

**MANAGING TYPE 1 DIABETES
IN THE YOUNG CHILD:
USING TOOLS NEW AND OLD**

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CH Children's Hospital
of Philadelphia

Conflict of Interest Disclosure:

None

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Session Objectives

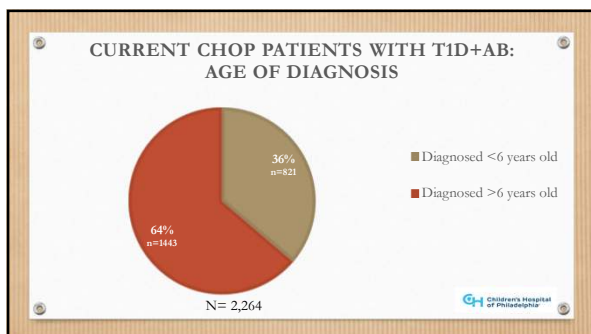
1. The learner will be able to describe the unique needs of families with young children (<six years old) diagnosed with Type 1 Diabetes (T1D).
2. The learner will be able to identify the types of insulin used in dosing young children and will be able to discuss the use of basal/bolus injections and subcutaneous insulin pumps in young children with T1D.
3. The learner will be able to identify the issues around childcare that T1D presents for families with young children with diabetes and will be equipped with some possible solutions.

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- 546 beds
- Large city-based hospital
- CHOP Diabetes Center for Children
 - ~2,200 patients with T1D
- Newly diagnosed patients with diabetes are admitted for 3 days of teaching. During T1Y1, patients are seen frequently and receive close CDE communication









Types of Insulin Used and Delivery Methods

- Basal/Bolus (method started routinely at CHOP)
 - **Basal insulin:**
 - glargine (*Basaglar--pens only, *Lantus)
 - detemir (*Levemir)
 - degludec (Tresiba--now in a vial, approved at age 1)
 - **Bolus insulin:**
 - lispro (Humalog** & Admelog--approved at age 3)
 - glulisine (Apidra--approved at age 4)
 - aspart (Novolog**--approved at age 2, *Fiasp)

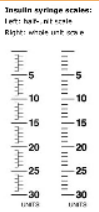
*not approved for use in age <6
**available in half-unit increment pens






Insulin Delivery Methods

- Syringes
 - Started routinely for newly diagnosed children at CHOP
 - **0.3 mL, 6mm, half-unit markings**
 - Used inpatient and outpatient
- Insulin pens
 - Can be leaky with small doses
 - Cartridges vs. "junior" pen
 - Need to hold after injection for 10 seconds

Insulin syringe scales:
 Left: 100 U, 10 U, 1 U
 Right: 0.1 U, 0.2 U, 0.5 U







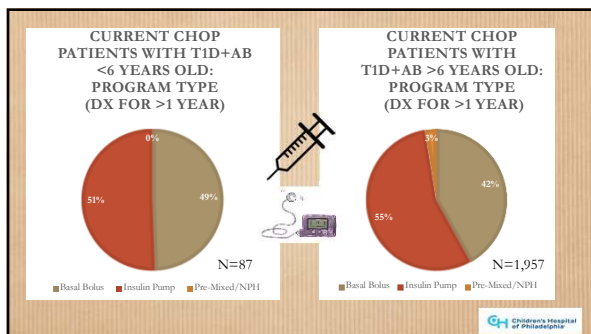
Insulin Delivery Methods

- Insulin pumps
 - Medtronic 530g*, 630g* & 670g*
 - Omnipod—Classic or Dash (FDA approval all ages)
 - t:slim x2 with Basal IQ*

**not FDA approved in ages <6*





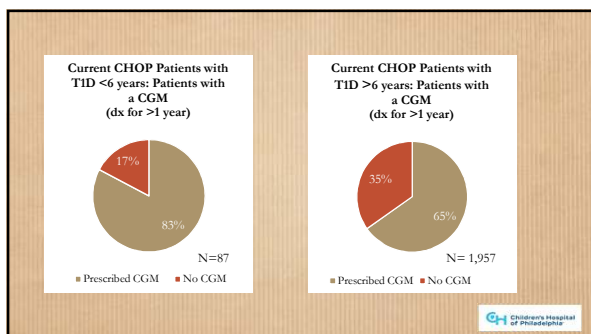


Blood Sugar Monitoring Options

- Glucometer (started routinely for newly diagnosed at CHOP)
- Continuous Glucose Monitor Options:
 - Dexcom (FDA use ages 2+)
 - Freestyle Libre*
 - Guardian*
 - Guardian Connect*
 - Eversense*

*not FDA approved in ages <6






Ketone Monitoring



What are the Unique Needs of Families with Young Children (<6 years old) with T1D?

