


# **WHEN YOUR PANCREAS IS NOT A HAPPY CAMPER**

**A PRESENTATION ON DIABETES MANAGEMENT IN THE CAMP SETTING  
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# OBJECTIVES

- Strong understanding of diabetes and its management
  - Understanding of the different devices used to manage diabetes
  - Understanding and ability to respond in a diabetic emergency
  - General guidelines for staff training
  - What health information to obtain prior to camp starting to ensure a smooth session
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# WHAT IS DIABETES

- Type 1 diabetes
  - No insulin produced
- Type 2 diabetes
  - Body does not properly use insulin produced
    - Insulin resistance
  - Body does not produce enough insulin
- Type 1 most commonly seen in children
- Type 2 becoming more prevalent in children
- ~10% of those living with diabetes are type 1

# HOW IS IT MANAGED

- Type 1 diabetes
  - Must be managed with insulin injections
  - Diet and exercise can be **beneficial** but will **not** manage type 1
- Type 2 diabetes
  - May be managed through diet, exercise and/or pharmacological treatments
    - This can include insulin injections
  - Most often a combination of treatments

# INSULIN




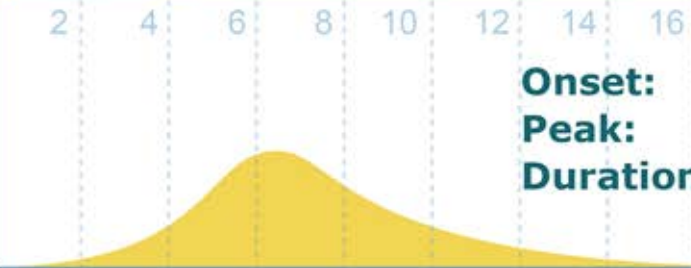


- Different insulins due to different courses of action
  - Onset
  - Peak
  - Duration
- Different brand names due to different pharmaceutical companies
- Proper storage of insulin
  - Unopened – refrigerated
  - Opened – room temperature



# INSULIN

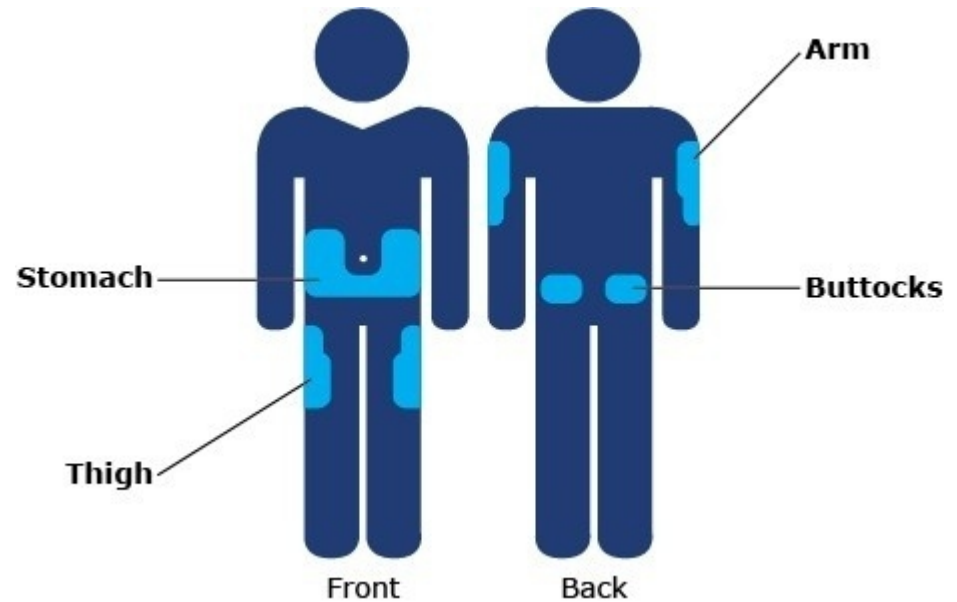
- Different regimens available to children
  - CSII (continuous subcutaneous insulin infusion)
  - MDI (multiple daily injections)
  - TID/BID
- Premixed insulin
  - Not recommended in children
- U-100 strength
- Basal insulin
- Bolus insulin



