Diabetes Technology in the School Setting

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Objectives

- Overview of technology tools for diabetes, including:
  - Apps
  - CGMs
  - Pumps
- Discuss the expectations and practical use of these tools in the school setting

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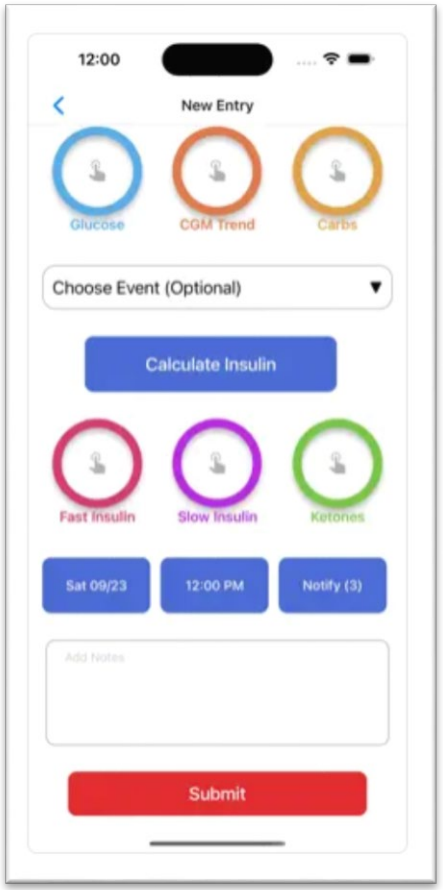
Mobile Apps

BlueLoop

BlueLoop



- App that helps to calculate, log and communicate diabetes information with caregivers and clinic
- Medical profile is programmed with student's settings and helps to calculate insulin dose.
- Decreases time, improves accuracy in calculating doses

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- Family can create account or school can too
- School can have account with multiple students
- A district RN can have an account with multiple schools
- Can input trend arrows to help determine any adjustments to insulin dose

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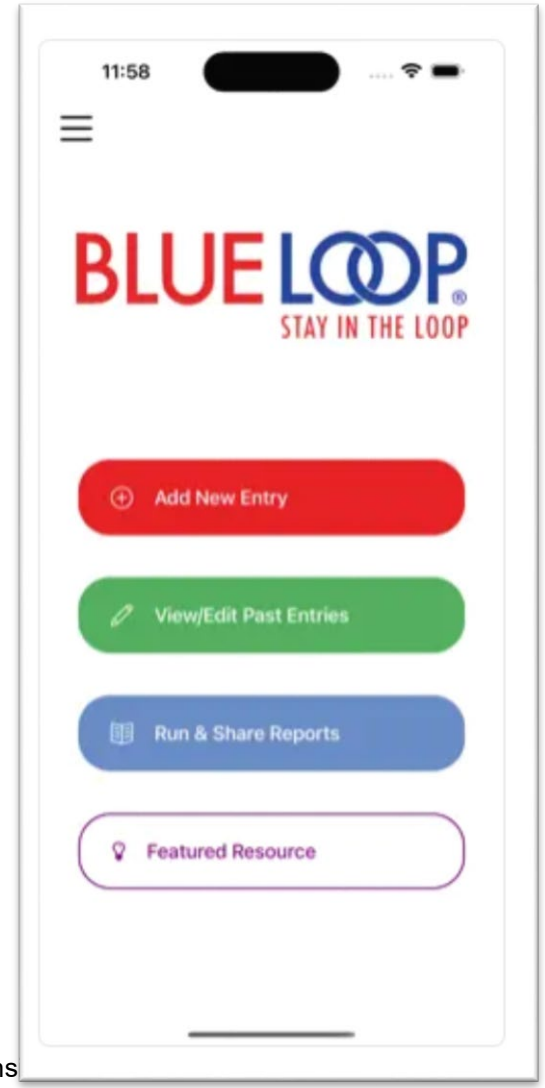
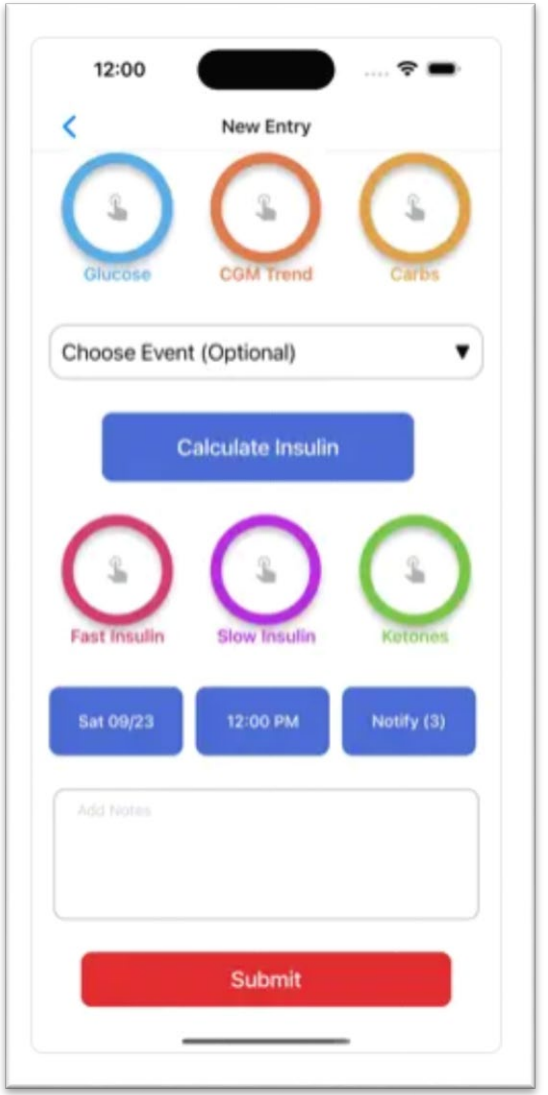
BlueLoop Snapshots





