Steroid-Induced Diabetes Education Handbook
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Steroid-Induced Diabetes

What is steroid-induced diabetes?
Steroid induced diabetes can occur when someone is taking corticosteroid therapy for a medical condition, such as an organ transplant. Steroids like prednisone are essential medicines used to control swelling and inflammation. But, they can also cause high blood sugars by increasing the amount of sugar released into the bloodstream by the liver.

Steroids increase blood sugar by making it difficult for the body to use the insulin it is producing. Some people can produce extra insulin to balance these effects and maintain normal sugar levels, but those who cannot develop steroid-induced diabetes. If you develop steroid-induced high blood sugar, you will need to give yourself insulin shots at home. Often this is a temporary condition, and insulin shots can stop when the steroid treatment is done. It is important to monitor blood sugar levels and to give yourself extra insulin as needed when taking steroids.

What are the dangers of high blood sugars while taking steroids?
High blood sugar levels increase your risk of infections, in particular, fungus infections. If you are immunocompromised or have a central intravenous line, you are especially at risk.

What do I do while tapering my steroids?
Your need for extra insulin may change as your steroids are tapered (when the dose is slowly lowered). It is very important to keep checking and calling or emailing in your blood sugars to the Blood Sugar Line at 206-987-5452 or endonurse@seattlechildrens.org as your steroid dose is being tapered.
Causes

High blood sugar (also called hyperglycemia) is when there is too much sugar in your blood. Over time, it can cause serious health problems. High blood sugar can happen if you:

- Skip a dose of insulin or diabetes pills
- Eat more than usual
- Are less active than usual
- Are under stress or sick

Signs & Symptoms

Here’s what may happen when your blood sugar is high:

- Very thirsty
- Needing to pass urine more than usual
- Very hungry
- Sleepy
- Blurry vision
- Infections or injuries heal more slowly than usual

What to do about high blood sugar

The best way to avoid high blood sugar is to follow your diabetes care plan. Call your diabetes care team if your blood sugar has been higher than your goal for 3 days and you don’t know why.

Of course, the best way to know if you have high blood sugar is to check your blood sugar regularly, as directed by your doctor.
Signs and Symptoms of Hyperglycemia (high blood sugar)

The list below shows some of the ways you may feel if your blood sugar is high:

- extreme thirst
- frequent urination
- dry skin
- hunger
- blurred vision
- drowsiness
- nausea

**How to treat hyperglycemia:**

If blood sugar is above 250 twice in a row, test for ketones.

If ketones are moderate or large, refer to sick day management guidelines first, and if they worsen or you have questions, contact the doctor or diabetes nurse through the hospital operator at 206-987-2000 or 1-866-987-2000.

Drink plenty of water and follow instructions of healthcare team.
Low blood sugar (Hypoglycemia)

Causes

You might get low blood sugar (also called hypoglycemia) if you:
- Take certain medicines and eat too few carbohydrates, or skip or delay a meal
- Take too much insulin or diabetes pills (ask your diabetes care team if this applies to you)
- Are more active than usual

Signs and Symptoms

Here’s what may happen when your blood sugar is low:

- Shaky
- Sweaty
- Dizzy
- Sudden behavior change
- Hungry
- Weak or tired
- Headache
- Nervous or upset

If low blood sugar is not treated, it can become severe and cause you to pass out. If low blood sugar is a problem for you, talk to your doctor or diabetes care team.
What to do if you think you have low blood sugar

Check your blood sugar right away if you have any symptoms of low blood sugar. If you think your blood sugar is low but cannot check it at that time, treat anyway.

Treat by eating or drinking 15 grams of something high in sugar, such as:
- 4 ounces (½ cup) of regular fruit juice (like orange, apple, or grape juice)
- 4 ounces (½ cup) of regular soda pop (not diet)
- 3 or 4 glucose tablets
- 5 to 6 hard candies that you can chew quickly (such as mints)

Wait 15 minutes and then check your blood sugar again. If it is still low, eat or drink something high in sugar again. Once your blood sugar returns to normal, eat a meal or snack. This can help keep low blood sugar from coming back.

