels
- Nutrition books and apps
- Important for Pumps , Basal /Bolus, Pregnancy



Diet

Insulin to Carbohydrate Ratio

- Ratio is used to determine the amount of insulin needed to cover a meal
- 1 unit of insulin will cover "X" grams of carbohydrate
- Examples are often 1:10 for ease of calculation

- Basal bolus with Lantus and Humalog
- Ratio is 1:10
- How much insulin would she need for this meal?

- 2 slices WW toast
- 1 orange
- 200 ml artificially sweetened yogurt
- 1 egg
- Coffee, black

a) 4 units
b) 10 units
c) 6 units
d) 3 units

Kathy

- Basal bolus with Lantus and Humalog
- Ratio is 1:10
- How much insulin would she need for this meal?

- 2 slices WW toast
- 1 orange
- 200 ml artificially sweetened yogurt
- 1 egg
- Coffee, black

c) 6 units

Kathy

Insulin Sensitivity Factor or Correction Dose

- The amount a person's blood glucose will drop (mmol/L) for each unit of insulin.
- "100 Rule"
- 100 divided by Total daily dose of insulin

Insulin Sensitivity Factor (ISF)

Kathy

- Target is 7 mmol/L
- Present blood glucose 11mmol/L
- ISF: 1 unit to decrease 2 mmol/L

How much extra insulin would Kathy require?
Blood glucose – target
11-7= 4
4 divided by ISF of 2
Kathy would add 2 extra units of insulin

Exercise requires:

- Add additional food
- Decrease Insulin or
- Both

Compensation for Physical Activity

Compensation for Physical Activity

	Insulin	Carbohydrate
Light exercise	Reduce bolus by 10%	Add 10 grams before activity (May not be needed)
Moderate Exercise	Reduce Bolus by 20%	Add 15-30 grams before exercise
Vigorous Activity	Reduce Bolus by 30-50%	Add 30-60 before or after exercise

Compensation for Physical Activity

Also consider:

- Timing of exercise compared to meal
- Blood glucose before starting exercise
- Weight goal: maintenance or loss
- Do not exercise if blood glucose is above 16.7 mmol/L

Things to consider to prevent Hypoglycemia
Injection site- avoid working muscles
Timing of exercise versus insulin action
Food Intake
Alcohol

Hypoglycemia can occur up to 24 hours after an activity

Compensation for Physical Activity

Hypoglycemia

Definition

- the development of autonomic or neuroglycopenic symptoms
- a low plasma glucose level (<4.0 mmol/L for patients treated with insulin or an insulin secretagogue); and
- symptoms responding to the administration of carbohydrate. The severity of hypoglycemia is defined by clinical manifestations

2013 Clinical Practice Guidelines

Severity of hypoglycemia

- Mild: Autonomic symptoms are present. The individual is able to self-treat.
- Moderate: Autonomic and neuroglycopenic symptoms are present. The individual is able to self-treat.
- Severe: Individual requires assistance of another person.
- Unconsciousness may occur. PG is typically <2.8 mmol/L.

Hypoglycemia

Hypoglycemia Symptoms

Neurogenic (autonomic)

- Trembling
- Palpitations
- Sweating
- Anxiety
- Hunger
- Nausea
- Tingling

Neuroglycopenic

- Difficulty concentrating
- Confusion
- Weakness
- Drowsiness
- Vision changes
- Difficulty speaking
- Headache
- Dizziness