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Continuous Glucose Monitors

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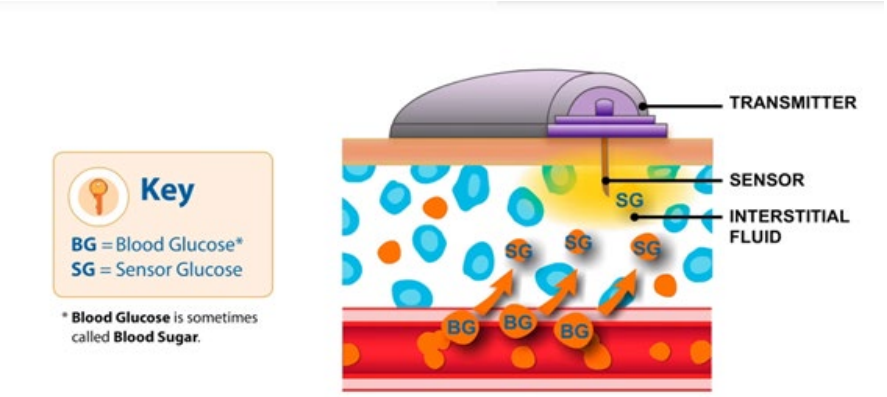
What is a CGM?



- Uses a tiny sensor inserted under the skin to check glucose levels in tissue fluid
- Sends the glucose level to a reader, phone, or insulin pump