- Presentation at diagnosis varies
- Need for very small insulin doses
- Childcare and school settings
- Hypoglycemia unawareness
- Dusk phenomenon
- Developmental behavior considerations



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Recognizing and Managing Unique Concerns: Presentation at Diagnosis of a Young Child with T1D

- Presenting symptoms appear as common illness (ex GI virus or flu) and can be easily missed.
- Obtaining urine sample in PCP's office can be difficult
- Children can become sick very quickly and waiting for lab work while BG increases allows dehydration to progress into DKA

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Recognizing & Managing Unique Concerns: Small doses of insulin

Unique Concerns:


- Consistency of insulin measurement with small doses
- Wide fluctuation in sliding scales
- Concerns of "grazing"
- Post-dosing
- Split basal dosing

How to manage?


- Pre-meal bolusing is important
- Using 0.25-0.5u increments in measurement
- Continuous glucose monitor trend arrows help families make dosing decisions
- Insulin pumps are useful tools for consistency in measurement

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Recognizing & Managing Unique Concerns: How to Measure Small Doses of Insulin



Example of Using 0.3ml Syringe with Half-Unit Markings to Measure 0.25u Increments

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Why Use Small Doses? **Better Control!**

Using 0.5 units:
 Insulin >320 Insulin >30g
 Same dose with BG 320 to 519 Same dose with carbs 30 to 59g

This is your Correction Factor: Your Correction factor is 0.5 units to lower blood sugar 200 points (Target Blood Sugar = 120)	This is your Insulin to Carb Ratio: Your ratio is 0.5 units for every 30 grams of carb
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Using 0.25 units:
 Insulin >220 Insulin >15g
 Same dose with BG 220 to 319 Same dose with carbs 15 to 29g


This is your Correction Factor: Your Correction factor is 0.25 units to lower blood sugar 100 points (Target Blood Sugar = 120)	This is your Insulin to Carb Ratio: Your ratio is 0.25 units for every 15 grams of carb
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Rounding up or Rounding Down?

The chart says ...
3.5 units

The math says ...
 BG 375 = 1.96 units
 Carbs 48 = 2.4 units
Total dose = 4.36 units



Importance of Details and Dose Adjustment

When using small doses, look at the detailed blood glucose logs to make insulin adjustments. Logs impact your dose decisions.

Why are CGM Arrows So Important for Dosing Small Amounts of Insulin?

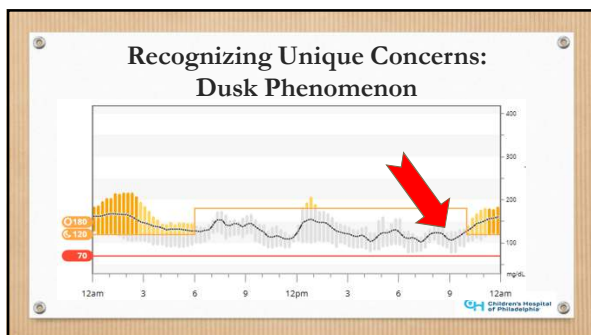
This is your Correction Factor:
Your Correction factor is 0.25 units to lower blood sugar 100 points (Target Blood Sugar = 120)

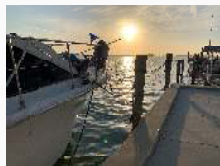
Correction Dose = 0 units


Why CGM Arrows So Important for Dosing Small Amounts of Insulin?

Using Arrows
Correction Dose Now = 0.25 units
(difference of 100 blood sugar points)

This is your Correction Factor:
Your Correction factor is 0.25 units to lower blood sugar 100 points (Target Blood Sugar = 120)



- ### Managing Unique Concerns: Dusk Phenomenon
- Need for high basal insulin between 9pm-1am
 - Standing bolus prior to blood sugar rise
 - Increase basal rate on the pump
 - Parents to monitor CGM or check BG and correct
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- ### Recognizing & Managing Unique Concerns: Hypoglycemic Symptom Unawareness
- Need for more frequent testing throughout the day and night
 - Recognizing behavior related to high and low sugars
 - Can be managed effectively with sensors
- Treatment**
- May not need a full 15g for low, each child is unique
- Need to be careful not to overtreat
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Overtreating and Overreacting to CGM → Rebound Highs?



