The School Nurse’s Role in Diabetes Management

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Objectives

1. Review, interpret, and execute the new DMMP
2. Review latest diabetes medications and technology
3. Hands on portion for technology and injections
4. Common trouble shooting at school
Types of Diabetes and Treatment Options
Diabetes Statistics

• In 2015, 30.3 million Americans, or 9.4% of the population, had diabetes.
  – ~1.25 million children and adults have type 1
• 1.5 million newly diagnosed each year
• ~193,000 kids under age 20 are estimated to have diagnosed diabetes
  – Latest data from 2011-2012 showed 17,900 with type 1 and 5,300 with type 2
• Diabetes is the 7th leading cause of death in the US in 2015
<table>
<thead>
<tr>
<th>T1 vs. T2</th>
<th>Type 1 Diabetes Mellitus</th>
<th>Type 2 Diabetes Mellitus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Onset usually seen from infancy to 30 years of age but may occur at any age</td>
<td>Onset <em>usually</em> seen in those $\geq 40$ years of age but increasingly seen in children and teens</td>
</tr>
<tr>
<td>Chronic disease</td>
<td>Chronic disease</td>
<td>Strong family history</td>
</tr>
<tr>
<td>Autoimmune</td>
<td>Autoimmune, genetic, and/or environmental</td>
<td>Insulin resistance and/or diminished insulin production</td>
</tr>
<tr>
<td>Treatment</td>
<td>Treatment: Insulin injections</td>
<td>Treatment: oral medications (Metformin), sometimes insulin</td>
</tr>
<tr>
<td>No cure</td>
<td>Ketone production common</td>
<td>Lifestyle modification</td>
</tr>
</tbody>
</table>
# Insulins Available and Ways to Give

## Insulin therapy
- Insulin pen or Syringe
- Insulin pump (refer to page 7)

### Type of Insulin therapy at school:
- [ ] Adjustable Bolus Insulin
- [ ] Fixed insulin therapy
- [ ] Long-Acting Insulin
- [ ] None

### Adjustable Bolus Insulin Therapy:
- [ ] Apidra
- [ ] Novolog
- [ ] Humalog
- [ ] Fiasp
- [ ] Admelog
  - (brands interchangeable)

### Fixed Insulin Therapy
- **Name of insulin:** ______________________________
- [ ] ____ Units of insulin given pre-breakfast daily
- [ ] ____ Units of insulin given pre-lunch daily
- [ ] ____ Units of insulin given pre-snack daily
- [ ] Other: ______________________________

### Long-Acting Insulin Therapy
- **Name of Insulin (Circle):** Lantus | Basaglar | Levemir | Tresiba (u100/u200) | Toujeo (u300)
- [ ] To be given during school hours:
  - [ ] Pre-breakfast dose: _____ units
  - [ ] Pre-lunch dose: _____ units
  - [ ] Pre-dinner dose: _____ units

### Other diabetes medications:
- [ ] Name: _____ Dose: _____ Route: _____ Times given: _____
- [ ] Name: _____ Dose: _____ Route: _____ Times given: _____
- [ ] Name: _____ Dose: _____ Route: _____ Times given: _____
Insulin Kinetics

Aspart, lispro, glulisine

Regular

NPH

Detemir

Degludec

Glargine

Plasma Insulin Levels

Hours
Basal Insulin
Bolus Insulin
Bolus Insulin
½ unit dosing
Pre-mixed Insulin
Insulin Pen: Steps to Inject

• Wipe injection port with ETOH
• Attach pen needle
• Prime with 2 units pointing pen up - ensure steady stream
• Choose injection location, clean skin
• **DO NOT PINCH IF USING 4MM OR 5MM**
• Count to 5 (one one thousand, two one thousand, etc.)
  – Novo Nordisk products recommend 6 and Lantus recommends 10 sec.
• Remove needle, dispose of properly
Storage and Disposal

- Humalog, Novolog, Admelog, and Apidra—once opened good for 28 days—regardless of how much is left (vials/pens)
- Lantus (glargine)—28 days, Levemir (detemir)—42 days (vials/pens), Basaglar (glargine)—28 days, Tresiba (degludec)—56 days
- Mixed insulin pens—10 days, exception is Novolog mix 70/30—14 days
- Dispose of sharps—rigid plastic container (detergent or bleach with screw on lid)
What is an insulin pump?

- A pager sized, mini-computer programmed to deliver insulin through infusion set and tubing. This device mimics the action of a functioning pancreas.
- The pump itself is clipped to clothing, put into a pocket or in a special case or holder. There is one device with no tubing that adheres to skin.
- Uses only rapid acting insulin (ie, Humalog, Novolog, Admelog or Apidra). So, no longer need long-acting insulin.
- The user fills the insulin cartridge and changes the infusion set or pod every 2 to 3 days.
An insulin pump can’t…

• It will not check the users blood sugar
• It will not automatically deliver insulin for meals
• It does not require surgery – the site is manually changed by the user
• It will not take away the responsibilities of performing diabetes self care
Insulin Pump Delivery Defined

• Basal
  – Insulin that is continuously delivered by the pump over 24 hours
  – Replaces the long lasting insulin
  – Programmed as units/hour
  – This rate may vary throughout the day based on insulin need (rather than one steady rate all day; may change during puberty, growth, exercise)

• Bolus
  – User selected amount of rapid-acting insulin delivered to cover for carb intake or glucose correction
  – The pump will assist with dose calculation based on insulin to carb ratio and insulin sensitivity factor
### Checking Blood Glucose

<table>
<thead>
<tr>
<th>Target Blood Glucose:</th>
<th>Before Meal: ___ - ___ mg/dL</th>
<th>Other: ___ - ___ mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before breakfast</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Before lunch</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Before PE</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>As needed for signs/symptoms of illness</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>_____ Hours after breakfast</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>_____ Hours after lunch</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>After PE</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>As needed for signs/symptoms of high/low blood glucose</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>_____ Hours after correction dose</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Before dismissal</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other: ______________________</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Accurate BG Monitoring

- When to check?
- Clean hands- soap and water or alcohol wipe
- Adequate sample size
- Weird reading, re-check
- In-date test strips
- Alternate site testing
- Helpful tips
Student’s Self-care Skills

Nutrition:
- □ Independently counts carbohydrates
- □ May count carbohydrates with supervision
- □ Requires school nurse/trained diabetes personnel to count carbohydrates
- □ Parents’/Guardians’ discretion for special event/party food
- □ Student discretion for special event/party food

Physical activity and sports
A quick-acting source of glucose must be available at the site of physical education activities and sports. Examples include glucose tabs, juice, glucose gel, gummies, skittles, starbursts, cake icing.

Student should eat:

<table>
<thead>
<tr>
<th>Carbohydrate Amount</th>
<th>Before</th>
<th>Every 30 minutes</th>
<th>Every 60 minutes</th>
<th>After activity</th>
<th>Per Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 grams</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>30 grams</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

If most recent blood glucose is less than ______ mg/dL, student can participate in physical activity when blood glucose is corrected and above ______ mg/dL.