For more information, visit Cornerstones4Care.com

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Signs and Symptoms of Hypoglycemia
(low blood sugar – less than 80mg/dl)

The list below shows some of the ways you may feel if your blood sugar is low (less than 80):

- Shakiness
- Dizziness
- Nervousness
- Sweating a lot
- Hunger
- Chills and cold sweat
- Fast heartbeat
- Feeling light-headed or dizzy
- Blurred vision
- Sick to your stomach
- Tingling or numbness of your lips or tongue
- Headaches
- Weakness/Fatigue
- Irritable
- Anxiousness

For how to treat low blood sugar, see the next page.
How to Treat Low Blood Sugar

Step 1   Eat or drink something with sugar (see list below for ideas)

Step 2   Wait about 15 minutes, and then test your blood sugar.  
          **Exception – if it is meal time, eat your meal now.**

Step 3   If your blood sugar is still too low (or if you don’t feel better), eat some more sugar and test again after 15 minutes.

Step 4   Once your blood sugar is above 80 mg/dl, eat an extra snack. This snack should include a complex carbohydrate (about 15 grams) and a protein (such as cheese and crackers).

Take 10-15 grams of simple carbohydrates like these to eat when blood sugar is low

4 to 6 ounces (1/2 to 3/4 cup) of fruit juice  
4 to 6 ounces of regular soda pop  
4 to 6 sugar cubes  
5 or 6 Life Savers  
2 or 3 glucose tablets  
1 tablespoon of tubed cake gel  
1 tablespoon of sugar  
1 tablespoon of honey  
1 tablespoon of corn syrup  
1/2 sugar-sweetened Popsicle
Types of Insulin

The most common way to manage blood sugars with insulin is called the basal-bolus method. This involves taking a 24-hour basal (long-lasting) insulin and then giving boluses (bursts) of rapid-acting insulin when carbohydrates are eaten.

It is important to recognize the difference between these two types of insulin. One way to help identify insulin type is by the color of the caps and labels, or by the shape of the bottle. The rapid-acting insulin can be delivered by using a syringe and needle or a pen device.

Store all unopened insulin in the refrigerator. It is good until the expiration date on the box. Once opened, keep insulin at room temperature and throw away after 30 days. If an unopened container of insulin is unrefrigerated for more than 48 hours, it should be considered open and discarded after 30 days.

Long-lasting insulin

Rapid-acting insulin vials
Syringes and Sharps Disposal

It is illegal to throw away used hypodermic syringes, lancets, pen needles and other sharps in your regular garbage can or recycling bin. However, there is a safe and legal way of taking care of your sharps so that nobody is put in danger of being infected or poked by sharp edges. Please take time to view the flyer from Seattle Children’s Hospital on the proper way to purchase sharps containers and find the closest disposal site in your area.

TYPES OF SYRINGES

On top: 1/2 cc (50 unit) syringe

Below: 3/10 cc (30 unit) syringe
How do long-acting insulin and rapid-acting insulin work together?

**Action of long-acting insulin + rapid-acting insulin**

- Long-acting injection
- Breakfast rapid-acting injection
- Lunch rapid-acting injection
- Dinner rapid-acting injection
Disposal of Sharps

What are sharps?
Sharps are used syringes, hypodermic needles and vials left over after giving injections. If you are one of many people who give yourself or a family member injections at home, you need to know how to dispose of your sharps safely and legally.

How do I dispose of my used sharps?
Never flush sharps down the toilet. Most communities do not allow you to put sharps in your home or community garbage and recycling, even if they are in a sealed container. Sharps can carry bloodborne germs that cause disease. In many counties, it is against the law to throw away sharps in household garbage cans. Though some counties allow the use of makeshift containers like empty 2-liter beverage or detergent bottles, we strongly recommend that you use only approved sharps containers in the home setting.

What are sharps containers?
Sharps containers are usually plastic red containers labeled with the word “Sharps” and a biohazard symbol to identify the contents as a potential danger (see the picture on the left). This is the safest method for collecting and storing used sharps in the home. It is not safe to use empty 2-liter pop bottles—needles can poke through the thin plastic.

Where can I get a red sharps container?
• Check with the pharmacy where you get your child’s medicines and syringes. Many pharmacies sell sharps containers or provide them for customers. Seattle Children’s Ocean Pharmacy has sharps containers for patients picking up needles or syringes for the first time.
• Check the following websites or search the Internet for mail-back programs that provide sharps containers and pick-up service for a small fee:
  www.sharpsdisposal.com
  www.stericycle.com/mailback.html
• Ask your child’s healthcare provider for a container.