Hypoglycemia

- Teach glucagon to family members
- Carry glucagon when traveling

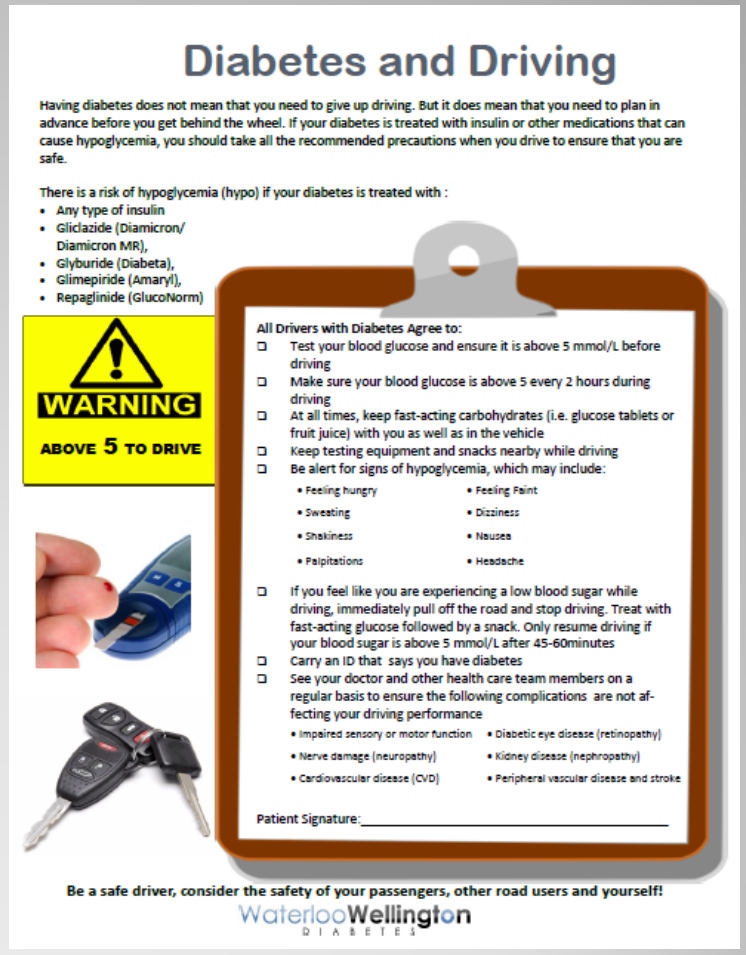
- 15 grams of carbohydrate

Treatment for Hypoglycemia

Risk factors for Severe Hypoglycemia

- Prior episode of severe hypoglycemia
- Current low A1C (<6.0%)
- Hypoglycemia unawareness
- Long duration of insulin therapy
- Autonomic neuropathy
- Low economic status
- Food insecurity
- Low health literacy
- Cognitive impairment
- Adolescence

“5 to Drive”



Diabetes and Driving

Having diabetes does not mean that you need to give up driving. But it does mean that you need to plan in advance before you get behind the wheel. If your diabetes is treated with insulin or other medications that can cause hypoglycemia, you should take all the recommended precautions when you drive to ensure that you are safe.

There is a risk of hypoglycemia (hypo) if your diabetes is treated with :

- Any type of insulin
- Gliclazide (Diamicron/ Diamicron MR),
- Glyburide (Diabeta),
- Glimepiride (Amaryl),
- Repaglinide (GlucoNorm)

WARNING

ABOVE 5 TO DRIVE

All Drivers with Diabetes Agree to:

- ❑ Test your blood glucose and ensure it is above 5 mmol/L before driving
- ❑ Make sure your blood glucose is above 5 every 2 hours during driving
- ❑ At all times, keep fast-acting carbohydrates (i.e. glucose tablets or fruit juice) with you as well as in the vehicle
- ❑ Keep testing equipment and snacks nearby while driving
- ❑ Be alert for signs of hypoglycemia, which may include:
  - Feeling hungry
  - Feeling Faint
  - Sweating
  - Dizziness
  - Shakiness
  - Nausea
  - Palpitations
  - Headache
- ❑ If you feel like you are experiencing a low blood sugar while driving, immediately pull off the road and stop driving. Treat with fast-acting glucose followed by a snack. Only resume driving if your blood sugar is above 5 mmol/L after 45-60minutes
- ❑ Carry an ID that says you have diabetes
- ❑ See your doctor and other health care team members on a regular basis to ensure the following complications are not affecting your driving performance
  - Impaired sensory or motor function
  - Diabetic eye disease (retinopathy)
  - Nerve damage (neuropathy)
  - Kidney disease (nephropathy)
  - Cardiovascular disease (CVD)
  - Peripheral vascular disease and stroke

Patient Signature:_____

Be a safe driver, consider the safety of your passengers, other road users and yourself!

WaterlooWellington DIABETES

Driving Guidelines

Waterloowellingtondiabetes.ca >professional side> resources

- Illness can result in elevated blood glucose requiring more insulin
- NEVER omit insulin even if vomiting
- Untreated hyperglycemia can result in DKA

Sick Day Management

Sick Day Guidelines for Insulin users

S **Sugar** Check every 2-4 hours
I **Insulin** **Continue to take it!**
C **Carbohydrate** Take some every 1-2 hours
K **Ketones** Test if your blood glucose is above 16

Illnesses like a cold, flu or sore throat can cause your blood sugar to rise. It is important to continue to monitor your blood sugar levels, eat and/or drink, and take insulin.
Insulin often needs to be increased during an illness.