Avoid physical activity when blood glucose is greater than ______ mg/dL AND / OR if urine ketones are moderate to large / blood ketones are > 1.0 mmol/L.

For insulin pump users: see “Additional Information for Student with Insulin Pump”, page 7”.

Carbohydrates
Macronutrients

Carbohydrates: ~45-60% of calories
Protein: ~10-35% of calories
Fat: ~20-35% of calories

*Graph showing energy absorption over time with peaks for Carbs, Protein, and Fat.*
So What Does that Mean?

Energy Absorption

Fast-acting Insulin

Carbs  Protein  Fat

Time (Hours)

1  2  3  4
Troubleshooting Lunch Challenges

• **Hunger Level**
  – Bolus for CHO after meal (if on pump or with MD order)
  – Substitute with snack foods/juice if they did not eat all the CHO they said they would

• **Foodservice**
  – Maintain open communication with staff in cafeteria and foodservice director; explain importance of your knowledge for helping with CHO counts

• **Food from Home**
  – Maintain open communication with parents; encourage them to send a notecard/sticky note with the CHO amounts from home or use packaged foods

• **Trading Food**
  – Educate your students on importance of knowing what they eat; can substitute as long as they’re honest and get the appropriate amount of insulin
Calculating Insulin Doses
Insulin chart

Your target blood sugar is 120.
Your insulin-to-carbohydrate ratio is 1 to 20.
This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to 60.
This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal

2. Divide carbs by ___.

3. This is the number of units of insulin needed to cover your meal.

Blood sugar

1. Check your blood sugar before your meal.

2. Subtract your target blood sugar value, ___ from this reading.

3. Divide this value by ___.

4. This is the number of units of insulin to correct for your blood sugar.

If you can dose ½ units, use the following for rounding:
If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

TOTAL = ______ Units

If you can dose only full units, use the following for rounding:
If 0.1 to 0.4 – Round down to nearest whole unit
If 0.5 or greater – Round up to nearest whole unit
Insulin chart

Your target blood sugar is **120**.
Your insulin-to-carbohydrate ratio is 1 to **20**.
This means you take 1 unit of insulin for every **20** grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to **60**.
This means you give yourself 1 unit of insulin for every **60** your blood sugar is over **120**.

Carbohydrates

1. Count the number of carbs in your meal: **103**
2. Divide carbs by **20**.
3. This is the number of units of insulin needed to cover your meal: **5.15** Units

Blood sugar

1. Check your blood sugar before your meal: **254**
2. Subtract your target blood sugar value, **120**, from this reading.
3. Divide this value by **60**.
4. This is the number of units of insulin to correct for your blood sugar: **2.23** Units

If you can dose ½ units, use the following for rounding:
If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the **TOTAL** number of units of insulin your child should take:

**TOTAL = 7.38** Units  
**Or 7**

If you can dose only full units, use the following for rounding:
If 0.1 to 0.4 – Round down to nearest whole unit
If 0.5 or greater – Round up to nearest whole unit
Insulin chart

Your target blood sugar is ________.
Your insulin-to-carbohydrate ratio is 1 to ________.
This means you take 1 unit of insulin for every _______ grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to ________.
This means you give yourself 1 unit of insulin for every _______ your blood sugar is over ________.

Carbohydrates

1. Count the number of carbs in your meal
2. Divide carbs by ____.
3. This is the number of units of insulin needed to cover your meal.

Blood sugar

1. Check your blood sugar before your meal.
2. Subtract your target blood sugar value, ____ from this reading.
3. Divide this value by ____.
4. This is the number of units of insulin to correct for your blood sugar.

If you can dose ½ units, use the following for rounding:
If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

TOTAL = _______ Units

If you can dose only full units, use the following for rounding:
If 0.1 to 0.4 – Round down to nearest whole unit
If 0.5 or greater – Round up to nearest whole unit

TOTAL = _______ Units
Insulin chart

Your target blood sugar is 120.

Your insulin-to-carbohydrate ratio is 1 to 20.

This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.

Your correction for your blood sugar is 1 to 60.

This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal
   - 18
2. Divide carbs by ___.
   - 20
3. This is the number of units of insulin needed to cover your meal.
   - 0.9 Units

Blood sugar

1. Check your blood sugar before your meal.
   - 300
2. Subtract your target blood sugar value, ___ from this reading.
   - 120
3. Divide this value by ___.
   - 180
4. This is the number of units of insulin to correct for your blood sugar.
   - 60
   - 3 Units

If you can dose ½ units, use the following for rounding:
- If 0.1 to 0.3 – Round down to nearest whole unit
- If 0.4 to 0.6 – Round to nearest half unit
- If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

TOTAL = 3.9 Units

4 units

If you can dose only full units, use the following for rounding:
- If 0.1 to 0.4 – Round down to nearest whole unit
- If 0.5 or greater – Round up to nearest whole unit
**Insulin chart**

Your target blood sugar is **120**.

Your insulin-to-carbohydrate ratio is 1 to **20**.

This means you take 1 unit of insulin for every **20** grams of carbohydrate you eat.

Your correction for your blood sugar is 1 to **60**.

This means you give yourself 1 unit of insulin for every **60** your blood sugar is over **120**.

---

**Carbohydrates**

1. Count the number of carbs in your meal.
   - **79**

2. Divide carbs by **__**.
   - **__**

3. This is the number of units of insulin needed to cover your meal.
   - **__** Units

---

**Blood sugar**

1. Check your blood sugar before your meal.
   - **118**

2. Subtract your target blood sugar value, **__**, from this reading.

3. Divide this value by **__**.
   - **__**

4. This is the number of units of insulin to correct for your blood sugar.
   - **__** Units

---

**If you can dose ½ units, use the following for rounding:**

- If 0.1 to 0.3 – Round down to nearest whole unit
- If 0.4 to 0.6 – Round to nearest half unit
- If 0.7 to 0.9 – Round up to nearest whole unit

**Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.**

**TOTAL** = **4** Units

---

**If you can dose only full units, use the following for rounding:**

- If 0.1 to 0.4 – Round down to nearest whole unit
- If 0.5 or greater – Round up to nearest whole unit
Insulin chart

Your target blood sugar is 120.
Your insulin-to-carbohydrate ratio is 1 to 20.
This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to 60.
This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal: 79
2. Divide carbs by 20:
   \[
   \frac{79}{20} = 3.95 \text{ Units}
   \]
3. This is the number of units of insulin needed to cover your meal.

Blood sugar

1. Check your blood sugar before your meal: 118
2. Subtract your target blood sugar value, 120, from this reading:
   \[
   118 - 120 = -2
   \]
3. Divide this value by ___:
4. This is the number of units of insulin to correct for your blood sugar.

If you can dose ½ units, use the following for rounding:
- If 0.1 to 0.3 – Round down to nearest whole unit
- If 0.4 to 0.6 – Round to nearest half unit
- If 0.7 to 0.9 – Round up to nearest whole unit

If you can dose only full units, use the following for rounding:
- If 0.1 to 0.4 – Round down to nearest whole unit
- If 0.5 or greater – Round up to nearest whole unit
Insulin chart

Your target blood sugar is 120.