Where do I dispose of my full containers?
Every county and city has different options for sharps disposal. You will need to find out what options are offered in your city or county. If you need assistance with this, ask your healthcare provider. Or, you can try these steps:
• Follow all directions on the official sharps container to close and seal it. If you are using a makeshift container (empty liquid laundry detergent jug), be sure to tape the lid securely.
• Check to see that the container is clearly labeled “sharps” or “biohazard.”
• Check with the pharmacy where you get your child’s medicines. Many pharmacies have drop-off sites for sharps containers.
Disposal of Sharps

To Learn More
- Ocean Pharmacy
  206-987-2138
- Ask your child’s nurse or doctor
- www.seattlechildrens.org

Check the websites above for mail-back programs.
Check with your county public health department or your city public utilities department that handles solid waste garbage for local options to dispose of sharps containers. You can find these numbers on the web or in the local phone book, usually in the community or blue pages. A local librarian is also a helpful resource for locating community resources and phone numbers.
Ask your healthcare provider if they will accept full sharps containers.

Locations for sharps disposal stations in Washington state

City of Seattle Solid Waste Recycle and Disposal Information Line
206-684-8400
- North Recycling and Disposal Station – 1350 North 34th Street
  (Located in the Fremont/Wallingford area)
- South Recycling and Disposal Station – 130 South Kenyon Street

King County Public Health
Main number: 206-296-4600 or 1-800-325-6165 ext.6-4600
www.kingcounty.gov
- Safe and legal disposal of sharps
  http://www.kingcounty.gov/healthservices/health/communicable/hiv/resou rces/disposal.aspx or
- Disposal of home-generated syringes and needles

Snohomish County Solid Waste Management Sharps Disposal
No disposal service through the county garbage pick-up or transfer stations. Call 425-388-3425, option 0, and ask for a list of participating pharmacies that provide drop-off services for sharps or visit www.snoco.org, and use the key words: sharps disposal.

For other counties’ sharps disposal sites, search the web:
Go to the Washington State Health Department map link to find your county health department: http://www.doh.wa.gov/AboutUs/PublicHealthSystem/LocalHealthJurisdictions
Use the keywords: sharps disposal, needle exchange programs, biohazard waste disposal, safe needle disposal, metro[city].gov, recycling and disposal stations. For more information on safe needle disposal, visit www.safeneedledisposal.org

Seattle Children’s offers interpreter services for Deaf, hard of hearing or non-English speaking patients, family members and legal representatives free of charge. Seattle Children’s will make this information available in alternate formats upon request. Call the Family Resource Center at 206-987-2201.

This handout has been reviewed by clinical staff at Seattle Children’s. However, your child’s needs are unique. Before you act or rely upon this information, please talk with your child’s healthcare provider.

Rotation of Injection Sites

Source: Diabetes Scene
http://www.banting.com/dcenter/injection.html
Rotation of Injection Sites

Basal-Bolus Insulin

Long-acting and rapid-acting insulin therapy

What do the words basal-bolus insulin mean?
Many people with Type 1 diabetes use a combination of long-acting (basal) and rapid-acting (bolus) insulin. This is called “basal-bolus” insulin. You will work with your diabetes educator to learn how to figure out how much basal-bolus insulin you will need every day.

Your goal is to use basal-bolus insulin to keep your blood sugar in target range. You will take enough insulin to cover what you eat and to give your body what it needs. This handout is mostly about calculating bolus insulin.

Basal insulin (long acting) - refers to the insulin you inject as background insulin to control blood glucose levels overnight and between meals.

Insulin names: Glargine (Lantus) or Detemire (Levemir)
- Works to keep blood sugars in the target range between meals and through the night. It works with the sugar that is released by the liver.
- Dose usually remains the same from day to day. Your doctor or diabetes educator will recommend an adjustment when blood sugars are not in target range.
- Lasts 12-24 hours.
- Taken at the same time every day.

Bolus insulin (rapid acting) – an insulin injection given as a burst to quickly counter carbs eaten or lower high blood sugars.

Insulin names: Humalog, Novolog
- Works to provide insulin in the right amount for the food you are eating (this is called a “Carb Bolus”) and/or to lower high blood sugars (this is called a “Correction Bolus”).
- Dose will be different each time you take it depending on blood sugar and the food/amount of carbohydrates you are eating.
- Lasts about 3 hours.
- Usually taken right before meals and snacks (when you eat carbohydrates).