Type of Insulin	Appearance	Action times after injection (in hours)
<b>Rapid-acting</b> <ul style="list-style-type: none"> <li>▪ Lispro (Humalog)</li> <li>▪ Glulisine (Apidra)</li> <li>▪ Aspart (NovoRapid)</li> </ul>	Clear 	 <p> <b>Onset:</b> 10 to 15 mins  <b>Peak:</b> 1 to 2 hours  <b>Duration:</b> 3 to 5 hours         </p>
<b>Intermediate-acting</b> <ul style="list-style-type: none"> <li>▪ NPH (Humulin-N, Novolin-NPH)</li> </ul>	Cloudy 	 <p> <b>Onset:</b> 1 to 3 hours  <b>Peak:</b> 5 to 8 hours  <b>Duration:</b> up to 18 hours         </p>
<b>Slow or long-acting</b> <ul style="list-style-type: none"> <li>▪ Glargine (Lantus)</li> <li>▪ Detemir (Levemir)</li> </ul>	Clear 	 <p> <b>Onset:</b> 90 mins  <b>Peak:</b> None  <b>Duration:</b> up to 24 hours         </p>

# PROPER SITE ROTATION

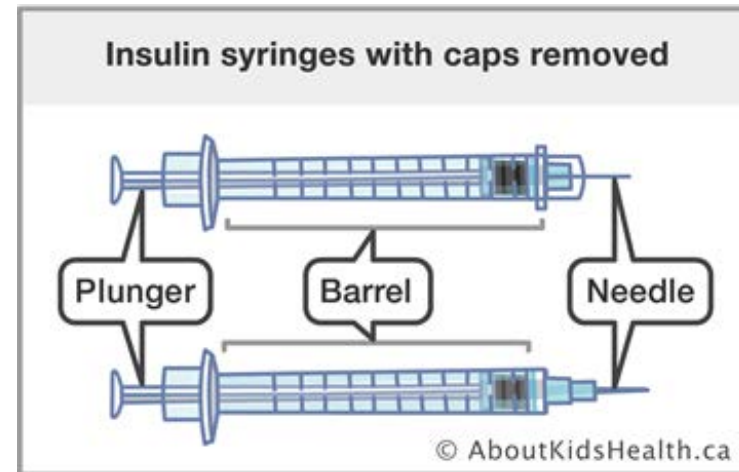
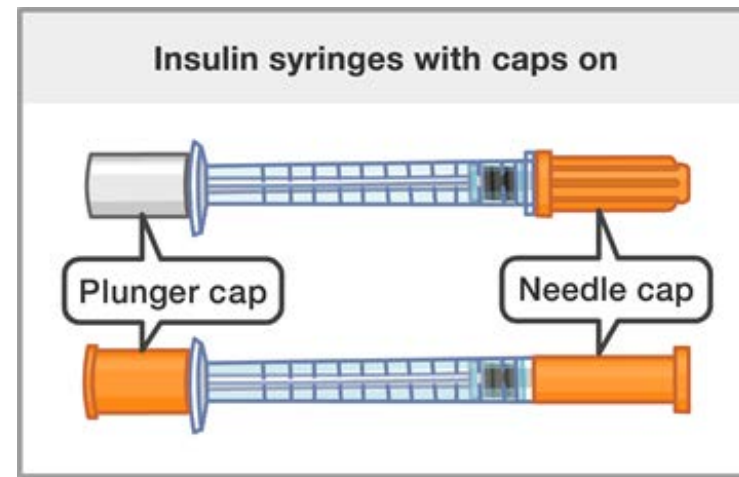
- 4 safe areas
  - Side of thigh
  - Back of upper arm
  - Abdomen
  - Upper outer buttocks
- Site rotation is very important
  - Prevent lipohypertrophy
- Faster absorption over exercising muscle