Your insulin-to-carbohydrate ratio is 1 to 20.

This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.

Your correction for your blood sugar is 1 to 60.

This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal

   74

2. Divide carbs by ___.

   \[ \frac{74}{\text{___}} = \text{___} \]

3. This is the number of units of insulin needed to cover your meal.

   \[ \text{Units} \]

Blood sugar

1. Check your blood sugar before your meal.

   60

2. Subtract your target blood sugar value, ___ from this reading.

   \[ 60 - \text{___} = \text{___} \]

3. Divide this value by ___.

   \[ \frac{\text{___}}{\text{___}} = \text{___} \]

4. This is the number of units of insulin to correct for your blood sugar.

   \[ \text{Units} \]

If you can dose 1/2 units, use the following for rounding:

- If 0.1 to 0.3 – Round down to nearest whole unit
- If 0.4 to 0.6 – Round to nearest half unit
- If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

\[ \text{TOTAL} = \text{___} \text{ Units} \]

If you can dose only full units, use the following for rounding:

- If 0.1 to 0.4 – Round down to nearest whole unit
- If 0.5 or greater – Round up to nearest whole unit
Insulin chart

Your target blood sugar is 120.
Your insulin-to-carbohydrate ratio is 1 to 20.
This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to 60.
This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal
2. Divide carbs by ___.
3. This is the number of units of insulin needed to cover your meal.

Blood sugar

1. Check your blood sugar before your meal.
2. Subtract your target blood sugar value, ___ from this reading.
3. Divide this value by ___.
4. This is the number of units of insulin to correct for your blood sugar.

If you can dose ½ units, use the following for rounding:
- If 0.1 to 0.3 – Round down to nearest whole unit
- If 0.4 to 0.6 – Round to nearest half unit
- If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

TOTAL = _____ Units

If you can dose only full units, use the following for rounding:
- If 0.1 to 0.4 – Round down to nearest whole unit
- If 0.5 or greater – Round up to nearest whole unit

60 105 after 2-15g CHO treatments
Insulin chart

Your target blood sugar is \(120\).
Your insulin-to-carbohydrate ratio is 1 to \(20\).
This means you take 1 unit of insulin for every \(20\) grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to \(60\).
This means you give yourself 1 unit of insulin for every \(60\) your blood sugar is over \(120\).

Carbohydrates

1. Count the number of carbs in your meal
   ___________

2. Divide carbs by __.  
   \(\div\)  
   _________

3. This is the number of units of insulin needed to cover your meal.  
   _________

Blood sugar

1. Check your blood sugar before your meal.  
   ___________

2. Subtract your target blood sugar value, \(\_\_\_\_\_\_\_\) from this reading.  
   \(-\)  
   _________

3. Divide this value by __.  
   \(\div\)  
   _________

4. This is the number of units of insulin to correct for your blood sugar.  
   _________

If you can dose \(\frac{1}{2}\) units, use the following for rounding:
If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

\[\text{TOTAL} = \underline{____} \text{ Units}\]

If you can dose only full units, use the following for rounding:
If 0.1 to 0.4 – Round down to nearest whole unit
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Insulin chart

Your target blood sugar is 120.
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This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to 60.
This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal:
   
   2. Divide carbs by ___:
       
   3. This is the number of units of insulin needed to cover your meal:

Blood sugar

1. Check your blood sugar before your meal:
   
2. Subtract your target blood sugar value, ___ from this reading:
   
3. Divide this value by ___:
   
4. This is the number of units of insulin to correct for your blood sugar:

If you can dose ½ units, use the following for rounding:

If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

TOTAL = _____ Units

If you can dose only full units, use the following for rounding:

If 0.1 to 0.4 – Round down to nearest whole unit
If 0.5 or greater – Round up to nearest whole unit
Insulin chart

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Your correction for your blood sugar is 1 to 60.
This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal
   __________________

2. Divide carbs by ____.
   __________

3. This is the number of units of insulin needed to cover your meal.
   ______

Blood sugar

1. Check your blood sugar before your meal.
   ______

2. Subtract your target blood sugar value, ____ from this reading.
   ______

3. Divide this value by ____. 
   ______

4. This is the number of units of insulin to correct for your blood sugar.
   ______

If you can dose ½ units, use the following for rounding:
If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

   TOTAL = ______ Units

If you can dose only full units, use the following for rounding:
If 0.1 to 0.4 – Round down to nearest whole unit
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Insulin chart

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This means you take 1 unit of insulin for every 20 grams of carbohydrate you eat.
Your correction for your blood sugar is 1 to 60.
This means you give yourself 1 unit of insulin for every 60 your blood sugar is over 120.

Carbohydrates

1. Count the number of carbs in your meal
   ___________

2. Divide carbs by ____.
   ___________

   This is the number of units of insulin needed to cover your meal.
   = ________ Units

If you can dose ½ units, use the following for rounding:
If 0.1 to 0.3 – Round down to nearest whole unit
If 0.4 to 0.6 – Round to nearest half unit
If 0.7 to 0.9 – Round up to nearest whole unit

Blood sugar

1. Check your blood sugar before your meal.
   ___________

2. Subtract your target blood sugar value, ____ from this reading.
   ___________

3. Divide this value by ____.
   ___________

   This is the number of units of insulin to correct for your blood sugar.
   = ________ Units

If you can dose only full units, use the following for rounding:
If 0.1 to 0.4 – Round down to nearest whole unit
If 0.5 or greater – Round up to nearest whole unit

Add the number of units together, and then round according to the appropriate dosing instructions for your child (see below). This is the TOTAL number of units of insulin your child should take.

TOTAL = ________ Units
Additional Information for Students with Insulin Pumps

Brand / model of pump: __________________________ Manufacturer’s phone number: __________________

Basal rates during school: ■ Refer to attached pump settings
Other pump instructions: ________________________

**Hyperglycemia Management:**
- If blood glucose greater than _______mg/dL that has not decreased within _______ hours after correction and / or if student has moderate to large ketones. Notify parents / guardians
- For infusion site failure: Insert new infusion set and / or replace reservoir, or give insulin by syringe or pen using insulin dosing prescribed on page 6
- For suspected pump failure: Suspend or remove pump and give insulin by syringe or pen using insulin dosing prescribed on page 6

**Adjustments for Physical Activity Using Insulin Pump**

| May disconnect from pump for sports activities: Yes, for ______ hours | No |
| Set temporary basal rate: Yes, ______ % temporary basal for ______ hours | No |
| Suspend pump: Yes, for ______ hours | No |
| Temp Target (specific to Medtronic): 150 mg/dL Yes, for ______ hours | No |

### Student's Self-care Pump Skills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Independent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counts carbohydrates</td>
<td>Yes</td>
</tr>
<tr>
<td>Calculates correct amount of insulin for carbohydrates consumed</td>
<td>Yes</td>
</tr>
<tr>
<td>Administers correction bolus</td>
<td>Yes</td>
</tr>
<tr>
<td>Calculates and sets basal profiles</td>
<td>Yes</td>
</tr>
<tr>
<td>Calculates and sets temporary basal rate</td>
<td>Yes</td>
</tr>
<tr>
<td>Changes batteries</td>
<td>Yes</td>
</tr>
<tr>
<td>Disconnects pump</td>
<td>Yes</td>
</tr>
<tr>
<td>Reconnects pump to infusion set</td>
<td>Yes</td>
</tr>
<tr>
<td>Prepares reservoir, pod, and / or tubing</td>
<td>Yes</td>
</tr>
<tr>
<td>Inserts infusion set</td>
<td>Yes</td>
</tr>
<tr>
<td>Troubleshoots alarms and malfunctions</td>
<td>Yes</td>
</tr>
</tbody>
</table>
History of Pump Therapy
We’ve come a long way!