Figuring out your bolus (Humalog/Novolog) insulin doses

How do you know how much rapid acting bolus insulin you need for mealtimes and snacks?

Ask yourself these 3 questions:
- How many grams of carbohydrates are you going to eat?
- What is your blood sugar (BS) now?
- How active are you going to be during the next few hours?
1. How many carbs are you going to eat?
First, add up the grams of carbohydrates in the meal or snack.

**Insulin/Carbohydrate Ratio**
- You need to know your Insulin/Carbohydrate Ratio. It tells you how many units of insulin you need to take for the grams of carbs you are going to eat.
- Everyone has a different insulin/carbohydrate ratio – it’s based on your size/weight and your body’s sensitivity to insulin.
- Ratio example #1: 1 unit of Humalog/Novolog per 10 carbs – 1:10
- Ratio example #2: \( \frac{1}{2} \) unit of Humalog/Novolog per 30 carbs – \( \frac{1}{2}:30 \)
- Once you know your carb ratio number (your insulin/carbohydrate ratio), you will use it to figure out your Carb Bolus.
- You should inject Humalog/Novolog 15 minutes before you eat. Young children can get this after their meal if it is uncertain how much of the meal or snack they will eat.

Your insulin/carb ratio is: _______

**Grams of Carbohydrates ÷ Insulin/Carbohydrate Ratio = Carb Bolus**

2: What is your blood sugar number?
The Correction Bolus is taken when you need to correct (lower) a high blood sugar number. You will need a Correction Bolus when your blood sugar goes above the number determined by your doctor.

To calculate your Correction Bolus, you need to know your Correction Factor.

**Correction Factor (CF)**
Your Correction Factor tells you how sensitive you are to insulin – it is an estimate of how much Humalog/Novolog you need to lower your blood sugar down to your target number. You will have a different target number for daytime and bedtime/middle of the night. Everyone has a Correction factor, unique to them, determined by their doctor. A Correction Factor of 50 means that 1 unit of Humalog/Novolog lowers your blood sugar by 50 points.

Your personal correction factor is: _______
Now, let’s figure out your **Correction Bolus**:

\[
\text{(Current blood sugar} - \text{target blood sugar}) \div \text{Correction Factor} = \text{Correction Bolus}
\]

\[
\begin{array}{c}
\boxed{\text{Current blood sugar}} \ - \ \boxed{\text{target blood sugar}} \\
\hline
\text{Correction Factor}
\end{array}
\]

DO NOT give a Correction Bolus if it has been less than 3 hours since the last Humalog/Novolog injection was given.

**Carb Bolus + Correction Bolus = Total Bolus Dose (Humalog/Novolog)**

**Example:**

<table>
<thead>
<tr>
<th>Time</th>
<th>BS</th>
<th>Carb Bolus</th>
<th>Correction Bolus</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 a.m. breakfast</td>
<td>315</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>10 a.m. snack</td>
<td>170</td>
<td>Yes</td>
<td>No (only 2 hours since last bolus dose with correction bolus)</td>
</tr>
<tr>
<td>12 p.m. lunch</td>
<td>150</td>
<td>Yes</td>
<td>No (only 2 hours since bolus dose; no correction dose as blood sugar now on target)</td>
</tr>
<tr>
<td>3 p.m. snack</td>
<td>298</td>
<td>Yes</td>
<td>Yes (3 hours since last injection and blood sugar high)</td>
</tr>
<tr>
<td>5 p.m. dinner</td>
<td>236</td>
<td>Yes</td>
<td>No (only 2 hours since last bolus dose)</td>
</tr>
<tr>
<td>8 p.m.</td>
<td>315</td>
<td>No</td>
<td>Yes using bedtime target.</td>
</tr>
</tbody>
</table>

**3: How much activity will you be doing in the next few hours?**

- For every 30-60 minutes of increased activity, eat an extra 15 gram carb snack. **DO NOT TAKE INSULIN TO COVER THESE CARBS.**
  
  Or

- If you know you are going to be active within one hour after a meal or snack, you may want to subtract 15 grams from the total number of carbohydrates you are counting for your meal or snack. This will give you less Humalog/Novolog for that dose.
**Bolus dose example**

Your child’s blood sugar at breakfast is 275. He is going to eat 50 carbs and then he is going to a 60 minute swim practice. His carb ratio is 1:10. His target is 150 and his Correction Factor is 50. What is the dose of Humalog/Novolog?