Always take your _____
(long acting insulin)
Take your _____
(rapid insulin)
If you are able to eat/drink.
Use the chart on the next page to add extra insulin.

Call your Health Care provider if you:
- Vomit more than twice in 12 hours
- Have severe stomach pain
- Have rapid breathing
- Have a rapid heart beat
- Have fruity smelling breath (ketones)
- Have difficulty staying awake

Often when people are sick they prefer to nibble or sip fluids during the day. Be sure to include items with carbohydrate. Use the sample meals below as a guide. Add sugar-free fluids to prevent dehydration.

Breakfast: 1/2 cup apple juice and 8 crackers (*Carbohydrate 30 grams*)
+ water or sugar free beverages
Morning snack: 4 melba toast or 3/4 cup of gingerale (*Carbohydrate 15 grams*)
+ sugar free beverages
Lunch: 3 arrowroot cookies and 1/2 cup regular jello (*Carbohydrate 30grams*)
+ water or sugar free beverages
Afternoon snack: 1 ready-to-serve pudding (*Carbohydrate 25 grams*)
+ sugar free beverages
Evening meal: 1/2 cup mashed potatoes and 1/2 cup gingerale (*Carbohydrate 30 grams*)
+ water or sugar free beverages
Evening snack: 1 popsicle (2 sticks) (*Carbohydrate 20 grams*)

September 2015

WaterlooWellington DIABETES

Clear Fluids
For People with Diabetes

"Clear Fluids" means you can see through them and there are no particles or pulp.

Carbohydrates need to be consumed anytime you are using clear fluids, to provide glucose for energy. You will need to continue with your medication and insulin to control blood sugars. In addition to carbohydrate containing beverages you will need sugar free fluids to prevent dehydration.

CAUTION: Red and purple beverages are to be avoided when preparing for a colonoscopy.

Here is a sample menu to use.

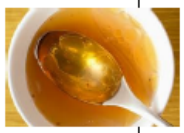
Breakfast: 2/3 cup apple juice and 1/2 cup gingerale (Carbohydrate 30 grams)
Morning snack: 1 cup powerade or 3/4 cup of gingerale (Carbohydrate 15 grams)
Lunch: 1/2 cup white grape juice and 1/4 cup regular jello (Carbohydrate 30grams)
Afternoon snack: 1 cup regular gingerale (Carbohydrate 15 grams)
Evening meal: ½ cup regular jello and 3/4 cup Gatorade (Carbohydrate 30 grams)
Evening snack: ½ cup regular jello and 1 popsicle (Carbohydrate 20 grams)

Carbohydrate Beverages
Each contain 10 grams of carbohydrate and can be substituted in the menu:

Apple Juice: 1/3 cup
Cranberry Juice (white): 1/4 cup
Cranberry Cocktail (white): 1/3 cup
Cranberry Cocktail Low Calorie : 1 cup
Gatorade: 3/4 cup
Grape Juice (white): ¼ cup
Powerade: 3/4 cup
Regular Jello: ¼ cup
Regular Iced Tea: 1/3 cup
Regular Gingerale: ⅓ cup
Regular Popsicle: 1 stick

Sugar Free Beverages:

Clear Coffee or Tea
Clear Broth
Club Soda
Crystal Light
Diet Cranberry
Diet Jello
Diet Pop
Powerade Zero
Water



Use as desired

WaterlooWellington DIABETES

Revised January 2016

Sick Day Guidelines

Waterloowellingtondiabetes.ca >professional side> resources

Insulin adjustment for Sick Days

Blood Glucose mmol/L	Blood Ketones mmol/L	Urine Ketones	Action Required My rapid insulin is_____
< 3.9	negative		Decrease pre-meal insulin
4.0- 16.0	<0.6	+ or -	Usual insulin dose
4.0 – 16.0	≥ 0.6	Small light purple +2	Add an Extra 10% in addition to pre-meal dose
>16.0	<0.6	+ or -	Add an Extra 10% in addition to pre-meal dose
>16.0	≥0.7- 1.4	Moderate purple +3	Add an Extra 15% in addition to pre-meal dose
>16.0	≥1.5 – 3.0	Large dark purple +3	Add an Extra 20% every 4 hours in addition pre-meal dose Contact your Dr. or healthcare team as soon as possible.

