General housekeeping

- Bathrooms
- Interruptions
- Breaks
- Safety
- Food
Schedule for today

Morning:
• Nutrition and you
• Insulin dose calculations
• Sick days / ketone management
• Physical activity
• Diabetes quick care guide
• Blood glucose logs
• Expectations for follow-up care
• Pathways to diabetes technology
• Research

Afternoon:
• Meet with Child Life Specialist
• Meet with diabetes provider
• Wrap-up with nurse educator
Connecting the dots…

Let’s review your blood glucose and food logs:

• Do you see any connection between food and blood glucose numbers?

• When are your blood glucose numbers highest? What made them high?

• When are your blood glucose numbers lower? What made them lower?

• Did you have any blood glucose numbers under 70 mg/dL? What did you do?

Flexibility with food

• Does this current way of eating suit you?

• What would make eating and food more enjoyable?

• Can you think of your favorite foods that you want to try?

• Is there an upcoming event or special occasion that you would like to plan for?
  o Examples: birthday, potluck, school pizza day, movie night
Carb counting when eating outside of the home

Experienced-based carbohydrate counting:

1. Find similar food on food databases or apps

2. Estimate the portions compared to the amount listed on referenced apps / databases

3. Come up with similar estimates

4. Review your carb estimates based on the results of your next blood glucose check

Carb counting home recipes

Let's work on your favorite recipe:

1. List out the ingredients and amount in the whole recipe

2. How many servings or portions will it make?

3. Find out the carbohydrate amount for each ingredient used

4. Add up all the carbohydrates

5. Divide total carbohydrates by the number of servings to find the carb amount for one portion
More tools for recipes

Digital Scale

Phone Apps

MyFitnessPal

Nutrition Wizard

Glooko

Break Time!
Please return in 10 minutes
Insulin Dose Calculations

Insulin dose calculations

You need rapid-acting insulin for two reasons:

1. Eating or drinking things with carbohydrates

2. Blood glucose is above range

See “Basal-Bolus Insulin: Long-Acting and Rapid-Acting Insulin Therapy” (PE1255) in Part 2 Handouts.
Insulin dosing definitions

• Insulin to Carb Ratio:
  1 unit of insulin will cover ____ grams of carbs

• Correction Factor:
  1 unit of insulin is expected to lower the blood glucose by ______ mg/dL

• Target Blood Glucose:
  Based on age
  Different number for daytime and bedtime / overnight

Insulin to carb ratio

Used to calculate the dose of rapid-acting insulin to cover carbs in food / drinks

\[
\frac{\text{Grams of carbs}}{\text{Insulin to carb ratio}} = \text{Carb dose}
\]
**Correction factor**

Used to calculate the dose of rapid-acting insulin to **lower** a high blood glucose.

\[
\frac{\text{Current Blood Glucose} - \text{Target Blood Glucose}}{\text{Correction Factor}} = \text{Correction Dose}
\]

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**Target blood glucose (BG)**

- **Low blood glucose**
- **High blood glucose**
- **Goal range**
Putting it all together...

**Example:** Insulin to carb ratio = 1:10  
Correction Factor = 50  
Target BG = 100 day / 150 night

Meal  
**Breakfast**

Carbs eating \[ \frac{60}{10} \] (carb ratio)  
= 6 Dose for food

BG now \[ \frac{240 - 100}{100} \] (target)  
= \[ \frac{140}{50} \] (correction factor)  
= 2.8 Dose for BG

Total insulin dose 8.8 units

Always round your final answer **DOWN** to the nearest half unit increment

See "Insulin Dose Calculations Worksheet" (PE3232) in Part 2 Handouts.
Putting it all together…

Your child’s current insulin dosing is:

- Insulin to carb ratio (I:C) = _____
- Correction factor (CF) = _____
- Target blood glucose (BG) = _____ day / _____ night

Now let’s do some practice problems together!

3 hour “rule”

Do not give a correction dose for high blood glucose if it has been less than 3 hours since last Humalog/Novolog injection. Cover carbs only!

- This is important to prevent insulin stacking of Humalog/Novolog that can lead to low blood glucose
- Humalog/Novolog is working to lower glucose in the body for 3 hours
### 3 hour “rule”

**Example:**

<table>
<thead>
<tr>
<th>Time</th>
<th>BG</th>
<th>Carb Dose</th>
<th>Correction Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast 8:00AM</td>
<td>280</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Snack 10:00AM</td>
<td>170</td>
<td>Yes</td>
<td>No, it has only been 2 hours since last Humalog/Novolog injection</td>
</tr>
<tr>
<td>Lunch 12:00PM</td>
<td>218</td>
<td>Yes</td>
<td>No, it has only been 2 hours since last Humalog/Novolog injection</td>
</tr>
<tr>
<td>Snack 3:00PM</td>
<td>298</td>
<td>Yes</td>
<td>Yes, it has been at least 3 hours since last Humalog/Novolog injection and glucose is high</td>
</tr>
<tr>
<td>Dinner 5:00PM</td>
<td>236</td>
<td>Yes</td>
<td>No, it has only been 2 hours since last Humalog/Novolog injection</td>
</tr>
<tr>
<td>Bedtime 9:00PM</td>
<td>315</td>
<td>No, not eating</td>
<td>Yes, it has been at least 3 hours since last Humalog/Novolog injection and glucose is high. Use bedtime target BG to calculate dose.</td>
</tr>
<tr>
<td>Overnight 2:00AM</td>
<td>125</td>
<td>No, not eating</td>
<td>No, glucose is in-range so no correction dose is needed</td>
</tr>
</tbody>
</table>

### Frequently asked questions about insulin dosing

**Question #1:**
I calculated my child’s insulin dose for breakfast and I got an answer of 3.9 units. Can I just round up to 4 units?