Current blood sugar: 275  
Grams of carbs eating: 50  
Target: 150

Remember the 3 questions:

- How many grams of carbohydrates are you going to eat? 50
- What is your blood sugar now? 275
- How active are you going to be during the next few hours? 60 min. swim.

**Solution:**

**Step 1.** Figure your Carb Bolus.
Grams of Carbohydrates LESS 15 grams for planned activity divided by Insulin/Carbohydrate Ratio = **Carb Bolus**

\[
\text{Carb bolus} = \frac{50 - 15}{10} = \frac{35}{10} = 3.5
\]

Carb ratio: 10  
Adjusted carbs eaten: 35

**Step 2.** Figure your Correction Bolus.
(Current blood sugar - target blood sugar) ÷ Correction Factor = **Correction Bolus**

\[
\text{Correction bolus} = \frac{275 - 150}{50} = \frac{125}{50} = 2.5
\]

Correction factor: 50  
Amount over target: 125
Step 3. Figure your total Bolus Dose
Carb Bolus + Correction Bolus = Bolus Dose Humalog/Novolog

\[ 3.5 + 2.5 = 6 \text{ units} \]

Carb Bolus + Correction Bolus = Total dose Humalog/Novolog

Adjusting insulin dosages:
- Take insulin dose adjustment class to learn how to change insulin doses on your own.
- Call into Blood Sugar Line daily, then as instructed.

Blood Sugar Line 206-987-2640
or email to endonurse@seattlechildrens.org
You may also call into the Blood Sugar Line any time you need help with insulin dosages.

Today's Dose (Basal)

<table>
<thead>
<tr>
<th>Lantus (basal)</th>
<th>Bedtime (8-10 p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levemir</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lantus (basal)</th>
<th>Bedtime (8-10 p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levemir</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Morning (8-10 a.m.)</td>
</tr>
</tbody>
</table>

Today's Dose (Bolus)

<table>
<thead>
<tr>
<th>Humalog/Novolog</th>
<th>_______ unit per _______ grams carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correction Factor is _______</td>
</tr>
<tr>
<td></td>
<td>Daytime target is _______</td>
</tr>
<tr>
<td></td>
<td>Bedtime/middle of the night target is _______</td>
</tr>
</tbody>
</table>
Sick Day Management Guidelines

Diabetes management when sick with an illness including a cold or flu

What happens with diabetes control when you are sick?

When your child is sick with the cold or flu or any other illness with or without fever, blood sugar levels might rise. Not only does your body need extra energy to fight off the germs, but stress hormones are produced that interfere with the action of insulin. Your cells may need more insulin to work. Eating, drinking, and taking insulin are extremely important when you are ill. If the cells do not get enough energy, or if there isn’t enough insulin to help the glucose get into your cells, your body breaks down its own stores (fat and muscle) to provide this energy. This process produces waste products called ketones.

What are ketones?

Ketones are waste product that shows up in the blood and urine when body fat is being burned for energy. The blood glucose level is often high but the body cannot use it in the lack of insulin. Taking enough insulin, eating and drinking helps prevent ketones.

If high blood sugar levels are not treated, ketones will develop and your child could become very sick with diabetic ketoacidosis even without an identifiable illness.

Did You Know? Ketones can occur even if your blood sugar is in your target range.

Please follow these general guidelines during any illness or ongoing hyperglycemia:

• Check blood sugar every 2 to 3 hours.
• Check urine or blood ketones every 3 hours.
• Do not omit an insulin dose. Give basal insulin (Lantus or Levemir) even if you are vomiting or not eating normally. Doses may need to be decreased by around 20%, including NPH, but should not be skipped.
• Follow the steps for ketone management given in the table beginning on the next page.
• Please note that management of ketones will be different, depending on whether you can eat and drink or if you are vomiting. See table on next page.

• Refer to the section in the Pink Panther book on sick-day management for a refresher on managing diabetes during illness, in addition to using this sheet.

Follow these guidelines for managing an illness and/or vomiting:

Children often catch germs and get sick. Take care of your child’s illness as you usually would. Call your primary care provider if your child’s symptoms are significant.

Give small sips (1 tablespoon) of clear liquids containing sugar (like Gatorade) every 15 minutes. If there is no vomiting after 30 minutes, increase the amount of liquids to 2 ounces (1/4 cup) every 15 minutes. If vomiting restarts, it may be necessary to rest your child’s stomach for another hour and then restart the small amounts of liquids. Continue to check blood sugar and blood or urine for ketones every 2 to 3 hours.