Animas
Stopped production in US on 10-5-17

Omnipod

Medtronic

Roche
Stopped production in US on 1-1-17

Tandem Diabetes
Infusion Sets and Sites
(...see no surgery!)

- Angled insertion with tubing
- 90° insertion with tubing
- Angled insertion with no tubing (Omnipod)
Lots of Options for Sets

Infusion sets to be manually changed every 2 to 3 days

Note: There is potential for poor insulin absorption if not changed regularly
Dosing with an Insulin Pump

Bolus peaks: units delivered

Notice...we can deliver insulin more than 4 times per day without having to give extra injections.
Additional options for insulin delivery with a pump...

• You can extend the delivery time of a bolus on a pump (depending on the type of food eaten—ie, high fat meals)

• You can begin to give insulin before the meal for correction, but enter CHO after (for those picky eaters that you can’t predict intake before to give shot)

• You can cut back on insulin delivery if you plan to be more active (while on long-acting insulin we have no control once given)

• Smart pumps calculate “insulin on board” (IOB) – Pump will track the amount of insulin still working from previous bolus then subtract some insulin from the next correction bolus to prevent low BG
Extending Boluses and IOB

Rates of Absorption of Nutrients

High fat meal
Dual wave/combo bolus
Square wave

Energy Absorption

Time (Hours)

Carbs  Protein  Fat
Animas Vibe

Animas Ping

Battery Info
- prefers 1 AA Lithium, but can run on Akaline
- full rewind and prime sequence is required
- IOB (insulin on board) resets to 0
- All bolus deliveries are cancelled
- Any temp basal in effect before the change will be cancelled
- Basal program delivery will automatically resume (however, recommended to review)

<table>
<thead>
<tr>
<th></th>
<th>630G</th>
<th>670G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump with Tubing</td>
<td>Pump with Tubing</td>
<td></td>
</tr>
<tr>
<td>Battery Powered: AA</td>
<td>Battery Powered: AA</td>
<td></td>
</tr>
<tr>
<td>Linking Glucometer</td>
<td>Linking Glucometer</td>
<td></td>
</tr>
<tr>
<td>Pump and Sensor:</td>
<td></td>
<td>Pump and Sensor:</td>
</tr>
<tr>
<td>• 7 day wear for sensor</td>
<td></td>
<td>• 3 different modes: Manual,</td>
</tr>
<tr>
<td>• 3-4 BG checks per day for calibration</td>
<td></td>
<td>Safe Mode and Auto Mode</td>
</tr>
<tr>
<td>• Can’t dose off readings</td>
<td></td>
<td>• Manual- Provides CGM</td>
</tr>
<tr>
<td>• No sharing</td>
<td></td>
<td>readings, suspend before</td>
</tr>
<tr>
<td>• Suspends before lows</td>
<td></td>
<td>low or on low and automatic</td>
</tr>
<tr>
<td>• Pump uses buttons for navigation</td>
<td></td>
<td>basal resume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Auto and Safe Mode- Micro</td>
</tr>
<tr>
<td></td>
<td></td>
<td>boluses for high blood sugar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>corrections automatically,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>basal rates automatically</td>
</tr>
<tr>
<td></td>
<td></td>
<td>adjust based on pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>history, temporary target for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exercise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pump uses buttons for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>navigation</td>
</tr>
<tr>
<td>Waterproof pump and sensor</td>
<td></td>
<td>Waterproof pump and sensor</td>
</tr>
</tbody>
</table>

---

https://www.medtronicdiabetes.com/download-library
Images: https://www.medtronicdiabetes.com/home
**Medtronic**

**Revel/530G Battery Life**
- 1 AAA new room temp Alkaline battery
- 5 minutes to change or you’ll get a BATT Out Limit which will require you to reset your pump clock to time, date, year

**630/670G Battery Life**
- 1 AA new room temp Lithium best, but will take alkaline
- 10 minutes to change battery & clear the insert battery alarm and avoid a power loss alarm which will cause you to re-enter time and date settings
- After removing your battery, wait until the insert battery screen appears before inserting a new battery

Images: [https://www.medtronicdiabetes.com/home](https://www.medtronicdiabetes.com/Home)

https://www.medtronicdiabetes.com/download-library
MiniMed 670G insulin pump modes and insulin delivery

<table>
<thead>
<tr>
<th>Manual Mode</th>
<th>Auto Mode Auto Basal delivery</th>
<th>Auto Mode Safe Basal delivery</th>
</tr>
</thead>
</table>
# Omnipod

<table>
<thead>
<tr>
<th></th>
<th>PDM</th>
<th>DASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump without Tubing: “Pod”</td>
<td>Pump without Tubing: “Pod”</td>
<td></td>
</tr>
<tr>
<td>Battery Powered: AAA</td>
<td>Rechargeable: About 2 days</td>
<td></td>
</tr>
<tr>
<td>Integrated Glucometer</td>
<td>Linking Glucometer</td>
<td></td>
</tr>
<tr>
<td>Pump and Sensor:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No integrated sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Must have PDM to bolus- it acts as a remote</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Mini food library in PDM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PDM uses buttons for navigation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump and Sensor:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No integrated sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Must have DASH to bolus- it acts as a remote</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Calorie King database built into bolus calculator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Parent or Caregiver can view Omnipod data alongside Dexcom app in compatible smart devices; DASH is otherwise a “locked down” device and cannot be used like a phone or tablet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DASH is touchscreen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pods are waterproof, PDM is not</td>
<td>Pods are waterproof, DASH is not</td>
<td></td>
</tr>
</tbody>
</table>

## Tandem

### T-slim X2

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump with Tubing</strong></td>
<td>Rechargeable: Recommend 15 minutes daily, but can last a full week. Obtain charging cord from family.</td>
</tr>
</tbody>
</table>
| **No linking meter. Blood sugars are entered by user.** | Pump and Sensor:  
  - 10 day wear with the G6, 7 day wear with the G5  
  - No calibrations with the G6, 2 per day with the G5  
  - Basal IQ feature with the G6, pump can suspend prior to low blood sugar and will automatically resume  
  - Can dose off of readings  
  - Sharing capability, if patient is carrying a compatible smart device and is using the Dexcom app  
  - Pump is touchscreen |
| **Pump is water resistant, sensor is waterproof** | |


Images: [https://www.tandemdiabetes.com/products/t-slim-x2-insulin-pump](https://www.tandemdiabetes.com/products/t-slim-x2-insulin-pump)

[https://www.tandemdiabetes.com/products/t-slim-g4-insulin-pump](https://www.tandemdiabetes.com/products/t-slim-g4-insulin-pump)
How does Basal-IQ Technology Work?