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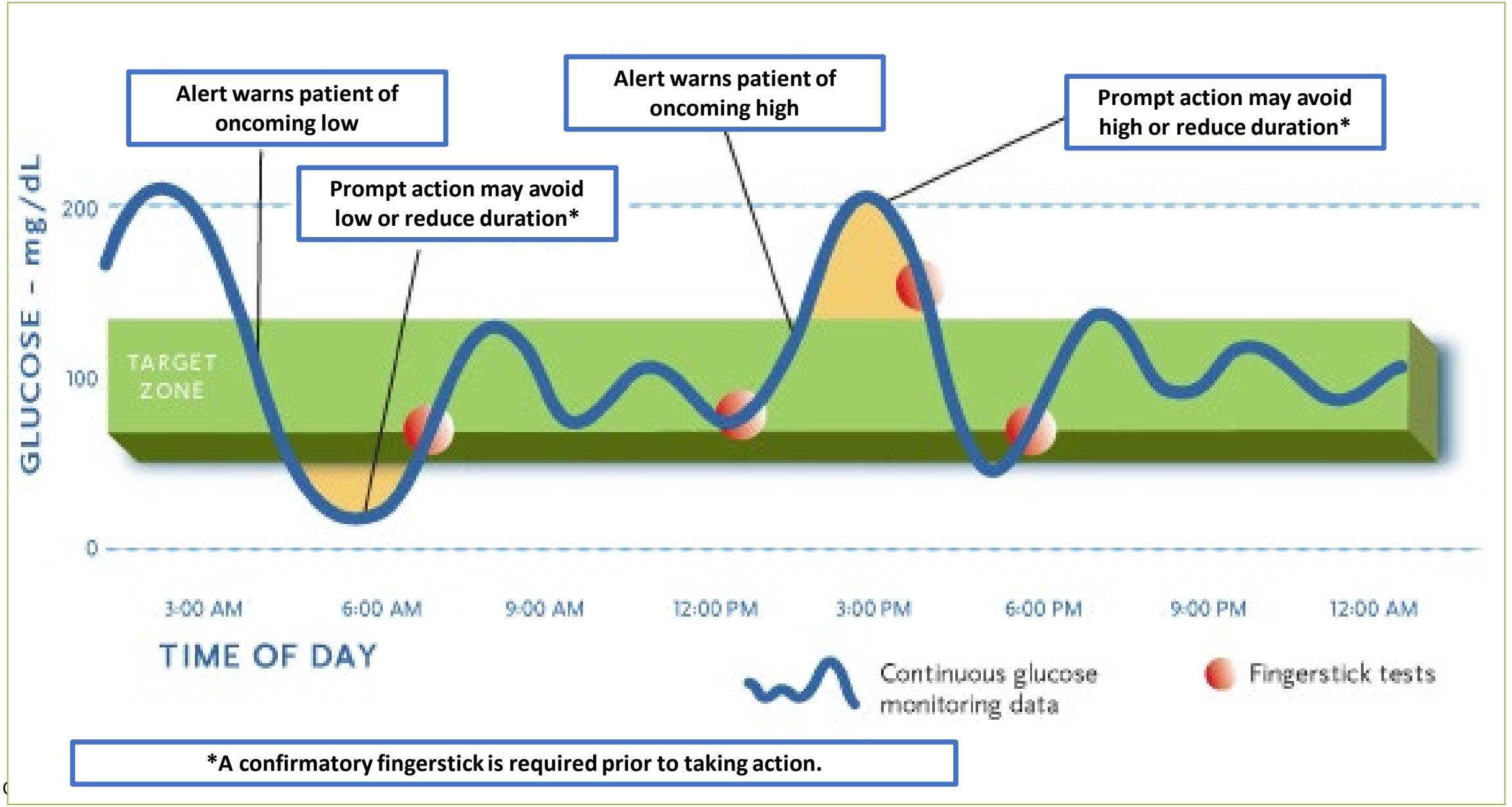
Benefits of CGM

- Provides real time glucose information every 1-5 minutes
- Shows where glucose is now and where it is going to be, using trend arrows
- Remote monitoring: Parents or guardians can follow glucose while child is at school*
- Alarms can be adjusted per student
- Reduces need for finger sticks

*This feature is only available if child uses a mobile phone as a receiver


Alert warns patient of oncoming low
Prompt action may avoid low or reduce duration*
Alert warns patient of oncoming high
Prompt action may avoid high or reduce duration*
GLUCOSE – mg/dL
200
100
0
TARGET ZONE
3:00 AM
6:00 AM
9:00 AM
12:00 PM
3:00 PM
6:00 PM
9:00 PM
12:00 AM
TIME OF DAY
Continuous glucose monitoring data
Fingerstick tests
*A confirmatory fingerstick is required prior to taking action.