Go to the Emergency Department if your child is experiencing any of the following symptoms:

• Signs of diabetic ketoacidosis: moderate or large ketones, nausea, vomiting, stomach pain, “labored breathing,” lethargy (very sleepy) or confusion. If these are present, take your child to the nearest emergency department.
• Your child has vomited more than 2 times and can’t keep anything down.

When to ask for help or see a doctor:

Between 7 a.m. and 10 p.m. call 206-987-2000 or 866-987-2000 (toll-free) if:

• Moderate to large ketones are present and you are unfamiliar and/or uncomfortable utilizing the Sick Day Management Guidelines.

REMEMBER: Always check the blood sugar and ketones before calling. The healthcare providers will need this information.
### Sick Day Management Guidelines, Page 1

<table>
<thead>
<tr>
<th>Ketones</th>
<th>If you are sick, but still able to eat and drink well</th>
<th>If you are unable to eat or drink and are vomiting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urine ketones: Negative/Trace or Blood ketones:</strong> &lt;0.5</td>
<td>No additional insulin is needed. Encourage sugar-free liquids.</td>
<td>Encourage small sips of clear, sugar-containing liquid (1 tablespoon) every 15 minutes as tolerated.</td>
</tr>
<tr>
<td></td>
<td>Continue checking blood sugar and blood or urine ketones every 2 to 3 hours.</td>
<td></td>
</tr>
<tr>
<td><strong>Urine ketones: Moderate or Blood ketones:</strong> 0.5-1.5</td>
<td>Extra rapid-acting insulin is essential. If using a “basal/bolus” regimen with Lantus/Levemir and short-acting insulin of Humalog/Novolog or the insulin pump: Multiply your usual correction dose by 1.5. For example if your correction is 1 unit per 50 over a target blood sugar of 150 mg/dl and the blood sugar is 357 mg/dl, the correction is 4 units ((357-150 = 207 \div 50 = \text{about} 4)). So give 1.5 times the amount = 6 units of Humalog or Novolog ((4 \times 1.5 = 6)). If on a pump – give this correction by injection and change infusion set. If using NPH and Humalog/Novolog: Add up all insulin doses for a usual day and give 10% of the total daily dose as short-acting insulin Humalog or Novolog. (divide by 10 to get the 10% figure) For example: If your total units amount of insulin per day = 25 units, give 2.5 units of Humalog  or Novolog ((25 \times 0.1 = 2.5, \text{i.e.} \ 10% \text{ of} \ 25)).</td>
<td>← Follow directions on the left AND: Encourage small sips of clear, sugar-containing fluids (1 tablespoon) every 15 minutes as tolerated. If blood sugar is already over 200, alternate sips with water or sugar-free fluids. Maintain good hydration.</td>
</tr>
<tr>
<td></td>
<td>Continue checking blood sugar and blood or urine ketones every 2 to 3 hours, and give extra insulin for ketones every 3 hours as needed. Call if you need help between 7 a.m. and 10 p.m.</td>
<td></td>
</tr>
</tbody>
</table>

**REMEMBER:** Always use rapid-acting insulin and check the blood sugar and ketones before calling. If blood sugar is below 200, maintain adequate hydration with sugar-containing liquids.
**Sick Day Management Guidelines, Page 2**