When the Basal-IQ feature is on, the system looks ahead 30 minutes to predict when sensor glucose will be below 80 mg/dL and suspends insulin to help reduce the frequency and duration of low glucose events.

1. Predicts glucose 30 minutes ahead
2. Suspends insulin to help avoid the low
3. Resumes insulin once glucose rises

Dexcom G6 CGM Integration

With Dexcom G6 CGM integration, the Basal-IQ feature works with no fingersticks required for mealtime dosing or calibration. Other benefits include an extended 10-day wear, acetaminophen blocking, and the ability to share real-time CGM data with up to 5 followers.

To learn more about Basal-IQ Technology, visit www.tandemdiabetes.com/tslimX2

*If glucose alerts and CGM readings do not match symptoms or expectations, use a blood glucose meter to make diabetes treatment decisions.
Continuous Glucose Monitoring (CGM)

- Yes  ☐ No  Brand/model: _______________________
- Alarms set for:  ☐ Severe Low: ______  ☐ Low: ______  ☐ High: ______
- Predictive alarm:  ☐ Rapid Fall: ______  ☐ Rapid Rise: ______

Student/School Personnel may use CGM for insulin calculation if glucose reading between _____ - ______mg/dL  ☐ Yes  ☐ No

Student/School Personnel may use CGM for hypoglycemia and hyperglycemia management  ☐ Yes  ☐ No

(Refer to Hypoglycemia and Hyperglycemia section of this document once confirmed)

Additional information for student with CGM

- Insulin injections should be given at least three inches away from the CGM insertion site.
- Do not disconnect from the CGM for sports activities.
- If the adhesive is peeling, reinforce it with any medical adhesive or tape the parent/guardian has provided.
- If the CGM becomes dislodged, remove, and return everything to the parents/guardian. Do not throw anything away. Check glucose by finger stick until CGM is replaced/reinserted by parent/guardian.
- Refer to the manufacturer’s instructions on how to use the student’s device.

<table>
<thead>
<tr>
<th>Student’s Self-care CGM Skills</th>
<th>Independent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student is able to troubleshoot alarms and alerts</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>The student is able to respond to HIGH alarm.</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>The student is able to respond to LOW alarm.</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>The student is able to adjust alarms.</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>The student is able to calibrate the CGM.</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>The student is able to respond when the CGM indicates a rapid trending rise or fall in the blood glucose level.</td>
<td>☐ Yes  ☐ No</td>
</tr>
<tr>
<td>School nurse or trained personnel notified if CGM alarms</td>
<td>☐ High  ☐ Low</td>
</tr>
<tr>
<td>Other instructions for the school health team:</td>
<td></td>
</tr>
</tbody>
</table>
Continuous Glucose Monitor (CGM)

**What can a CGM do?**
- Give sensor glucose readings, updated every 5 minutes on most systems
- Connect to a smartphone device for receiving the information and sharing with caregivers
- Make sharing blood glucose information with your provider easier

**What can’t a CGM do?**
- Give insulin. There are some insulin pump and CGM systems that work together to adjust insulin doses, but a CGM will not give insulin
- Completely eliminate blood glucose checks. Some systems require at least 3-4 to keep the CGM working. Some systems require them only if the system senses a problem
Dexcom G5

- Sensor is changed every 7 days
- Blood glucose calibrations are required at least every 12 hours to keep the system working
- FDA approved for dosing insulin off of the readings the sensor provides
- Can provide alerts or alarms for high or low blood sugars, or if dropping or rising at a specific rate
- Information can be received on Apple phones, some Android phones, or on the receiver sent at initiation
- Can link to an app for sharing, if compatible phone. Check website for specifics.
Dexcom G6

- Sensor is changed every 10 days
- Blood glucose calibrations are not required
- FDA approved for dosing insulin off of the readings the sensor provides
- Can provide alerts or alarms for high or low blood sugars, or if dropping or rising at a specific rate
- Can predictively alert for an urgent low blood sugar of 55mg/dl
- Information can be received on Apple phones, some Android phones, or on the receiver sent at initiation
- Can link to an app for sharing, if compatible phone. Check website for specifics.
- Reports can be shared with providers, using an app rather than downloading, if using phone
Medtronic Guardian for Pump

- Approved for those 2 years and older
- Sensor is changed every 7 days
- Sensor requires calibrations to continue to work. Minimum of 3-4 per day
- If using the sensor and the pump, the pump can suspend basal insulin and provide additional correction when blood sugar is high, without user input
- Information can be received on pump only. The patient is not able to share his or her sensor graphs. Has the ability to alert of high or low blood sugars predictively
- Can be downloaded, and reports can be shared with providers. Does not have a sharing app for caregivers at this time
Medtronic Guardian

- Approved for those 14 years and older
- Sensor is changed every 7 days
- Information can be received on Apple devices with Bluetooth capability. No separate receiver available
- Has an additional app called “Sugar IQ” which can help users become more aware of patterns in blood sugars (iPhone 6 and newer only)
- Has the ability to alert of high or low blood sugars predictively
- Can be downloaded, and reports can be shared with providers. Does not have a sharing app for caregivers at this time
Freestyle Libre

• Approved for those 18 years and older
• Sensor is changed every 14 days
• Information can be received on Apple phones or on the receiver, which can be purchased
• Readings are not continuously shown on the receiver. Rather, the person wearing must “scan” the sensor using the receiving device in order to receive updated information
• No alerts or alarms with sound. They may appear on the receiver if a scan is done and the sensor glucose is low, but it will not alert without the person scanning
• Lower cost than other sensors if paying cash price
Troubleshooting Scenarios with Pump Therapy
What if my student bolused in the morning and his/her blood sugar is not responding or is going up?

Follow the hyperglycemia plan in the school form. Threshold may be different if on injections versus pump.

**Insulin Correction Dose**
For blood glucose greater than _______ mg/dL AND at least ______ hours since last insulin dose, give correction dose of insulin (see correction dose orders, refer to page 6).
Notify parents/guardians if blood glucose is over _______ mg/dL.
For insulin pump users: see “Additional Information for Student with Insulin Pump”, refer to page 7.