- Pumps
- Pens
- Insulin storage and safety

Topics related to insulin

www.Fit4diabetes.com/canada-english

- Which statement about people with type 1 diabetes is accurate?

a) 49% of people experience diabetes distress
b) 10 % of people have depression
c) 90% of people feel their health care providers listen to them
d) 90% of people were helped to set goals by their health care providers

Dawn 2 Study

What is the name given to an elevated blood sugar following a low blood sugar?

a)Dawn Effect

b)Atypical hypoglycemia


c)Somogyi effect

d)Szycofski effect

Elevated Blood Sugar

Questions

Diabetes and Children

Goals:

- Optimal Growth and development
  - Physical and psychologically
- Prevent severe hypoglycemia
  - Disrupts cognitive function
  - Severe Hypoglycemia age <6 can result in later cognitive impairment
- No symptoms of hyperglycemia
  - Hyperglycemia has also been shown to affect cognitive function
- Lots of Energy
- Interest in Friends and Activities
- Regular School Attendance

Challenges

- Growth Spurts
  - **HORMONES**
  - Altered patterns of eating and activity
- Recognition of Hypoglycemia
  - Nocturnal Hypoglycemia
  - Fear of seizures (parents)
- Changing behavior
  - Is this a normal response for a child this age or is this diabetes related?
- Variable Appetite
- Food Jags
- Illness
  - Regular colds, flu, infections require additional attention to maintain blood sugar control and prevent DKA

Insulin Dose

- Children .3-.5 u/kg
- Adolescents 1.0-1.5 u/kg

Blood Sugar Targets

Age	A1c	AC Meals	2 hr PC Meals
<6	<8.0	6-10	-
6-12	<7.5	4-10	-
13-18	<7.0	4-7	5-10

2013 Clinical Practice Guidelines

Rational for Targets

- Infants/Toddlers/Preschool
  - Unpredictable food intake
  - Can't recognize hypoglycemia
  - Prevent Hypoglycemia due to effect on cognitive function
- School Age
  - Communicate Hypoglycemia
  - Food more predictable
  - Lacking in Judgment
- Teenagers
  - Recognize and Treat Hypoglycemia
  - Understand concept of Balance
  - Able to Plan Ahead

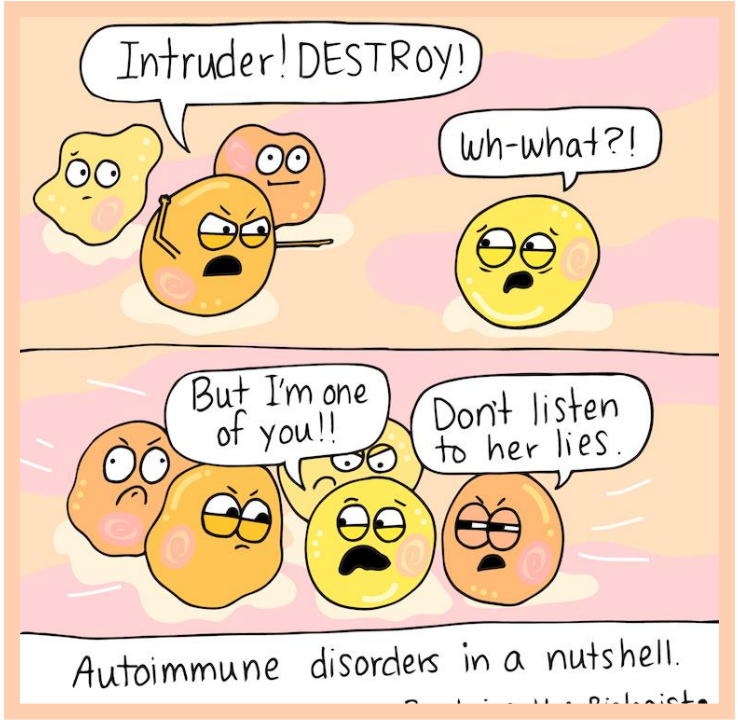
Honeymoon

- Can last from a few weeks up to 2 years
- Good blood glucose control with decreased insulin requirements
- Insulin may even be stopped

Other Autoimmune Disease

Thyroid

- Most likely girls at onset of puberty
- Testing at Diagnosis and every 2 years
- +ve antibodies screen 6-12 months



Other Autoimmune Disease

Celiac

- 4-9% of children with Type 1
- Screening controversial,

Done as clinically indicated

No wheat, rye, barley
Non-contaminated oats

Screening for Complications

	Screen at:
Nephropathy	• Age 12 with 5 years duration-yearly
Retinopathy	• Age 15 and 5 years duration-yearly
Neuropathy	• Post puberty, 5 years duration and poor control
Hypertension	• twice per years
Dyslipidemia	• age 12 and 17 or
	• <12 if BMI> 95th or fam history

Eating Disorders

Females with diabetes have a 2 fold risk of eating disorders

Eating Disorders

- Anorexia- restriction of calories
- Bulimia- binge and purge
- Insulin omission

A1c over 12% is indicative of insulin omission

Eating Disorders Red Flags!