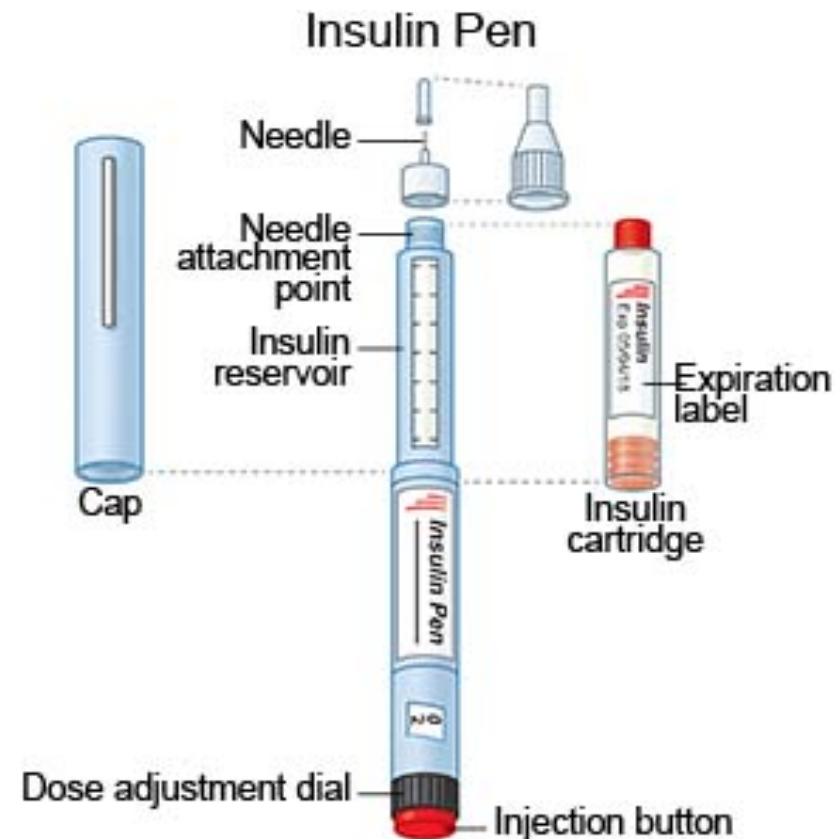
# SYRINGES

- Least common
- Administer by units or half units
- Important to know as emergency back up
- Clear\* and cloudy insulins may be mixed
  - \*Only rapid acting clear insulin
  - Clear and clear can not be mixed



# INSULIN PENS

- Most common method of delivery for those using injections
- Easier to use
- Administer by units and half units
- Disposable and reusable
- Attach new pen tip with each use
  - Pen tip must be primed before use
  - Approximately 2 units



# INSULIN PUMPS

- Seen in literature as CSII
- Most common method in managing type 1
- 2 pump manufacturers currently in Canada
  - Medtronic and Omnipod
  - Will still see Animas pumps
- Only rapid acting insulin used in pumps
- Run on batteries
- Some pumps are waterproof
- Government funded program