<table>
<thead>
<tr>
<th>Ketones</th>
<th>If you are sick, but still able to eat and drink well</th>
<th>If you are unable to eat or drink and are vomiting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urine ketones: Large</strong> or <strong>Blood ketones: &gt;1.5</strong></td>
<td>Extra rapid-acting insulin is essential.&lt;br&gt;&lt;br&gt;If using a “basal/bolus” regimen with Lantus/Levemir and Humalog/Novolog or the insulin pump: Multiply your usual correction dose by 2. For example if your correction is 1 unit per 50 over a target blood sugar of 150 mg/dl and the blood sugar is 357 mg/dl, the correction is 4 units (357-150 = 207 ÷ 50 = about 4)&lt;br&gt;So give 2 times the amount = 8 units Humalog or Novolog (4 x 2 = 8).&lt;br&gt;&lt;br&gt;If on a pump - give this correction by injection and change infusion set.&lt;br&gt;&lt;br&gt;<strong>If using NPH and Humalog/Novolog:</strong> Add up all insulin doses for a usual day and give 20% of the total daily dose as short-acting insulin Humalog or Novolog. (divide by 5 to get the 20% figure)&lt;br&gt;For example: If your total units amount of insulin per day = 25 units, give 5 units of Humalog or Novolog (25 x 0.2 = 5, i.e. 20% of 25).&lt;br&gt;&lt;br&gt;Continue checking blood sugar and blood or urine ketones every 2 to 3 hours. Give extra insulin every 3 hours as needed for ketones.&lt;br&gt;Call if you need help between 7 a.m. and 10 pm.&lt;br&gt;After hours (10 p.m. to 7 a.m), please go to the Emergency Department.&lt;br&gt;&lt;br&gt;<strong>REMEMBER:</strong>&lt;br&gt;Always use rapid-acting insulin and check the blood sugar and ketones before calling.&lt;br&gt;If blood sugar is below 200, maintain adequate hydration with sugar-containing liquids.</td>
<td>-&gt; Follow directions on the left AND:&lt;br&gt;&lt;br&gt;Give small sips of clear, sugar-containing fluids (1 tablespoon) every 15 minutes as tolerated.&lt;br&gt;If blood sugar is already over 200, alternate sips with water or sugar-free fluids. Maintain good hydration.&lt;br&gt;• Watch for signs of diabetic ketoacidosis: stomach pain, “labored breathing,” lethargy (very sleepy) or confusion. If these are present, take your child to the nearest emergency department.</td>
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</table>
Sick Day Management Guidelines

**Sick day management record**

Use this table to keep track of details for this illness. Record number and symptoms that your healthcare team will need to know. Refer back to it in the future to see what worked and what didn’t.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Blood Sugar</th>
<th>Ketone</th>
<th>Units of Extra Insulin</th>
<th>Symptoms</th>
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</table>
Management of high blood sugars

- If your child has high blood sugars, check blood or urine ketones.
- If your child has high blood sugars and no or trace ketones, please give them their insulin correction doses as previously instructed by your diabetes team and call the Endocrinology Nurses before 11 a.m. the next business day at 206-987-2640, or email Endonurse@seattlechildrens.org
- If your child has high blood sugars and ketones are present, refer to the Sick Day Management Guidelines on pages 2 and 3.

Management of hypoglycemia (low blood sugar) and use of Mini-Dose Glucagon

- If your child has severe hypoglycemia (seizure, loss of consciousness), use the full dose of glucagon as instructed by your healthcare provider and call 911 for an ambulance.
- If your child has low blood sugars and is alert and able to eat or drink:
  - Give 10 to 15 grams of simple carbohydrate and re-check their blood sugar in 15 minutes as previously instructed by your diabetes team. If needed, call the Endocrinology Nurses before 11 a.m. the next business day at 206-987-2640, or email Endonurse@seattlechildrens.org
  - If your child has ongoing hypoglycemia, please follow the instructions below for Mini-Dose Glucagon. Low doses of glucagon can be used to raise the blood sugar before they become too low. The 1 mg glucagon emergency kit comes with a bottle containing a powdered tablet and a syringe containing diluting liquid.
  - Mini-Dose Glucagon is NOT for use in cases of severe low blood sugar, as in a seizure or in the unconscious child.
  - Mini-Dose Glucagon is NOT for use when ketones are present.
  - To give the Mini-Dose Glucagon: Inject the Glucagon syringe containing the liquid into the bottle with the powdered tablet. Push all of the contents of the syringe into the bottle and swirl to form a clear liquid. Use your insulin syringe to give the following dose based on your child’s age:
    - If the child is 2 years or less, give 2 units.
    - If your child is over 2 years, give one additional unit for each year of age over age 2. For example: at age 2 give 2 units, at age 5 give 5 units…up to age 15. Any child age 15 or older should receive a maximum of 15 units.
    - At these small doses, you can expect the blood sugar to rise approximately 60-90 mg/dl and last about one hour. If the blood glucose does not rise sufficiently within 20-30 minutes the glucagon dose can be doubled and given again. These doses may be given every 1-2 hours as needed. Mixed glucagon can be stored in the refrigerator and used for up to 24 hours. Any unused glucagon should be discarded after 24 hours.
    - Glucagon raises the blood sugar by stimulating the release of glycogen stores from the liver and muscles. If blood sugar has been low over a long period of time, glucagon may not be effective. If after two doses, the blood sugar does not rise and your child will not eat or drink or begins/continues to vomit, then go to the Emergency Department.
    - Glucagon raises the blood sugar rapidly but does not keep it up over a long period of time. Food, in the form of carbohydrates and protein, are needed to sustain blood sugar.
Troubleshooting your pump

