Alternate Caregiver Training

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Goals—Caregivers will learn:

- Basic understanding of diabetes
- How to use a blood glucose monitor
- How to treat high or low blood sugars
- Carb counting skills
- Proper technique for giving insulin injection
- Basics of insulin pump therapy
What is diabetes?

- Autoimmune diabetes (commonly referred to as “Type 1” diabetes)
  - Beta cells—cells that make insulin are recognized as foreign

- Beta cells attacked by body until T1D is unable to produce their own insulin

- Insulin from the external source (i.e.: via injection or insulin pump) is the only treatment—this is NOT a cure
What does that mean?

- Without insulin, the body cannot properly use carbohydrates

- Carbohydrates are the body’s main source of fuel

- Insulin is the gatekeeper to the cells; if there is not enough insulin, carbohydrates/glucose will not get into the cells and will build up in the blood

- Blood sugar rises above safe levels
How do I know what the blood sugar is?
You must CHECK it!
Testing Blood Sugar Levels:

- Be sure to change your lancet EVERY time you test
- Clean your finger using alcohol pad or hand washing
- Use the **sides** of the finger
- Make sure the finger is warm before trying to lance it—otherwise it will be difficult to get a sample
Testing blood sugar (cont’d):

- Make sure your lancing device is ready before placing on sample area

- 33 gauge is the smallest lancet

- Various lancing devices
Testing blood sugar (cont’d)

- If difficulty obtaining sample, “milk” the finger

- Bring glucometer to the blood sample, hold the strip to the blood sample, and let it “draw” the blood in
What does the number mean?

- Goals for blood sugar
  - Age 0-6yrs: 80-180 before meals
  - Age 6-12yrs: 70-180 before meals
  - Age 13-19yrs: 70-150 before meals
  - No-diabetic: 70-100 *

  (13th Edition A First Book for Understanding Diabetes, by Peter Chase, 2014)
  (ADA “Diabetes Care”, 2014)

- If blood sugars are **below 70** - you must take action

- If blood sugars are **above 300** (unexplained) - you must take action
Blood Glucose Meter
Hyperglycemia

- High blood sugar
- Symptoms
  - Feels hot
  - Thirsty
  - Urinating more often than usual
  - Hungry
  - Nauseated
  - Complains of headache
  - Mood swings
  - Drowsy

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Symptoms of hyperglycemia (blood glucose too high)

Glucose test outcomes that are 150 - 250 mg./dl. are considered mild to moderate elevations. 300 mg./dl. or more are considered seriously elevated.

Cartoon Figures by Novo Nordisk Pharmaceuticals Inc. Diabetes Care
Hyperglycemia (cont’d)

- What do I do?
  - You must **always** test blood sugar **first**!
  - If blood sugar is above target goal, give correction dose
  - Insulin for correction should never be given sooner than 3-4 hours apart = STACKING INSULIN
  - If blood sugar is over 300, you **must** test for ketones
What are ketones?

- When there is a lack of insulin to let carbohydrates into the cell, the body needs a fuel source
  - Burns through protein quickly, then burns through fat

- Ketones are by-products, or “poisons” that release into the body as a result of burning fat for fuel
When and how are they tested?

- Ketones should be tested
  - Any time you have an unexplained high blood sugar greater than 300
  - When ill—test every 2-3 hours regardless of the blood sugar
  - If nauseated or vomiting

- How are they tested?
  - Blood ketone meter
  - Urinating on a strip that changes color if ketones are present
  - Wait 15 seconds after urine hits the strip, then look for one of the colors below:

Image source: www.gorbzilla.com/ketones_for_dummies.htm
How are ketones treated?

- If trace or small, encourage water (age in ounces every 30 minutes)
- If child is nauseated, allow them to drink only what they can handle without vomiting—vomiting can make ketones worse!
  - May need Zofran for NAUSEA
- If ketones are moderate or large, this is a “danger zone”
  - Encourage water
  - Restrict from activity—can make ketones worse
  - If vomiting, may need to go to emergency room for fluids
Hypoglycemia

- Signs of low blood sugar
  - Shaking
  - Sweating
  - Mood swings
  - Hungry
  - Anxious
  - Headache
  - Fatigue, or complains of feeling weak
  - Child may tell you he or she “feels funny”

- Always test first before treating!

- Some of the signs of lows are the same as highs
Symptoms of hypoglycemia (blood glucose too low)

Glucose test outcomes averaging under 80 mg./dl. are considered too low. **Blood glucose outcomes of 40 mg./dl. or less are considered serious and dangerously low.**
Treatment for low blood sugar

• “Rule of 15”—treat with 15 grams of a fast-acting carbohydrate, wait 15 minutes and retest

• Sources of 15 grams include:
  ○ 4 oz (1/2 cup) of juice
  ○ 6 oz (1/2 can) of regular soda
  ○ 8 oz (1 cup) of milk
  ○ 3-4 glucose tabs
  ○ 1 oz. cake icing gel
  ○ 15 Smarties candies

• Retest - if blood sugar is less than 70 (or 80 if child is under the age of 6); repeat the Rule of 15

• If blood sugar is above 70 (or 80 if the child is under age 6) no further action is needed
Glucagon

- Glucagon is used for extreme cases of low blood sugar when
  - Child is unconscious
  - Child is seizing
  - Child is unable to cooperate to take anything by mouth
Glucagon (cont’d)

- Always make sure child comes to you with their Glucagon kit and that you know where it is

- If you are by yourself
  - Give Glucagon
  - Call 911
  - Test blood sugar

- If someone is with you
  - Designate one person to test blood sugar
  - If unresponsive or seizing give Glucagon
  - While giving the Glucagon, have the other person call 911
How Glucagon is given

- Video:

- Rule of thumb to know how much to give:
  - If child is above the waist in height, give all of the Glucagon
  - If child is below the waist, give HALF of the Glucagon

- Can give anywhere you can give a shot

- Child may complain of headache or nausea, or may vomit
Giving insulin

- If using a manual injection, corrections for high blood sugar should only be given before meals and bedtime to prevent low blood sugar.