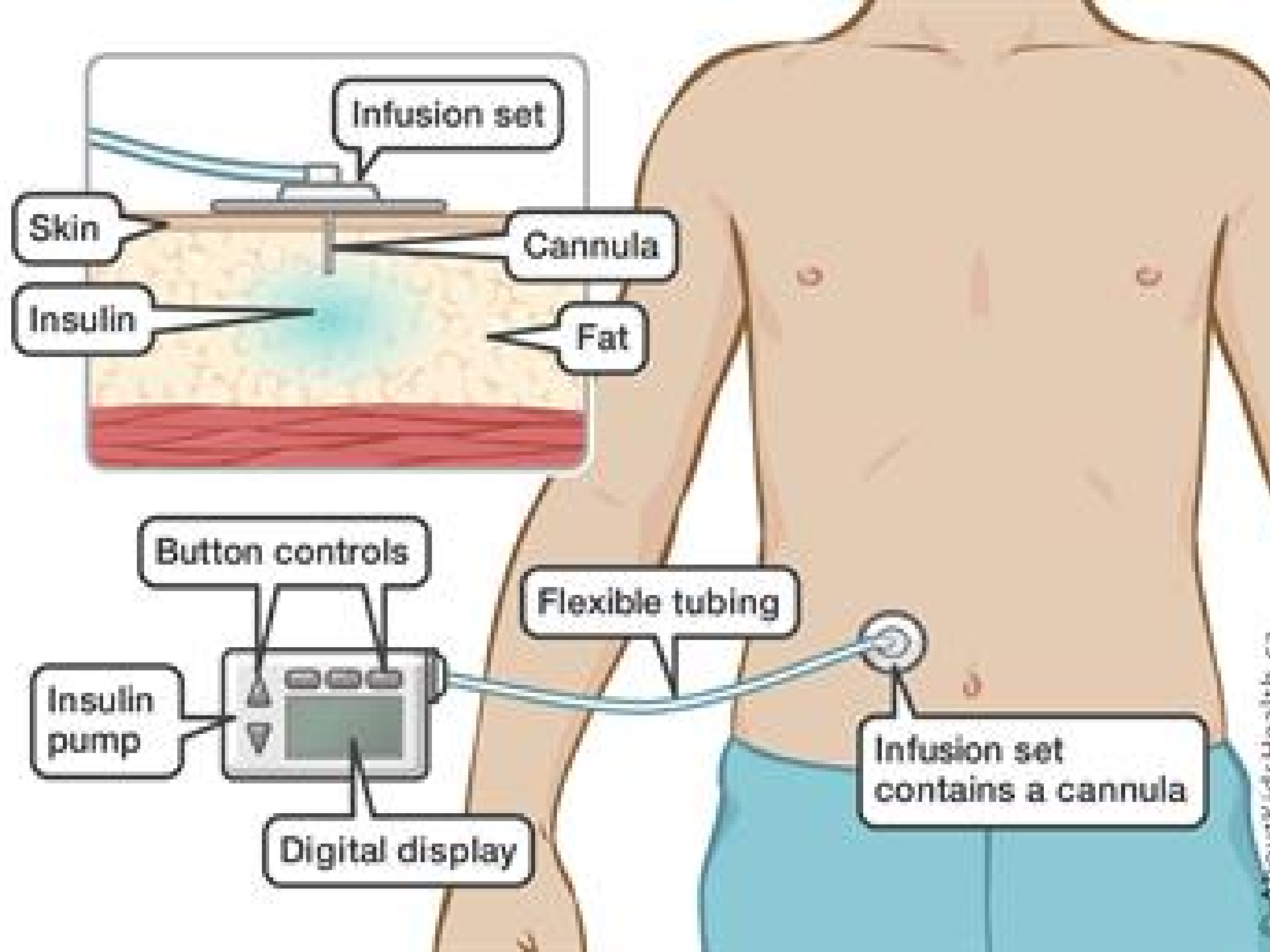


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# PARTS OF A PUMP

- Cartridge or reservoir
  - Holds the insulin
- Infusion set or site, or Pod (Omnipod)
  - Tubing under the skin called the cannula
  - May need extra adhesive at camp due to increased activity
- Pump tubing (Medtronic and Animas)
- Omni pod handheld device called PDM
- Cartridges, sites and insulin need to be changed every 3 days





Infusion set

Skin

Cannula

Insulin

Fat

Button controls

Flexible tubing

Insulin pump

Digital display

Infusion set contains a cannula

# CALCULATIONS

- Insulin to carb ratio
  - 1 unit of insulin covers x amount of carbs
  - Eg. 1:10 – 1 unit of insulin covers 10g of carb
- Insulin correction factor / insulin sensitivity factor
  - 1 unit of insulin will lower the blood glucose x amount
  - Eg. 1:4 – 1 unit of insulin will lower the blood glucose 4mmol/L
- Insulin on board or active insulin
  - How long insulin will still be working in the body after a bolus
  - This is based off of the duration of insulin action
  - Typically set to 4 hrs