- Make sure infusion set is inserted correctly and there are no air bubbles.
- If you think your pump isn’t working, call the 1-800 number from your pump company immediately and let them know that your pump is not working. They will work with you to resolve any of the problems affecting the function of your child’s insulin pump.
- Give a basal dose of Lantus insulin (insulin glargine) that is equal to your total daily basal insulin delivery on the insulin pump. Look for this—in your pump settings report on your computer or in the pump itself under basal menu or settings (depending on brand of pump), or on your Lantus prescription label.
- At meals, dose with Humalog/Novolog based upon your insulin-to-carbohydrate ratio and your correction factor for high blood sugars.
- When you get your new pump, restart it 22 hours after last Lantus injection.

To Learn More

- Endocrinology 206-987-2640
- Your child’s healthcare provider
- www.seattlechildrens.org

Free Interpreter Services

- In the hospital, ask your child’s nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.
### Daily Diabetes Care at a Glance

<table>
<thead>
<tr>
<th>Task</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Check blood sugar</strong></td>
<td>Check blood sugar before each meal, before bedtime snack and at 3 a.m. every day unless told otherwise.</td>
</tr>
<tr>
<td><strong>Record your numbers</strong></td>
<td>Record all blood sugars and insulin doses in the logbook.</td>
</tr>
<tr>
<td><strong>Call or send in the numbers</strong></td>
<td>Weekdays, call blood sugars in to the blood sugar line at 206-987-2640, option 2 or 1-866-987-2000 before 11 a.m as instructed by your diabetes educator. Or you may email them to our nurses at <a href="mailto:endonurse@seattlechildrens.org">endonurse@seattlechildrens.org</a> using the template (you can also request a copy of the template at this email address.) Leave your name, your child’s name and the phone numbers you can be reached at on that day. If leaving blood sugar numbers, please include insulin doses and ratios. Use meal time names like breakfast, lunch, dinner, snacktime, or bedtime instead of specific times. You will get a return call before 2 p.m.</td>
</tr>
<tr>
<td><strong>If you have been instructed to call on Saturday, Sunday or a holiday</strong></td>
<td>If you have been instructed to call on Saturday, Sunday or a holiday, call the hospital operator at 206-987-2000 or 1-866-987-2000 between 11 a.m. and 12 noon and ask for the diabetes doctor on call to report your blood sugars.</td>
</tr>
<tr>
<td><strong>If blood sugar is above 250 two tests in a row</strong></td>
<td>If blood sugar is above 250 two tests in a row, check for ketones. If ketones are moderate or large, refer to the sick day management guidelines on the yellow sheet first. Follow the instructions for help.</td>
</tr>
<tr>
<td><strong>If your child is sick or vomiting</strong></td>
<td>If your child is sick or vomiting, refer to the sick-day management guidelines (yellow sheet) first. If they continue to get worse or you have questions, call the hospital operator 206-987-2000 or 1-866-987-2000 to talk to the diabetes nurse or doctor on call for insulin dose adjustment.</td>
</tr>
<tr>
<td><strong>After-hours line</strong></td>
<td>For high blood sugars or a sick child, if you are calling after hours (10 p.m. to 7 a.m.), you will be transferred to the after-hours voicemail, which reviews the sick-day management guidelines. If your issue is medically urgent, or if you are not confident following these guidelines, you will be instructed to go to the Emergency Department.</td>
</tr>
<tr>
<td><strong>For general questions or concerns</strong></td>
<td>Call the office at 206-987-2640.</td>
</tr>
</tbody>
</table>

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**Free Interpreter Services**

- In the hospital, ask your child’s nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.

Seattle Children’s offers interpreter services for Deaf, hard of hearing or non-English speaking patients, family members and legal representatives free of charge. Seattle Children's will make this information available in alternate formats upon request. Call the Family Resource Center at 206-987-2201.

This handout has been reviewed by clinical staff at Seattle Children’s. However, your child’s needs are unique. Before you act or rely upon this information, please talk with your child’s healthcare provider.

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