**Ketones**
Check □ Urine for ketones OR □ Blood for ketones:
If blood glucose is above ______ mg/dL, two times in a row, at least one hour apart AND / OR when student complains of nausea, vomiting or abdominal pain,
Give ______ ounces of water and allow unrestricted access to the bathroom

<table>
<thead>
<tr>
<th>If urine ketones are negative to small OR blood ketones &lt; 0.6 mmol/L - 1.0 mmol/L:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If insulin has not been administered within ____ hours, provide correction insulin according to student’s correction factor and target pre-meal blood glucose (refer to page 6)</td>
</tr>
<tr>
<td>2. Return student to his / her classroom</td>
</tr>
<tr>
<td>3. Recheck blood glucose and ketones in ____ hours after administering insulin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If urine ketones are moderate to large OR blood ketones &gt;1.0 mmol/L:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do NOT allow student to participate in exercise</td>
</tr>
<tr>
<td>2. Call parent / guardian, if unable to reach parent / guardian call health care provider</td>
</tr>
<tr>
<td>3. If insulin has not been administered within ____ hours, provide correction insulin according to student’s correction factor and target blood glucose. (refer to page 6)</td>
</tr>
<tr>
<td>4. <strong>IF ON INSULIN PUMP</strong>: See “Additional Information for Student with Insulin Pump”, refer to page 7</td>
</tr>
</tbody>
</table>
What if my student is a picky eater or eats an unpredictable amount of carbohydrates?

- Insulin pump allows the correction (ISF) to be given prior to eating and insulin for carbohydrate coverage (ICR) to be given after eating
- Tell the child to come back to nurses office after lunch and report CHO
  - Give the insulin needed for covering the food they just ate
What if my student gave his/her insulin without me knowing outside of the clinic?

- Review history screen in the pump
- BG checks
- Open communication if student is required to come to clinic to check and bolus insulin
- Appropriate for “self carry”?
What if my student’s site falls out, and he or she is not independent in changing his or her own set?

- By law, you are not required to change the set. If trained by the parent or trainer and you want to, you can
- Call Parent to ask them to come replace
- Injections as back-up. If no long acting insulin at school, correction injections can be given every three hours with fast acting
Potential Causes of Skin/Site Issues

- Problem with Cannula (bent, crimped, dislodged/removed)
- Insulin itself (been in cartridge too long, got too hot/cold)
- Site infection
- Air in tubing (not primed correctly)
- Tubing not connected to pump site
Treating High and Low Blood Sugars

**Hypoglycemia (Low Blood Glucose)**

*Hypoglycemia:* Any blood glucose below _____ mg/dL checked by blood glucose meter or CGM.

*Student’s usual symptoms of hypoglycemia (cyclical):*
- Hunger
- Sweating
- Shakiness
- Palenness
- Dizziness
- Confusion
- Loss of coordination
- Fatigue
- Irritability/anger
- Crying
- Headache
- Inability to concentrate
- Hypoglycemia Unawareness
- Passing-out
- Seizure

*Mild to Moderate Hypoglycemia:*
*Student is exhibiting symptoms of hypoglycemia AND OR blood glucose level is less than _____ mg/dL.*

1. Give a fast-acting glucose product equal to _____ grams fast-acting carbohydrate such as: glucose tablets, juice, glucose gel, gummies, skittles, starburst, cake icing
2. Recheck blood glucose in 15 minutes
3. If blood glucose level is less than _____, repeat treatment with _____ grams of fast-acting carbohydrates
4. Consider providing a carbohydrate/protein snack once glucose returns to normal range, as per parent/guardian

*Severe Hypoglycemia:*
*Student is unable to eat or drink, is unconscious or unresponsive, or has having seizure activity or convulsions (jerking movement)*

1. Position the student on his or her side to prevent choking
2. Administer glucagon dose: ___ mg
   - Subcutaneous (SC): ___
   - Intramuscular (IM): ___
   - Intranasal: ___
3. Call 911 (Emergency Medical Services)
   - AND the student’s parents/guardians
   - AND the health care provider
4. If an INSULIN PUMP: Stop insulin pump by any of the following methods:
   - Power off pump in “suspended” or “stop mode” (See manufacturer’s instructions)
   - Disconnect/remove urine site/tubing
5. ALWAYS send pump with EMS to hospital

**Hyperglycemia (High Blood Glucose)**

*Hyperglycemia:* Any blood glucose above _____ mg/dL checked by blood glucose meter or CGM.

*Student’s usual symptoms of hyperglycemia (cyclical):*
- Extreme thirst
- Frequent urination
- Blurry vision
- Hunger
- Headache
- Nausea
- Hyperactivity
- Irritable
- Dizziness
- Stomach ache

*Insulin Correction Dose:*
*For blood glucose greater than _____ mg/dL AND at least _____ hours since last insulin dose, give correction dose of insulin (see correction dose orders, refer to page 6).*
*Notify parents/guardians if blood glucose is over _____ mg/dL.

*For insulin pump users: “Additional Information for Student with Insulin Pump,” refer to page 7.*

*Ketones:*
- Check ___ Urine for ketones OR ___ blood for ketones
  - If blood glucose is above _____ mg/dL, two times in a row, at least one hour apart
  - AND OR when student complains of nausea, vomiting, or abdominal pain
  - Give _____ ounces of water and allow unrestricted access to the bathroom

*If urine ketones are negative to small OR blood ketones < 0.6 mmol/L - 1.0 mmol/L:*

1. If insulin has not been administered within _____ hours, provide correction insulin according to student’s correction factor and target pre-meal blood glucose (refer to page 6)
2. Return student to his/her classroom
3. Recheck blood glucose and ketones in _____ hours after administering insulin

*If urine ketones are moderate to large OR blood ketones >1.0 mmol/L:*

1. Do NOT allow student to participate in exercise
2. Call parent/guardian, if unable to reach parent/guardian call health care provider
3. If insulin has not been administered within _____ hours, provide correction insulin according to student’s correction factor and target blood glucose... (refer to page 6)
4. “IF ON INSULIN PUMP:” See “Additional Information for Student with Insulin Pump,” refer to page 7

**HYPERGLYCEMIA EMERGENCY**

*Presence of ketones associated with the following symptoms Call 911*

- Chest pain
- Nausea and vomiting
- Severe abdominal pain
- Heavy breathing or shortness of breath
- Increasing sleepiness or lethargy
- Depressed level of consciousness
Hypoglycemia

Defined as a blood sugar less than 70 (for patients < 5 yrs we use 80 mg/dL)

Causes
- Missed meals
- Extra exercise
- Too much insulin
- Illnesses
Hypoglycemia Treatment

“Rule of 15’s” → Treat with 15 grams of fast acting carbs, wait 15 minutes, then re-check

- 3-5 Glucose tabs, glucose liquid or glucose gel (These enter the system twice as fast as any other fast acting carbs)
- ½ cup juice (prefer no orange juice)

- ½ cup regular soda
- 1 small tube of cake gel icing
- 1 Tablespoon sugar
- 7 pixy stix
- 1 airhead
Severe Hypoglycemia

Severe Hypoglycemia:
Student is unable to eat or drink, is unconscious or unresponsive, or is having seizure activity or convulsions (jerking movement)

1. Position the student on his or her side to prevent choking

2. Administer glucagon
   - Dose: □ 1 mg    □ 0.5 mg    □ Other ______________
   - Route:  □ Subcutaneous (SC)  □ Intramuscular (IM)
   - Site: □ Buttocks □ Arm □ Thigh □ Other: ______________

3. Call 911 (Emergency Medical Services)
   - AND the student’s parents / guardians.
   - AND the health care provider.

4. If on INSULIN PUMP, Stop insulin pump by any of the following methods:
   - Place pump in “suspend” or “stop mode” (See manufacturer’s instructions)
   - Disconnect/remove at site/cut tubing

ALWAYS send pump with EMS to hospital
Severe Hypoglycemia

• Dosing:
  ✤ <20kg, 0.5mg IM
  ✤ ≥ 20 kg, 1mg IM

• Response should be within 15 minutes
  – If no response, give an additional dose

• Position patient

• Side effects: nausea, headache, sleepiness
Steps for Mixing Glucagon/Glucagen

Step 1
Flip off the seal from the vial of Glucagon powder.