Trend Arrows

What do the arrows mean

	Increasing/decreasing less than 1 mg/dL each minute
	Glucose could increase/decrease 30-60 mg/dL in 30 minutes
	Glucose could increase/decrease 60-90 mg/dL in 30 minutes
	Glucose could increase/decrease more than 90 mg/dL in 30 minutes

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Blood Glucose vs. Sensor Glucose

- CGM data lags behind blood sugar, especially if the number is rapidly rising or falling.
- A meter should be used if
  - Symptoms don't match the CGM number
  - Before you give a low treatment and at recheck
  - Before a correction dose for a high blood sugar

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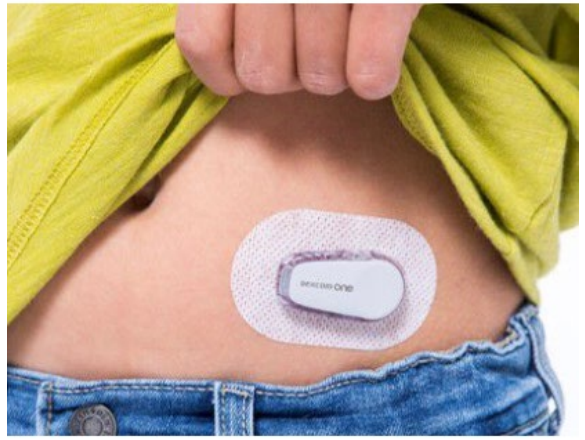
Types of CGM: Dexcom



- 2 years and above
- Wear up to 10 days
- 2 types:
  - **Dexcom G6** (2 pieces)
  - **Dexcom G7** (1 piece)
- Can connect to different pumps
- Separate receiver or can work with iPhone or Android

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Libre

- Ages 4 and up
- Wear up to 14 days
- 1 piece
- 2 types
  - **Libre 2**
  - **Libre 3**
  - **Libre 2 Plus**
    - Connects to certain insulin pumps

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Guardian

- Can be a standalone sensor, but most commonly used with Medtronic Pump
- 2 types
  - Guardian 3
    - Used with Medtronic 770 G pumps
    - Needs to be calibrated
  - Guardian 4
    - Used with Medtronic 780 G pumps
    - May need calibrations

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Children's Recommendations for CGM Use in School

- Student may need to have cellphone with them and use school Wifi or celluar data to transmit data to remote receivers during the school day
- Constant monitoring is not expected of school staff, priority should be given to low and high alerts
- High alerts may occur after eating and will not always need treatment. There must be 2 hours between insulin doses.

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Children's Recommendations for CGM Use in School

- Blood glucose should be checked with a meter if symptoms don't match sensor glucose readings or trending arrows are double up or down
- Schools should **not** be asked to reinsert a sensor.
- Experienced families may ask for doses to be adjusted based on trend arrows-This should be indicated in the child's Individual Health Plan (IHP)

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Insulin Pumps

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What is an Insulin Pump?

- A small battery operated computerized device
- Infuses rapid-acting insulin (Humalog or Novolog) in precise programmable doses to meet individual patient needs
- **Replaces long-acting insulin**
- Delivers insulin through a soft cannula under the skin to replace injections
- Pump Delivers insulin in 2 ways
  - Basal
  - Bolus

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Benefits of Insulin Pump Therapy

- Convenience – fewer or no insulin injections
- More flexibility and freedom – easier to dose extra snacks
- More precise dosing – the pump can deliver very small increments eliminating the need for rounding
- Improved blood sugar control with the ability to use advanced features a pump may offer
- Less room for error in dose calculations since the pump calculates the dose for the user