# BLOOD GLUCOSE TARGETS

- Toddlers and preschooler: younger than 6 years old
  - 6.0 to 10.0 mmol/L
- School aged: 6-12 years
  - 4.0 to 10.0 mmol/L
- Adolescents and young adults: 13 – 18 years old
  - 4.0 to 7.0 mmol/L
- Please note these are the guidelines put out by Diabetes Canada but should be followed with discretion and using clinical judgement

# WHEN TO TEST

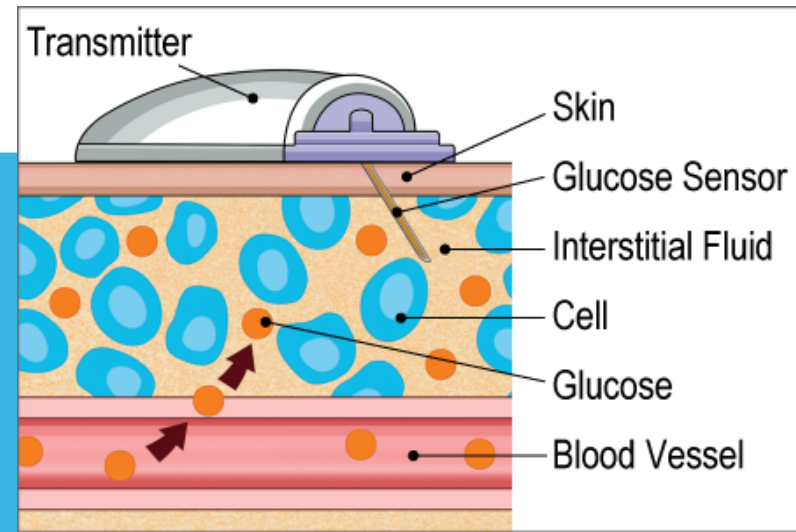
- Checking sugar 4-10 times a day
  - Before meals
  - Before activity
  - When feeling hypo or hyperglycemic
  - Overnight checks may be needed
- Try to ensure hands are clean when testing
  - Accuracy of reading
  - Infection prevention
- Many different glucometers but will function primarily the same
  - Meter
  - Strips
  - Poking with lancets






# CONTINUOUS GLUCOSE MONITORS

- Freestyle Libra
  - Patch worn on skin that is scanned for glucose readings
- Medtronic – Enlite
  - Transmits data to Medtronic pump
  - Predictive alerts
  - Low glucose suspend
- Dexcom
  - Transmits data to Animas Vibe, Dexcom receiver, or phone
  - Trending arrows



# HYPERGLYCEMIA

- Above 10mmol/L
  - Signs and symptoms
    - Thirst
    - Frequent urination
    - Drowsiness
  - Treatment
    - May need an insulin correction
      - caution if within 2hrs of last insulin dose/injection
    - Recheck sugar in approximately 2hrs
    - Troubleshoot if wearing an insulin pump
  - Ketones
- 

# HIGH BLOOD SUGAR

## *Hyperglycemia*

Signs and Symptoms:



DRY MOUTH



EXTREME THIRST



FREQUENT URGE TO URINATE



DROWSINESS




FREQUENT BED WETTING



STOMACH PAIN

# HYPOGLYCEMIA

- Below 4mmol/L
  - Signs and symptoms
    - Shaky/trembling
    - Pale
    - Weak
    - Tired
  - Treatment
    - Fast acting carbohydrates – approximately 15g
    - Retest in 15min
    - Should be followed by snack (carb and protein) if meal not within 1hr
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# LOW BLOOD SUGAR

