



# **The Diabetes Rollercoaster: Highs and Lows**

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# Objectives

- Define hypoglycemia and hyperglycemia in school aged children with diabetes
- Review the symptoms, causes, and treatments of hypo- and hyperglycemia in children
- Discuss strategies to minimize time spent in hypo- and hyperglycemia during the school day
- Review situations that would benefit from collaboration between school health staff, family, and pediatric diabetes clinic

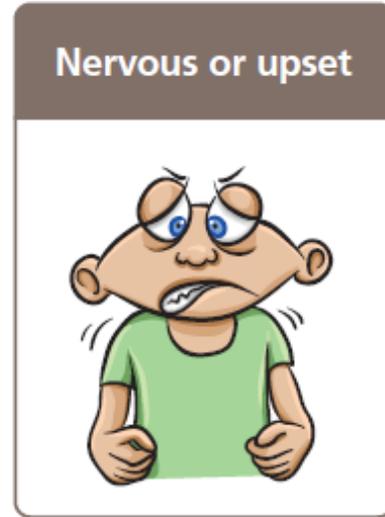
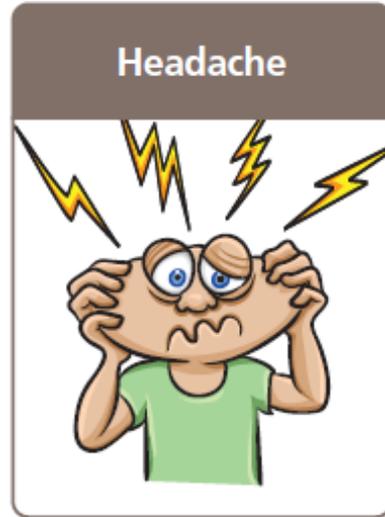
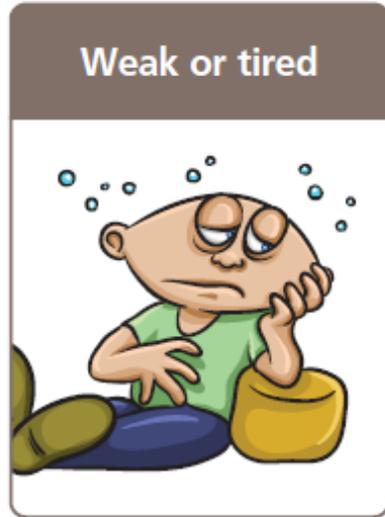
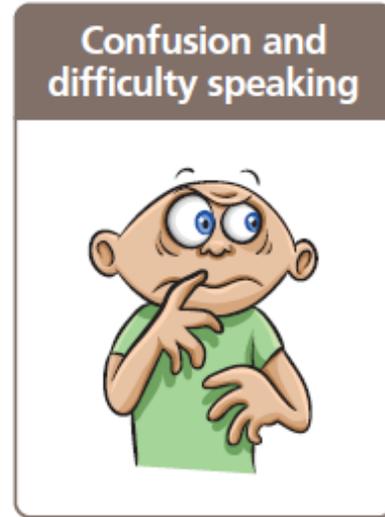
# Highs and Lows, Defined

- Hypoglycemia
  - Blood glucose <70 mg/dL
  - Some use <80 mg/dL in younger children or in school setting
- Hyperglycemia
  - Blood glucose >180 mg/dL

# Causes of Hypoglycemia

- Exercise/increase in activity
  - Or extra/unplanned physical activity
- Too much insulin
- Too little food or delayed meal/snack
- Injection of insulin into muscle instead of under the skin
- Other

# Symptoms of Hypoglycemia

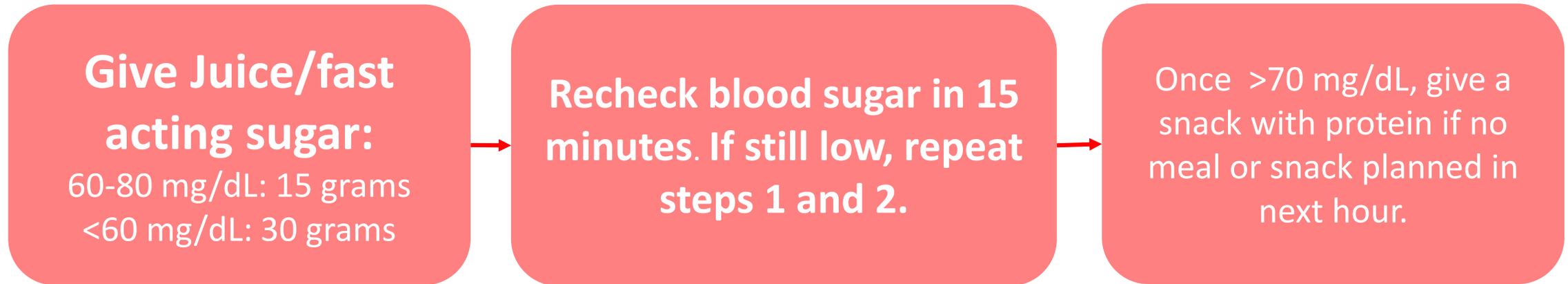


- SEVERE Symptoms:**
- change in level of consciousness,
  - unconsciousness,
  - seizure

# Hypoglycemia

- Most cases are mild
- This is the greatest immediate danger to students with diabetes
- Can impair cognitive and motor functioning
- If having more than 3-4 lows per week, insulin adjustment may be needed
  - If unsure what adjustment is needed, family may reach out to clinic.