- We teach you to round DOWN to reduce the risk of low blood glucose from too much insulin
- You would round DOWN to the nearest half unit increment, which would be 3.5 units

**Question #2:**
My child’s blood glucose at bedtime is 130 mg/dL. Their night time target is 150 mg/dL. Do I need to feed them uncovered carbs to get their blood glucose at or above 150 mg/dL before they can go to sleep?

- No, your child can go to sleep with a blood glucose of 130 mg/dL
- The night time target is only used for dose calculations when correcting high blood glucose at bedtime/overnight; your child does not have to be at or above the night time target before going to sleep
Frequently asked questions about insulin dosing

Question #3:
My child’s blood glucose at 3:00AM is above their night time target BG. I calculated a correction dose of insulin and I got an answer of 0.3 units. Do I give any insulin?

- No, anything less than 0.5 units would round DOWN to 0 units of insulin. Your child can go back to sleep!

Question #4:
Can I give my child rapid-acting and long-acting insulin at the same time or do I have to wait 3 hours in-between injections?

- Yes, you may give both rapid-acting and long-acting insulin injections at the same time since they both work differently in the body (just choose different injection site locations)
- Reminder: the 3 hour “rule” only applies to rapid-acting Humalog/Novolog doses

Sick Days / Ketone Management
**Ketones: the basics**

**What are ketones?**
- A waste product of fat breakdown
- When our bodies don’t have enough insulin to move glucose into the cells for energy, our bodies breakdown fat for energy instead

**Why check for ketones?**
- Ketone checking is VERY important!
- High levels of ketones in the body can result in diabetic ketoacidosis (DKA), which can be serious

See “Sick Days/Ketone Management” (PE3233) in Part 2 Handouts.

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**Ketones: when and how to check**

**When to check for ketones?**
- If blood glucose is above 250 mg/dL twice in a row
- Your child is sick, regardless of the blood glucose levels
- Your child is vomiting

**How to check for ketones?**
- Most common method is checking urine ketones
Ketones: how to treat

If ketones are negative, trace or small:

- Drink extra water
- Give normal correction dose of insulin if blood glucose is high

If ketones are moderate or large:

- Drink extra water
- Your child will need extra insulin to clear the ketones
- Please refer to the “Sick Days/Ketone Management” handout in the Appendix section for instructions on dosing extra insulin for ketones
- Please call the diabetes urgent pager for help with insulin dosing if you are unsure what to do (206-987-2000)

When your child with diabetes is sick

What can happen?

- Blood glucose levels may rise due to the body’s stress response of illness
- Ketones can develop, even with normal glucose levels
- More insulin may be needed to prevent or treat ketones

What should I do?

- Keep your child well hydrated
- Monitor glucose and ketone levels every 3 hours
- Please refer to the “Sick Days/Ketone Management” handout in the Appendix section for additional guidelines on managing Sick Days with diabetes
What do you do if…

Scenario #1:
Your child wakes up in the morning and says they are not feeling well and that their stomach is upset.
- Check blood glucose and ketone levels
- Review “Sick Days/Ketone Management” handout to see if additional insulin is needed
- Continue to check blood glucose and ketone levels every three hours until your child feels better and ketones are negative

Scenario #2:
Your child is sick and has large ketones. Their blood glucose is 150 mg/dL.
- Give carbohydrates (without insulin) to get the blood glucose above 200 mg/dL so extra insulin can be given for the large ketones
- Once blood glucose is above 200 mg/dL, give double the normal correction dose for the large ketones
- Continue to check blood glucose and ketones every 3 hours while your child is sick

Physical Activity
Physical activity guidelines

• Physical activity generally lowers blood glucose
• Type of activity, duration, and intensity affect blood glucose levels
• It is important to check your child’s blood glucose before, during, and after physical activity

General guideline:

Eat 15g of carbs (without insulin) for every 30 to 60 minutes of physical activity

Unplanned versus planned activity

Unplanned activity

• Eat a 15g snack without insulin (depending on pre-activity glucose level)

Planned activity

• If going to be active within 1 to 2 hours after a meal or snack you can subtract 15g from the total carb count that you dose insulin for

Example: 60g – 15g = 45g

*only dose for 45g due to anticipated activity*
What do you do if…

**Scenario #1:**
You and your child are going on a 1 hour bike ride. You check their blood glucose before leaving and it is 155 mg/dL.
- Have your child eat a 15g snack (without insulin) in anticipation of the activity
- Bring BG meter, Medical ID, extra snacks and water with you on the bike ride
- Check blood glucose in 30 minutes and eat another 15g snack if blood glucose is dropping

**Scenario #2:**
Your child has been invited to the neighbor’s house to jump on the trampoline. You check their blood glucose beforehand and it is 75 mg/dL.
- Have your child eat/drink 15g of fast-acting carb (without insulin) since blood glucose is borderline low
- Recheck blood glucose in 15 minutes to make sure the blood glucose is going up before starting activity
- Once blood glucose is above 100 mg/dL, give your child an additional 15g snack with protein and fat (without insulin). Check blood glucose again in 30 minutes.