## Hypoglycemia

### Signs and Symptoms



SWEATING



TREMBLING



DIZZINESS



MOOD CHANGES



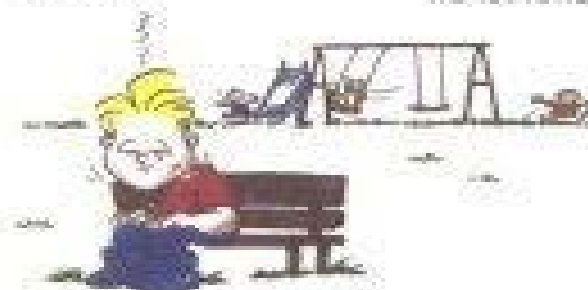
HUNGER



HEADACHES



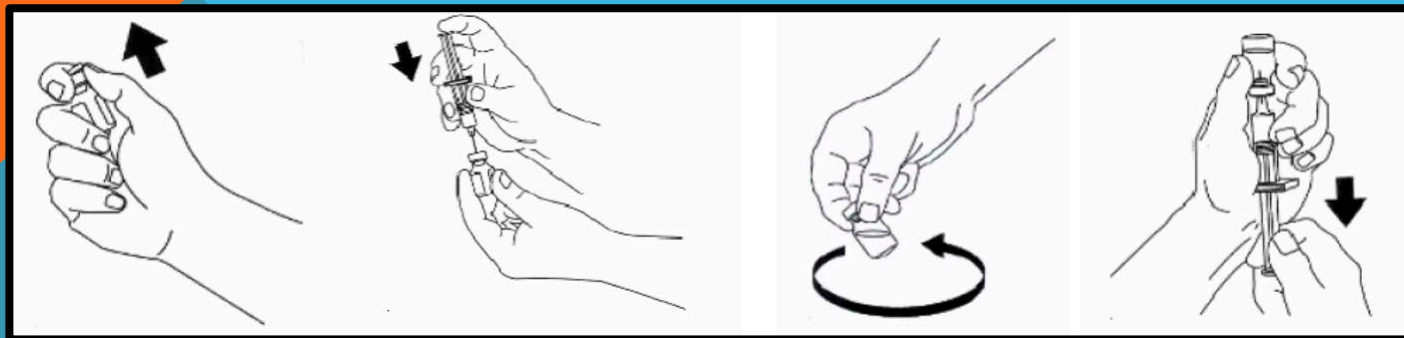
BLURRED VISION




EXTREME TIREDNESS AND PALENESS

# GLUCAGON

- Emergency use if camper is unconscious or unable to treat orally
- Recovery
  - Side effect - may cause vomiting
  - When conscious fast acting carb should be administered followed by snack (carb and protein)
  - Close monitoring post episode
  - Use of glucagon would be considered a cause for evacuation from a wilderness trip
- 911 should be called
- Parents notified as soon as possible
- Glucagon is only stable for 24hrs once mixed



# FOOD – YES, WE CAN EAT THAT

- Follow Canada's Food Guide
  - Carbohydrate counting vs set meal plans
  - Importance of scheduled meal times
    - May need to be accommodating of this in the camp setting
    - May require snacks between meal times
  - Fast acting vs slow acting carbohydrates
  - Out tripping
    - Will need to have access to carbohydrates overnight
    - Pelican case – smell proof
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# EXERCISE

- Test often and test before activity begins!
  - Eg. ropes course or swimming
    - Extremely important to test before
    - Should be in target before beginning or resuming program
- May require a decrease in insulin
- May require extra carbohydrates prior to activity
  - Granola bars are a great snack
- Camper or staff should have low treatment supplies easily accessible
- Effects of exercise on blood sugar levels can last up to 24hrs later






# SICK DAYS


- Notify parents as soon as possible
- Test often!
  - Monitor glucose and ketones
  - Recommended every 4hrs minimum
- Do not stop insulin delivery
- Maintain hydration



# DIABETES PLAN OF CARE

- What insulin regimen is the camper on?
  - Is the camper carb counting or on a meal plan?
    - If on a meal plan what time do they need to eat?
  - Who are the emergency contacts?
  - How independent is the camper in their management?
    - Who will be making treatment decisions?
    - Do they feel their low blood sugars?
    - How open are they about their diabetes?
  - Any other medical history
  - Storage of supplies
  - Establish communication/point of contact
- 

# KEY TAKEAWAYS

- Ensure expectations of parents/camper have been acknowledged prior to camp
    - Have emergency contacts for all times of day
  - Ensure staff is educated on signs and symptoms of hypo/hyperglycemia
  - Ensure staff is properly trained to recognize and respond to an emergency
  - Have a strong understanding of camper's skill level and competency in their diabetes management
  - Understand each child's management will be unique!
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