Step 2
Remove the needle cover from the syringe. DO NOT REMOVE THE PLASTIC CLIP FROM THE SYRINGE, as this may allow the push rod to come out of the syringe.

Step 3
Insert the needle into the rubber stopper on the vial, then inject the entire contents of the syringe into the vial of Glucagon powder.

Step 4
Remove the syringe from the vial, then gently swirl the vial until the liquid becomes clear. Glucagon should not be used unless the solution is clear and of a water-like consistency.

Step 5
Insert the same syringe into the vial and slowly withdraw all the liquid. To use on children weighing less than 44 pounds, withdraw half of the liquid (0.5 mark on the syringe).

Step 6
Cleanse site on buttock, arm, or thigh and inject Glucagon immediately after mixing, and then withdraw the needle. Apply light pressure against the injection site.
Steps for Mixing Glucagon/Glucagen

**Step 7**
Turn the person on his/her side. When an unconscious person awakens, he/she may vomit.

Call 911 immediately after administering Glucagon. If the person does not awaken within 15 minutes, give another dose of Glucagon and inform a doctor or emergency services immediately.

**Step 7 continued**
As soon as the person is awake and able to swallow, give him/her a fast-acting source of sugar (such as fruit juice), followed by a snack or meal containing both protein and carbohydrates (such as cheese and crackers, or a peanut butter sandwich).

**Step 8**
Discard any unused reconstituted Glucagon.
Remember to notify your healthcare provider that an episode of severe hypoglycemia has occurred.
Hyperglycemia

Hyperglycemia

• BG >350 once OR
• >300 twice in a row, an hour apart OR
• Value provider has chosen

Causes
- Excessive carb intake in relation to insulin dose
- Too little insulin
- Pump failure
- Illness or stress

Symptoms
- Extreme thirst
- Urination
- Headache
Hyperfentanyl Treatment

- Check for ketones, as directed in the DMMP
- Hydrate (with sugar-free drinks)
- Give insulin per DMMP

Call MD/parent
Hyperglycemia Flow Chart

**Insulin Correction Dose**
For blood glucose greater than _______ mg/dL AND at least _____ hours since last insulin dose, give correction dose of insulin (see correction dose orders, refer to page 6).
Notify parents/guardians if blood glucose is over _______ mg/dL.
For insulin pump users: see “Additional Information for Student with Insulin Pump”, refer to page 7.

**Ketones**
Check □ Urine for ketones OR □ Blood for ketones:
If blood glucose is above _____ mg/dL, two times in a row, at least one hour apart
AND / OR when student complains of nausea, vomiting or abdominal pain,
Give _____ounces of water and allow unrestricted access to the bathroom

<table>
<thead>
<tr>
<th>If urine ketones are negative to small OR blood ketones &lt; 0.6 mmol/L - 1.0 mmol/L:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If insulin has not been administered within _____ hours, provide correction insulin according to student’s correction factor and target pre-meal blood glucose (refer to page 6)</td>
</tr>
<tr>
<td>2. Return student to his / her classroom</td>
</tr>
<tr>
<td>3. Recheck blood glucose and ketones in _____ hours after administering insulin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If urine ketones are moderate to large OR blood ketones &gt;1.0 mmol/L:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do NOT allow student to participate in exercise</td>
</tr>
<tr>
<td>2. Call parent / guardian, if unable to reach parent / guardian call health care provider</td>
</tr>
<tr>
<td>3. If insulin has not been administered within _____ hours, provide correction insulin according to student’s correction factor and target blood glucose. (refer to page 6)</td>
</tr>
<tr>
<td>4. <strong>IF ON INSULIN PUMP:</strong> See “Additional Information for Student with Insulin Pump”, refer to page 7</td>
</tr>
</tbody>
</table>
Questions On Call Provider May Ask:

- Pump or injections?
- Last insulin dose?
- Ketones?
- Activity level?
- Current dosing guidelines?
- Pump site status?

If urine ketones are moderate to large OR blood ketones >1.0 mmol/L:

1. Do NOT allow student to participate in exercise
2. Call parent/guardian, if unable to reach parent/guardian call health care provider
3. If insulin has not been administered within ____ hours, provide correction insulin according to student’s correction factor and target blood glucose. (refer to page 6)
4. **IF ON INSULIN PUMP:** See “Additional Information for Student with Insulin Pump”, refer to page 7

**HYPERGLYCEMIA EMERGENCY**
**Presence of ketones associated with the following symptoms Call 911**

| Chest pain | Nausea and vomiting | Severe abdominal pain |
| Heavy breathing or shortness of breath | Increasing sleepiness or lethargy | Depressed level of consciousness |

**CHILDREN’S HOSPITAL OF RICHMOND AT VCU**
Student’s Self-care Skills

Blood Glucose:
☐ Independently checks own blood glucose
☐ May check blood glucose with supervision
☐ Requires school nurse or trained diabetes personnel to check blood glucose
☐ Uses a smartphone or other monitoring technology to track blood glucose values

Insulin Administration:
☐ Independently calculates / gives own injections
☐ May calculate / give own injections with direct supervision to confirm glucose and insulin dose
☐ Requires school nurse or trained diabetes personnel to calculate dose and student can give own injection with supervision
☐ Requires school nurse or trained diabetes personnel to calculate dose and give the injection

Nutrition:
☐ Independently counts carbohydrates
☐ May count carbohydrates with supervision
☐ Requires school nurse/trained diabetes personnel to count carbohydrates
☐ Parents'/Guardians' discretion for special event/party food
☐ Student discretion for special event/party food

Support
Authorization to Treat and Administer Medication in the School Setting as Required by Virginia Law

This Diabetes Medical Management Plan has been approved by the undersigned Health Care Provider.

It further authorizes schools to treat and administer medication as indicated by this plan and required by Virginia Law.

Providers:

My signature below provides authorization for the Virginia Diabetes Medical Management Plan contained herein. I understand that all treatments and procedures may be performed by the student, the school nurse, unlicensed trained designated school personnel, as allowed by school policy, state law or emergency services as outlined in this plan. I give permission to the school nurse and designated school personnel who have been trained to perform and carry out the diabetes care tasks for the student as outlined in the student’s Diabetes Medical Management Plan as ordered by the prescribing health care provider (Code of Virginia § 22.1-274).