What do you do if…

**Scenario #3:**
Your child wants to go to the park and play on the playground. You check their blood glucose before leaving and it is 280 mg/dL.
- Check for ketones since the blood glucose is above 250 mg/dL before activity. If ketones are moderate or large they should not exercise. Follow guidelines in the “Sick Days/Ketone Management” handout.
- Your child does not need to eat a snack prior to activity with an elevated blood glucose of 280 mg/dL. Check blood glucose in 30 minutes to see if it is coming down on its own with the activity.

**Scenario #4:**
Your child is playing in a competitive soccer game. Their blood glucose was 180 mg/dL at half time, but after the game the blood glucose has spiked up to 350 mg/dL without any carbohydrate intake.
- The sharp rise in blood glucose is likely due to an adrenaline response from the game. Wait 2-3 hours before correcting the high blood glucose as it may drop on its own over the next few hours.
Diabetes Care Quick Guide

- Quick snapshot of important diabetes care tasks
- Can give copies of handout to family members and/or caregivers

See "Diabetes Care Quick Guide" (PE3213) in Part 2 Handouts.
**Blood Glucose Logs**

Different ways to log information

**BG Meter Apps**

**Logbook**

**SCH Excel Log**

**Glooko App**
Honeymoon period

- Shortly after diagnosis the remaining beta cells can continue producing insulin for a temporary period of time
  - Insulin production varies in quantity and duration from person to person
  - Likely need to inject less insulin during this time
  - May need more frequent insulin dose adjustments

- This does not necessarily happen to every person with Type 1 diabetes
Diabetes clinic follow-up

- First diabetes team visit in 2 to 4 weeks
  - Expect a longer visit
  - Will see provider, nurse, dietitian and social worker

- Follow-up appointments every 3 months
  - Bring blood glucose meter to all appointments
  - Visit with provider and diabetes nurse educator
  - Diabetes team visit once per year or as needed
  - Small finger poke to measure Hemoglobin A1c level

See "Why the Diabetes Team Visit?" (PE2419) in Part 2 Handouts.

Hemoglobin A1c

- Average blood glucose over the past 3 months
  - Measures the amount of glucose that attaches to hemoglobin on red blood cells

- Recommended goal is less than 7.5% for those under 18 years old
  - Well-controlled diabetes reduces risk for potential long-term complications from diabetes

See "About Hemoglobin A1c" (PE1517) in Part 2 Handouts.
How to contact us between clinic visits

Diabetes nurses are available by phone or MyChart for non-urgent concerns

Please include your child's name and date of birth in your messages

General questions
206-987-2640
Monday-Friday
7 a.m. to 4:30 p.m.

- Insulin dose adjustments (choose option 3)
- Prescription refills (choose option 3)
- School forms
- To talk to a Registered Nurse (choose option 4)

How to contact us between clinic visits

Diabetes team is available 24/7 for urgent concerns

Urgent questions
206-987-2000
24/7

Ask the operator to page the diabetes team for you

- Completely out of insulin
- Gave too much or too little insulin
- Gave the wrong insulin (example: Humalog vs. Lantus)
- Insulin pump problems that you or the pump company can't fix
- Low blood glucose (under 70) and not responding to treatment
- Moderate to large ketones that continue after treatment. Follow the steps in the “Ketone Management Guidelines” handout for how to treat moderate to large ketones.

Emergency
Call 911 or go to the emergency department

- Glucagon/Baqsimi has been given
- Presence of large ketones with one of the following:
  - Chest heaviness
  - Vomiting more than twice in 2 hours
  - Trouble breathing
  - Change in mental state
Continuous glucose monitors (CGMs)

Small sensor inserted under the skin to continuously monitor glucose levels

Medtronic Guardian Connect

Dexcom G6

See "Continuous Glucose Monitoring" (PE1232) in Part 2 Handouts.
**Insulin pumps**

Insulin is infused through a cannula under the skin instead of by injection

- Omnipod DASH
- Tandem X2
- Medtronic 670G

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**Additional classes we offer**

- **Insulin Dose Adjustment class** – 1 to 6 months after diagnosis
- **Insulin Pump Information class** – 3 to 6 months after diagnosis
- **Insulin Pump Start class** – approximately 6 months after diagnosis
- **Advanced Pump class** – at least 1 month after starting on insulin pump
Any Questions?

Hope. Care. Cure.