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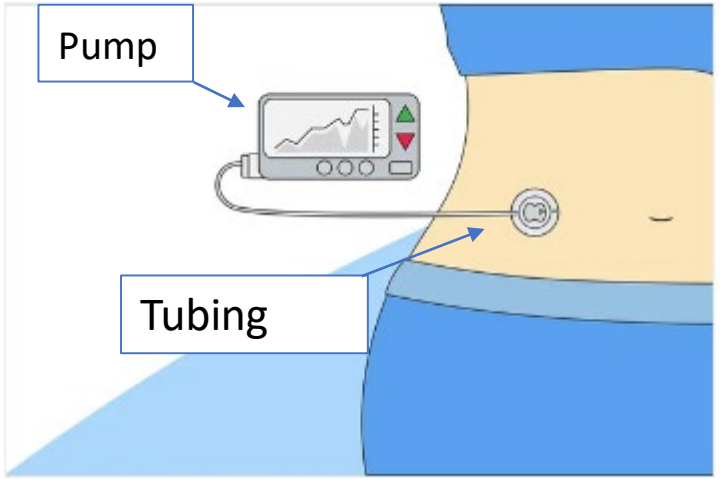
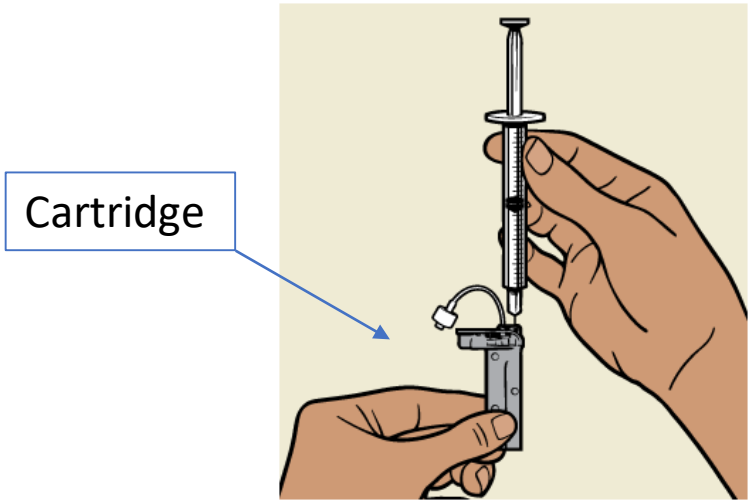
Disadvantages of Pump

- Can cause skin irritation
  - Skin reactions to adhesive or pump sites
  - Skin infections
- High Cost
- Increased risk of DKA with pump malfunction
  - If pump stops working, their body will have no working insulin in 2-3 hours
- Technical challenges
  - Pumps break
- Always on
  - Other students can see and ask questions
  - Another thing is beeping!

Parts of a Tubed Pump





- Pump delivers insulin through a tiny catheter placed under skin
- Uses sets to deliver insulin and cartridges to load insulin into the pump
- Students change their cartridge, set and tubing every 1 to 3 days

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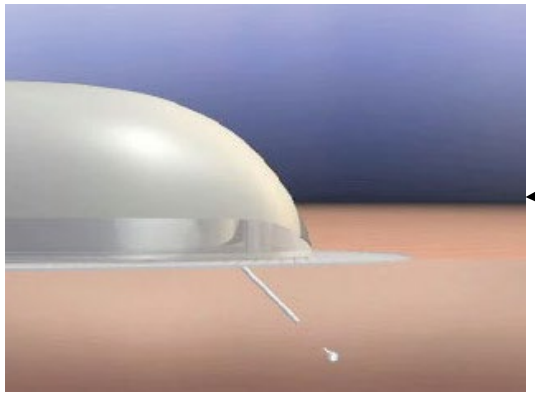
Parts of a Tubeless Pump



- Use pods to deliver insulin.
- Insulin is inserted into the pod then placed directly on the skin
- Student changes pod every 1 to 3 days
- Fill with new insulin each pod