- Unexplained lows
- Unexplained weight loss or lack of weight gain
- A1c above 10%
- Restriction of carbohydrate
- A1c/meter and log book discrepancy
- Recurrent DKA
- Reverting to symptoms pre-diagnosis
- Lack of fingerpricks

Krishnamoorathy, MacDonald. S Diabetes and Eating Disorders: Are we feeding the problem? Presentation at Vascular 2013 conference.

Misc

- Flu shots yearly
- Females counseling about contraception

Risk of developing Type 1 Diabetes?

- Identical Twin — 1 in 2-3 chances
- Father — 1 in 16-20 chances
- Sibling — 1 in 20 chances
- Mother, child born before age 25 — 1 in 25 chances
- Mother, child born after age 25 — 1 in 100 chances
- No Family Members — 1 in 250-400 chances

Teenager

- Jessica is a 17 year old who has had diabetes for 12 years. She had a recent admissions for DKA and has lost 20 pounds since her last clinic visit.
- What would be the most likely cause of the weight loss?

a) Additional exercise

b) Starvation diet


Insulin omission

d) Less hypoglycemia from frequent use of fibre snacks

Sick Day Management

Justine has just had her wisdom teeth removed. She is trying to convert her lunch to liquids which she can tolerate. She normally has 45 grams of carbohydrate. Which answer is not equivalent ?

a) 1 cup orange juice and 1 stick of popsicle

) 1 cup jello and 1 cup apple juice

c) 1 pudding cup and ½ cup ice cream

d) 1 cup chicken noodle soup and 8 crackers and ½ cup gingerale

Questions

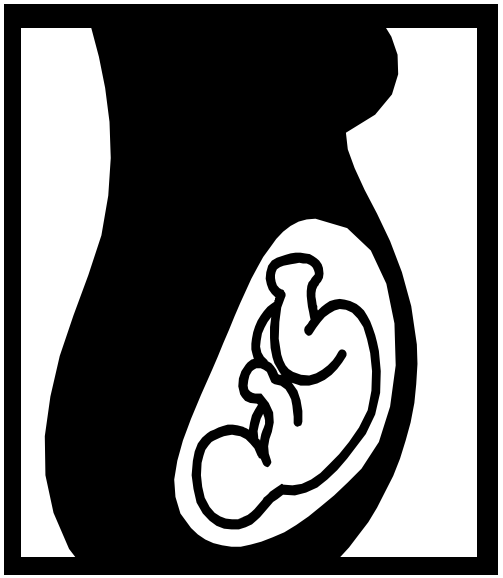
PREGNANCY- Gestational Diabetes (GDM)

- Screening and Diagnosis
- Risk Factors
- Complications
- Management

PREGNANCY- Gestational Diabetes

24 to 28 weeks
75 g oral glucose tolerance test

FBS ≥ 5.1
1 hr ≥ 10.0
2 hr ≥ 8.5



Preferred method recommended in Waterloo Wellington

PREGNANCY- Gestational Diabetes

24 to 28 weeks

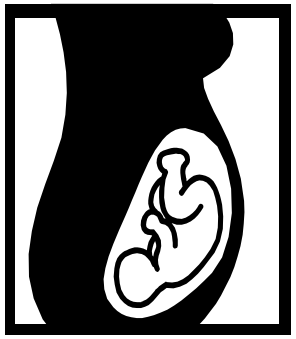
50 g oral glucose tolerance test

1 hr pc 7.8-11.0

1 hr > 11.0
GDM

Follow by 75 g glucose tolerance test

FBS ≥ 5.3
1 hr ≥ 10.6
2 hr ≥ 9.0



PREGNANCY- Gestational Diabetes

Risk Factors

- Age
- Obesity
- Ethnicity
- PCOS
- Family History of Type 2
- Family History of large babies (ie. >9 lbs)

PREGNANCY- Gestational Diabetes

Complications

Baby

- Trauma
  - Shoulder dystocia
- Low Blood Sugars
- Respiratory Distress
- Jaundice