- Correction factor is usually written like this:
  - 1:50 greater than 150
  - Every number in equation gets used
    - Example: Blood sugar is 300
    - Subtract 150 (the target blood sugar) from 300
      - 300-150=150
    - Then, divide 150 (your answer from previous problem) by 50
      - 150/50= 3 units
Giving insulin (cont’d)

- For any food amount greater than 5 grams of carbohydrate, you must give insulin based on child’s carbohydrate ratio
  - Example: Child’s carb ratio is 1 unit for every 10 grams (usually written as 1:10), and eats 50 grams at a meal
    - Divide 50 by 10 to know how much insulin to give for food
      - 50/10 = 5 units
  
- If at mealtime, and child’s blood sugar is high, you will add the food dose to the correction dose for the total insulin dose
Insulin Injection
How do I give a shot?

- Wash your hands
- Wipe the rubber top of the insulin bottle with an alcohol swab
- Remove the syringe caps (bottom first, then top to keep from sticking yourself)

Image source: www.kidshealth.org
How do I give a shot (cont’d)?

- Pull amount of air equal to the dose into the syringe (ex. If the dose is 5 units, pull 5 units of air into the syringe)

Image source: www.kidshealth.org
How do I give a shot (cont’d)?

- Push the needle straight into the rubber top

Image source: www.kidshealth.org
How do I give a shot (cont’d)?

- Push the air into the vial (you are creating positive pressure to prevent getting air bubbles at the end)

Image source: www.kidshealth.org
How do I give a shot (cont’d)?

- Turn the syringe and vial upside down
- Pull slowly back on the plunger until the top of the black tip is even with the line of your dose

Image source: www.kidshealth.org
Why am I worried about air bubbles?

- Air bubbles can displace insulin and give you an inaccurate insulin dose

What happens if you see air bubbles?

- Two ways to rid of air bubbles
  - Take the syringe out of the vial, pull air into the syringe, “flick” the syringe to move the air bubbles to the top, then push the air out (may require you to draw more insulin in to equal the correct dose)
  - “Flick” the syringe to move air bubbles out (be sure to take the syringe out of the vial to do this, so as not to bend the needle)
Now what?

- If no air bubbles in your syringe, you are ready to inject
- Be sure to clean the shot site with alcohol
- You do **not** have to pinch the injection area with 6mm
- Inject the needle straight into the shot site
- Push the dose in until you cannot push anymore
- Wait 5 seconds, then remove the needle
- Dispose of the needle in a sharps container!

Image source: www.kidshealth.org
Where can I inject a shot?

Anywhere you see here...

...Or anywhere you can do the Macarena...

Image source: [www.diabetesmonitor.com](http://www.diabetesmonitor.com)
Insulin Pens

- Works with NovoTwist® 32G Tip (5mm) needle, our thinnest single-twist needles
- Prefilled with NovoLog® Insulin
- Large, clear scale
- Accurate dose adjustment
- Push-button injection

Easy to see numbers
Easy to set the dose
Short thumb-reach at high doses
Easy to dispense maximum dose of 60 units
Easy to dial up and back down for dose correction

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JDRF type one nation
Questions?

Questions are guaranteed in life; Answers aren't.
Insulin Pump How Does it Work
Insulin is delivered in two ways

- Basal: “round-the-clock” insulin
- Bolus: “immediate” insulin
What is Basal Insulin?

Background Insulin:

- The amount of insulin you need to run the body every minute of the day for 24 hours
- Basal insulin is delivered continuously by the pump
- Takes the place of Levemir or Lantus
What is a Bolus?

A “Burst” of Insulin

A bolus is delivered when insulin is needed immediately for:

- FOOD
- HIGH BLOOD SUGAR
Pump Definitions

- **Basal Rate** – insulin delivered every minute
- **Bolus Insulin** – insulin for carbs + high BG
- **Cannula** – small flexible tube
- **Infusion Set** – connects pump to cannula
- **Reservoir/Cartridge** – holds 2-3 days of insulin
- **Insulin on Board/Active Insulin**
Let’s look at Insulin Pumps

- Medtronic MiniMed
- Animas Ping
- OmniPod
- TandemT-Slim
Low-profile site uses a flexible cannula for insulin infusion. Tubing comes in a choice of lengths.

Pump Infusion Set
Insulin Pumps are Smart Pumps

Easily customizable calculator

Simplifies diabetes management

- Blood glucose targets
- Carbohydrate ratios
- Insulin-sensitivity
- Insulin on board

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Break Out Session – Table Topics

- Medtronic pump
- Animas Pump
- T-Slim Tandem Pump
- OmniPod
- Pens and Syringes
- Carbohydrate Counting Skills