# Hypoglycemia Treatment



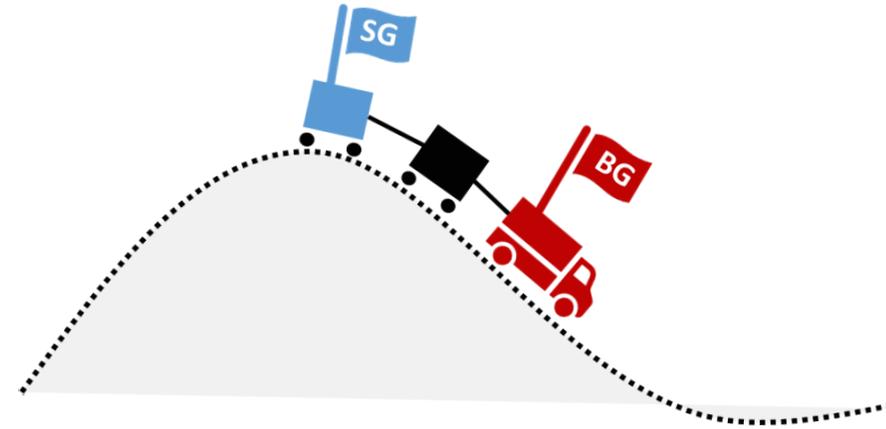
**\*For safety, never send student with low blood sugar anywhere alone\***

# Hypoglycemia Treatment

- Treatment should be a rapid-absorbing form of glucose (simple sugar)
  - Juice (4 oz),
  - Glucose tabs (3-4 tabs),
  - Honey (1 Tbsp)
  - Airheads, skittles, etc.
- Food that contains fiber, protein, or fat can cause delay in blood sugar recovery, rebound hyperglycemia
  - Chocolate, Applesauce, granola bars, etc.

# Hypoglycemia and CGM

- If a child feels low, it is the recommendation of our clinic that a blood glucose be checked
  - CGM values may lag behind blood glucose, esp. when blood glucose is LOW or rapidly changing
- Some kids who use CGM may find that treating with 15 grams carbohydrate leads to hyperglycemia and may use less to treat hypoglycemia
  - May need to use more than at home given that school is a different environment, less supervision



# Hypoglycemia – Special Populations

- Students with Insulin Pumps
  - Temporary basal rate reductions can help with reducing hypoglycemia
    - Must plan ahead
      - changes in basal rate will usually take about 1-2 hours to see effect
    - Not helpful when blood glucose is dropping quickly or already low
- Children with Type 2 DM, NOT on Insulin
  - Metformin alone does NOT cause hypoglycemia
  - If on insulin, Metformin increase hypoglycemia (increases sensitivity to insulin)

# Severe Hypoglycemia

- Inability to eat or drink
- Unconscious
- Unresponsive
- Convulsions/Seizures

# Severe Hypoglycemia Treatment

- Glucagon
  - Hormone that causes the liver to release stored glucagon
- Available forms
  - Glucagon Kit
  - Baqsimi Intranasal Powder
  - Gvoke Prefilled Syringe or Hypopen



# What to do if glucagon is given?

- After administering glucagon, place child on their side
- Call 911 and child's guardian
- Remain with child
- Expect response within 10-20 minutes
  
- Nausea/emesis is common after glucagon administration
- Once child is awake and able to swallow safely, give snack with carbs and protein while awaiting EMS

# Causes of Hyperglycemia

- Late, missed, or too little insulin
- Food intake exceeds insulin coverage
- Decreased physical activity
- Compromised (expired/improperly stored) insulin
- Stress
- Illness/injury
- Hormones
- Medications

# Symptoms of Hyperglycemia

Very thirsty



Needing to pass urine more than usual



Very hungry



Sleepy



Blurry vision



Infections or injuries heal more slowly than usual



Students with high blood sugar may have difficulty concentrating

# Hyperglycemia Treatment

- Correction Insulin should be given as ordered
  - Typically not given more than every 3-4 hours to avoid “Insulin Stacking”

# Hyperglycemia – What is the cause?

- Is the child having snacks without insulin coverage that are elevating the glucose?
- Can insulin be given prior to eating to help match insulin and carbs more closely?
  - If no, can insulin be given <10 minutes into the meal?
- Is an insulin dose adjustment needed?
  - Carb dose at previous meal?
  - Basal insulin?

# Hyperglycemia – When should I be concerned?

- No single blood glucose value that necessitates sending a child home or to the hospital
- Evaluate how child looks
- Check ketones if necessary
- Encourage intake of water
- Can child be active?

# Resources

- Lilly Glucagon App
- [DiSH a La Carte: Glucagon](#)
- [Glucagon Handout](#) from UW Health
- Emergency Action Plan
  - <https://www.dhs.wisconsin.gov/forms/f4/f43009.pdf>
- ADA Safe at School Modules
  - High blood sugar: <https://www.youtube.com/watch?v=i26P860R1AU&feature=share&list=EC3DE9DDE8EB2A2E56>
  - Low blood sugar: [https://www.youtube.com/watch?v=dH9Y\\_rby-jQ&feature=share&list=EC3DE9DDE8EB2A2E56](https://www.youtube.com/watch?v=dH9Y_rby-jQ&feature=share&list=EC3DE9DDE8EB2A2E56)