- BG may take 15 minutes to rise
- SG may take 30-40 minutes to rise back into range
- Unclear if dose adjustment needed when overreacting/overtreating
 - May only need 5-10g carb
 - Need to be patient



**Unique Concerns:
Childcare and School Settings**

- **Daycare**
 - Most daycares do not have a nurse
 - Some daycares are eligible to undergo training through state resources
 - Parents and product representatives can educate staff
- **Medical daycares**
 - May not be covered with insurance
 - Split up siblings
 - Developmentally appropriate learning
- **Skilled nursing at daycare, school or home**
 - Insurance dependent
- **Babysitters**
 - Parents can train
 - BeyondIT!: Safesitters



**Recognizing Unique Concerns:
Behavior**

- Variable parenting experience
- Developmental testing of boundaries
- Parent perception of developmental expectations

- Ages 1-3 unable to recognize signs of hypoglycemia
- Ages 4-6 start to recognize signs of hypoglycemia





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**Managing Unique Concerns:
*Behavior***

- Include the Diabetes Management team
 - Child life specialist--inpatient/outpatient
 - Clinical psychologist


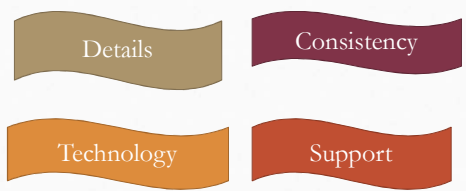


**Managing Unique Concerns:
*Behavior***


- **Discuss** developmental expectations
- **Teach** parents not refer to BGs as “good” or “bad”, rather “in range/normal” or “out of range/high or low”
- **Encourage** caregivers to have consistent expectations
- **Show** parents how to give positive feedback for requested behaviors



Conclusion




"Nobody saw you...
 At 3 am, headlamp on, sneaking into her room
 Every Single Night
 Praying she doesn't wake as you bleed her finger for the 10th time today
 68. Shut.
 You too for 3 am.
 Get the juice box
 Nobody saw you
 Holding your screaming child down to give them their 5th shot of the
 day, or change their pump site for the 3rd time this week
 "She needs this to survive," you repeat to yourself
 "Will she be able to handle this life?"
 "Will I?"
 Nobody saw you cry
 Because you always had to be so strong
 You can't let her see your broken heart
 You must keep going
 She has to be so brave, you must set the example
 Soldier on
 Nobody saw you desperately showing sugar in your shaking and confused
 child
 "One more sip, baby!"
 "One more gummy bear for mommy, please!"
 Stating a lie through the Dexcom
 Waiting for the arrows to stop going down
 Waiting for the alarm to shut up
 Nobody saw you..."



For more, visit:
<https://pypetoddler.com/2016/12/06/nobody-saw-you/>

Questions?



Sources

- Bachran, R., Beyer, P., Klinkert, C., Heidemann, B., Rosenbauer, J., & Hall, R. (2012). Basal rates and circadian profiles in continuous subcutaneous insulin infusion (CSII) differ for preschool children, prepubertal children, adolescents and young adults. *Diabetes, 61*(1), 1-5. doi:10.1111/j.1399-5448.2011.00777.x
- Children's Hospital. (n.d.). About the About Children's Hospital of Philadelphia. Retrieved from <https://www.chop.edu/about-us/about>
- Continuous Glucose Monitoring System. (n.d.). Retrieved April 8, 2019, from <https://www.freestylelibre.us/>
- Dexcom. (n.d.). Retrieved from <http://www.dexcom.com/>
- Minimed 630g. Retrieved April 04, 2019, from <https://www.medtronicdiabetes.com/products/minimed-630g-insulin-pump-system>
- Senseonics. (n.d.). Retrieved from <https://www.senseonics.com/>
- Tandem Diabetes Care. Retrieved April 05, 2019, from <https://www.tandemdiabetes.com/products/t-slim-s2-insulin-pump>