Parents:

I also consent to the release of information contained in this Diabetes Medical Management Plan to all school staff members and other adults who have responsibility for my student and who may need to know this information to maintain my student’s health and safety. I also give permission to the school nurse or another qualified health care professional to contact my student’s diabetes health care providers.

I give permission to the student to carry with him/her and use supplies, including a reasonable and appropriate short-term supply of carbohydrates, an insulin pump, and equipment for immediate treatment of high and low blood glucose levels, and to self-check his/her own blood glucose levels on a school bus, on school property, and at a school-sponsored activity (Code of Virginia § 22.1-274.01:1).

☐ YES ☐ NO   Parent authorization for student to self-administer insulin
☐ YES ☐ NO   Parent authorization for student to self-monitor blood glucose
☐ YES ☐ NO   Prescriber authorization for student to self-administer insulin
☐ YES ☐ NO   Prescriber authorization for student to self-monitor blood glucose

*For self-carry: Provider and Parent must both agree to the statements above per (Code of Virginia §22.1-274.01:1)

<table>
<thead>
<tr>
<th>Parent / Guardian Name / Signature:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>School representative Name / Signature:</td>
<td>Date:</td>
</tr>
<tr>
<td>Student’s Physician / Health Care Provider Name / Signature:</td>
<td>Date:</td>
</tr>
</tbody>
</table>
Strategies for Supporting Students: Communication is KEY

<table>
<thead>
<tr>
<th>Instead of...</th>
<th>Try to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Fixing it” for them</td>
<td>Nurture problem solving skills...they are the expert!</td>
</tr>
<tr>
<td>“What ideas do you have about how you can remember to come by the clinic before lunch?”</td>
<td></td>
</tr>
<tr>
<td>Getting upset or frustrated with a student about a high blood sugar</td>
<td>Keep your emotions neutral, a reading is a data point!</td>
</tr>
<tr>
<td></td>
<td>→ Prevent blame/shame cycle</td>
</tr>
<tr>
<td></td>
<td>→ Keep communication open</td>
</tr>
<tr>
<td></td>
<td>→ Ask them to be the detective</td>
</tr>
<tr>
<td>Only noticing when pts make a mistake</td>
<td>Notice and comment when they are coping well</td>
</tr>
<tr>
<td>Focusing on the long-term complications</td>
<td>Help students identify current and personalized motivators for taking care of his/her diabetes</td>
</tr>
</tbody>
</table>
# The Words You Use Matter

<table>
<thead>
<tr>
<th>Problematic</th>
<th>Preferred</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diabetic (as an adjective)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diabetic foot</td>
<td>foot ulcer; infection on the foot</td>
<td>Focus on the physiology or pathophysiology.</td>
</tr>
<tr>
<td>diabetic education</td>
<td>Diabetes education</td>
<td></td>
</tr>
<tr>
<td>diabetic person</td>
<td>Person with diabetes</td>
<td></td>
</tr>
<tr>
<td>“How long have you been diabetic?”</td>
<td>“How long have you had diabetes?”</td>
<td>“Diabetic education” is incorrect (education doesn’t have diabetes).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Put the person first.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Avoid using a disease to describe a person.</td>
</tr>
<tr>
<td><strong>Diabetic (as a noun)</strong></td>
<td>Person living with diabetes</td>
<td>Person-first language puts the person first.</td>
</tr>
<tr>
<td></td>
<td>Person with diabetes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Person who has diabetes</td>
<td>Avoid labeling someone as a disease. There is much more to a person than diabetes.</td>
</tr>
<tr>
<td>“Are you a diabetic?”</td>
<td>“Do you have diabetes?”</td>
<td></td>
</tr>
<tr>
<td><strong>Non-diabetic; normal</strong></td>
<td>Person who doesn’t have diabetes</td>
<td>See above.</td>
</tr>
<tr>
<td></td>
<td>Person without diabetes</td>
<td>The opposite of “normal” is “abnormal”; people with diabetes are not abnormal.</td>
</tr>
<tr>
<td><strong>Compliant/compliance/ non-compliant/ non-compliance</strong></td>
<td>Engagement</td>
<td>Compliance and adherence imply doing what someone else wants, i.e., taking orders about personal care as if a child. In diabetes care and education, people make choices and perform self-care/self-management.</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Involvement</td>
<td>Focus on people’s strengths – what are they doing or doing well and how can we build on that?</td>
</tr>
<tr>
<td></td>
<td>Medication taking</td>
<td>Focus on facts rather than judgments.</td>
</tr>
<tr>
<td>“She takes insulin whenever she can afford it.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control (as a verb or an adjective)</strong></td>
<td>Manage</td>
<td>Control is virtually impossible to achieve in a disease where the body no longer does what it’s supposed to do.</td>
</tr>
<tr>
<td>controlled/uncontrolled, well controlled/poorly controlled</td>
<td>“She is checking blood glucose levels a few times per week.”</td>
<td>Use words/phrases that focus on what the person is doing or doing well.</td>
</tr>
<tr>
<td></td>
<td>“He is taking sulfonylureas, and they are not bringing his blood glucose levels down enough.”</td>
<td>Focus on physiology/biology and use neutral words that don’t judge, shame, or blame.</td>
</tr>
<tr>
<td><strong>Control (as a noun)</strong></td>
<td>A1C</td>
<td>Focus on neutral words and physiology/biology.</td>
</tr>
<tr>
<td>glycemic control; glucose control; poor control; good control; bad control; tight control</td>
<td>Blood glucose levels/targets</td>
<td>Define what “good control” means in factual terms and use that instead.</td>
</tr>
<tr>
<td>Glycemic target/goal</td>
<td>Glycemic stability/variability</td>
<td></td>
</tr>
</tbody>
</table>

## Four principles guided this work and served as a core set of beliefs for the paper:

- Diabetes is a complex and challenging disease involving many factors and variables
- Stigma that has historically been attached to a diagnosis of diabetes can contribute to stress and feelings of shame and judgment
- Every member of the health care team can serve people with diabetes more effectively through a respectful, inclusive, and person-centered approach
- Person-first, strengths-based, empowering language can improve communication and enhance motivation, health and well-being of people with diabetes

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## Use Language That...

- Is neutral, non-judgmental, and based on facts, actions, or physiology/biology
- Is free from stigma
- Is strengths-based, respectful, inclusive, and imparts hope
- Fosters collaboration between patients and providers
- Is person-centered

*For additional resources, including the full list of word suggestions, click here or visit diabetesseducator.org/language*
Questions?
References

• Delamater 1987; Graue et al., 2004
• http://www.endotext.org/diabetes/diabetes17/diabetesframe17.html
• http://www.med.uni-giessen.de/itr/history/inshist.html
• CHoR at VCU- New Onset Packet
• Pink Panther- Understanding Diabetes 11th ed
• http://diabeteshealth.com/media/pdfs/PRG0113/InsulinPumps.pdf