Mom

- ↑ Trauma
- ↑ Swelling
- ↑ B.P.
- ↑ Infection

PREGNANCY- Gestational Diabetes

Management

- Monitor Blood Glucose
- Healthy Eating (Diet)
- Exercise
- Insulin as required

PREGNANCY- Gestational Diabetes

Management - Monitoring

- Fasting and
- 1 or 2 hours post prandial
- Testing 4 times per day

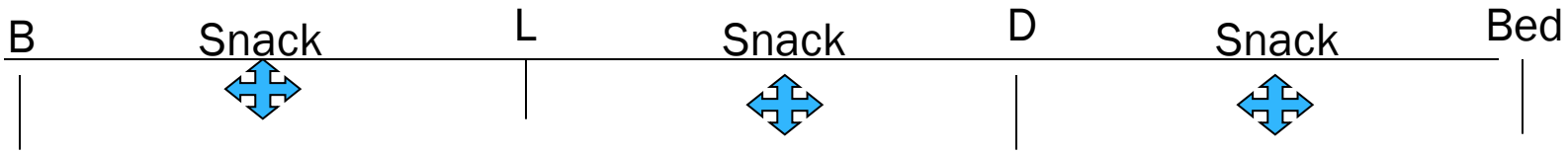
Targets

Testing Times	Target
Before breakfast	< 5.3
One hour after meal	< 7.8
Two hour after meal	<6.7

Pregnancy- Gestational Diabetes

Management - Diet

- 3 meals/day
- 3 snacks/day



- Control the amount of Carbohydrate at meals
- Bedtime snack
- Low Glycemic Index

Pregnancy- Gestational Diabetes

Management - Exercise

- Walking after meals

Pregnancy- Gestational Diabetes

Management – Oral medications

- Metformin
- Glyburide

Management - Insulin

- Breakfast
- Basal and or Bolus

Pregnancy- Gestational Diabetes

Post Partum

75 g OGTT 6 weeks – 6 months

- Screened early in next pregnancy
- Risk of Type 2

PREGNANCY- Preexisting Diabetes

Pregnancy- Preexisting Diabetes

- Preconception Counseling
- Type 1 vs Type 2
- Management
- Complications

PREGNANCY- Preexisting Diabetes

Preconception Counseling

All women with Type 1 and Type 2 should receive education and preconception care.

- Optimize Blood sugars
- Assess complications-eyes, kidneys, heart
- Review medications
- Begin folic acid supplements

PREGNANCY- Preexisting Diabetes

Preconception Counseling

Blood sugars A1c <7%

Reduces risk of:

- **Congenital malformations**
- **Preeclampsia**
- **Progression of retinopathy**

Folic acid supplements 5mg

3 months preconception up to 12 weeks

- **Neural tube defects**

PREGNANCY- Preexisting Diabetes

Preconception Counseling

Hyperglycemia

- **Teratogenic to the fetus**
- **Increased Birth Weight**
- **Increased Risk of Obesity**
- **Post delivery Hypoglycemia of infant**
- **Increased incidence Jaundice/Respiratory distress**

PREGNANCY- Preexisting Diabetes

Preconception Counseling

Hypertension

40-50 % in women with diabetes

- Type 1 – increased risk of pre-eclampsia
- Type 2 – chronic hypertension
- Teratogens: ACE/ ARB

Substitute with effective antihypertensives,
Calcium channel blockers, beta blockers
eg labatolol/ aldomet

PREGNANCY- Preexisting Diabetes

Preconception Counseling

Hyperlipidemia

- Medications are teratogens

Retinopathy

- Eye exam prior to pregnancy and in 1st trimester and as required each trimester
- Retinopathy worsens during pregnancy

PREGNANCY- Preexisting Diabetes

Type 2

- Older
- Heavier
- PCOS
- Taking oral medications
- Likely to have hypertension, hyperlipidemia

Less likely to have preconception care for diabetes

PREGNANCY- Preexisting Diabetes

Type 1

Risk for autoimmune conditions

ie hypothyriodism

1st trimester insulin needs go down

2nd, 3rd trimester insulin needs go up by 1.5 – 2 times

Risk for severe hypoglycemia in 1st trimester
Especially when asleep

PREGNANCY- Preexisting Diabetes

Management

Check blood sugar 4- 6 times per day

Basal Bolus Insulin

Testing Times	Target
Fasting	≤ 5.3
One hour after meal	≤ 7.8
Two hour after meal	≤ 6.7

Questions

Contact me at: wendyg@langs.org

Check out information at: waterloowellingtondiabetes.ca