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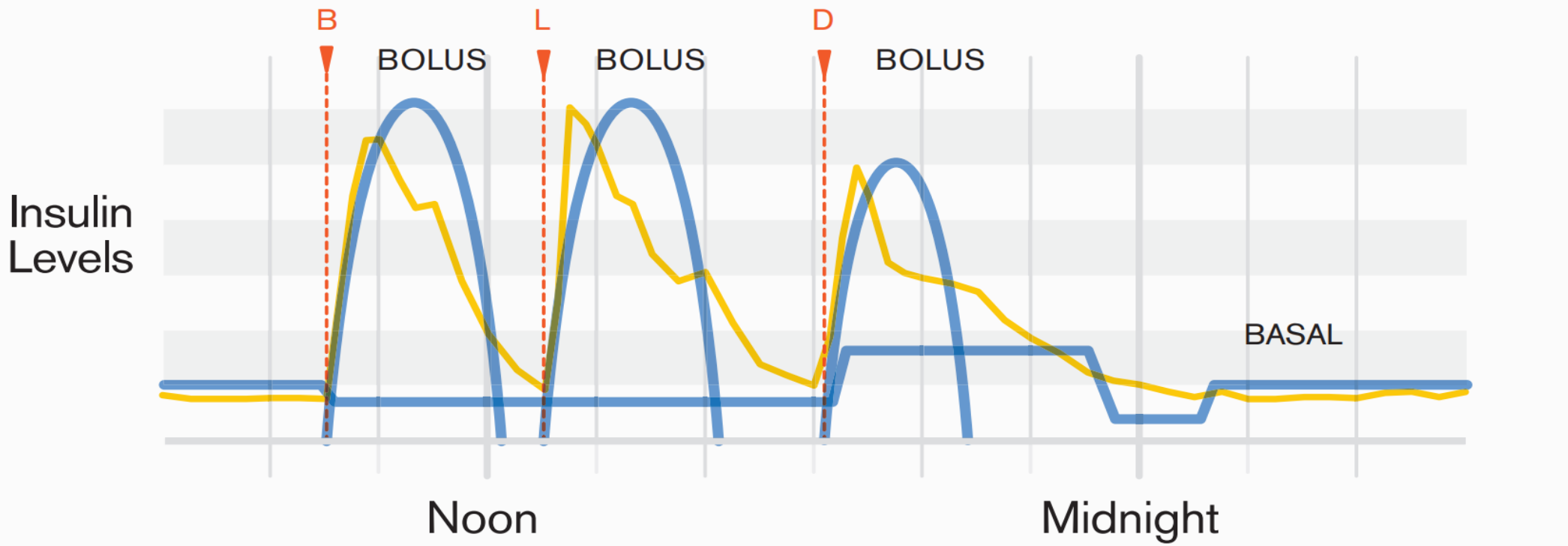
Insulin Delivery with a Pump vs Normal Insulin Release†



Insulin pumps mimics what a pancreas without diabetes would do!

Using an Insulin Pump for a Bolus

- Should always be used at mealtimes and for as needed corrections
- Manually push buttons on the pump or connected app to deliver the bolus dose
- CGM may automatically enter, but can also enter a blood glucose
- Need to enter grams of carbohydrates into pump*
- Pump will do calculation, but you can override it and give more or less than recommended dose

*Exception is the iLet pump. It does not require carb counting, just “carb awareness”

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Activity with an Insulin Pump

- Speak with student and family on how they will manage their pump around activity
- May need to place pump in an activity/exercise mode or set a temporary basal rate
- May need a **small** uncovered snack
- If tubed pump, could disconnect from pump during activity

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Children's Recommendation for Pump Use in School

- Staff should know:
  - What pump the child is using
  - How to deliver a bolus
  - How to set activity/exercise mode or a temporary basal rate
  - How to suspend insulin delivery
  - How to identify a bad site
- The management plan should include how independent a student is with the pump
- If there is a severe low, seizure or loss of consciousness, the pump should be removed or insulin should be suspended.

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Children's Recommendation for Insulin Pump Use in School

- Staff is not responsible for:
  - Changing a pump site
- A backup plan needs to be in place for dosing if pump fails
- Insulin pen or vials needs to be available at school for dosing
- Pump settings or doses need to be provided by caregivers in the event of pump failure
- Blood sugars need to be checked and insulin needs to be given every 2 hours if a pump is off the body. Remember, there is no long acting insulin on board.

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How do I know if a pump malfunctions?

- Site may:
  - Be leaking
  - Smell like insulin
- Blood sugars may be:
  - Not responding to correction doses
- Pump may be:
  - Alarming constantly or not at all!

High Blood Sugars on a Pump

- If blood sugar is over 250 mg/dl and you don't know why:
  - Check ketones and check site.
  - If pump and site look OK and no ketones, give correction as recommended by pump. Wait 2 hours.
- If sugar does not improve by at least 50 mg/dl in 2 hours, give a dose of insulin through vial or insulin pen and check ketones again.
- If ketones, student will need to change out insulin pump set or switch to injections until they get home.

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More Resources

- For pump specific resources, go to:

Pump Brand	Resources
Omnipod	https://www.omnipod.com/current-podders/resources/omnipod-system/podder-resource-guide
Medtronic	780G: https://www.medtronicdiabetes.com/download-library/minimed-780g-system 770G: https://www.medtronicdiabetes.com/download-library/minimed-770g-system
Tandem	https://www.tandemdiabetes.com/support/insulin-pump-training/training-materials
Beta Bionics iLet	https://www.betabionics.com/resources/patient-training-resources/