Practical Strategies for Managing Diabetes in Children and Teens

Cindy Lybarger, APRN, CDE—moderator

Panelists:
Vanessa Howe, MSW, LCSW
Susan Schultz, RN, CDE
Martha Upchurch, RD, CDE
Ann Vander Woude, APRN, CDE

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Introduction

- Objective: List goals and targets for glycemic control
- Objective: Describe management principles for hyperglycemia and hypoglycemia in the school setting
- Describe strategies for improving outcomes in children and teens with diabetes, including use of new technology
- Apply principles of management in interactive case scenarios with group discussion
ADA position statement:
A1C Goal for youth with type 1 diabetes <7.5% (Across all age groups)
The ADA emphasizes that glycemic targets should be individualized with the goal of achieving the best possible control while minimizing the risk of severe hyperglycemia and hypoglycemia.

Diabetes Care : June 16, 2014.
Pre–meal Blood Sugar Goals

Toddlers and preschoolers 100–180 up to age 6y

School age (6 y–12y) 80–160

Adolescents and young adults 80–130
ADAG (A1C–derived average glucose) Study: “Translation” of HbA1c into eAG

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<th>Hb A1C</th>
<th>Average Glucose</th>
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<td>269 mg/dl</td>
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<td>12%</td>
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Diabetes Management

Goals

- Maintain blood glucose level as close to normal as possible—“think like a pancreas”
- Occasional low BG is acceptable, but not too frequent or severe. (avoid fear of low BG)
- Reduce risk of both short- and long-term complications
- Maintain acceptable quality of life—fit diabetes into their lifestyle
- Gradually shift responsibility for diabetes tasks from parent/adult to child/teen. (when child/teen is ready)
How *Does a Pancreas Think?*

- Insulin secreted for ~2h with meals
- Insulin needs largely determined by carbohydrates
- Insulin secretion never completely stops
- Premeal dosing is more physiologic
Managing Hyperglycemia in the School Setting

Recognition: chronic versus acute problem
Isolated high blood glucose is NOT a reason to send a student home from school.

More urgent problem if:
- vomiting, abdominal pain
- insulin pumper (no long acting insulin)
- urine ketones moderate to large
- blood ketones over 0.6 mmol/L
Causes of hyperglycemia

- Illness and/or medications (steroids, decongestants)
- Pump or site problem (catheter dislodged, kinked or poor absorption—“old site?”)
- Missed insulin doses – accidental or intentional (eating without insulin coverage) “Forgetting” Lantus the night before
- Inadequate evaluation for trends and need for dose adjustment. (coming out of honeymoon, puberty, “outgrowing dose”– back to school)
- Old/ outdated/ damaged insulin given?
Mild Hyperglycemia Symptoms

- Thirst
- Frequent urination
- Sleepiness
- Hunger
- Blurred vision
- Weight loss (chronic high BG)
- Stomach ache
- Flushing of the skin
- Difficulty concentrating
- Headache
Moderate Hyperglycemia Symptoms

- Mild symptoms plus
- Dry mouth
- Nausea
- Stomach cramps
- Vomiting
- Fruity smell to breath
- Signs of dehydration—sunken eyes, poor skin turgor
- Presence of urine/blood ketones
Severe Hyperglycemia Symptoms

- Mild and moderate symptoms plus:
- Labored breathing (sign of acidosis)
- Very weak
- Confused
- Unconscious
Address immediate concerns:
  thirst; need 16 oz water per hour
  restroom access
  insulin needs– for pumpers– are they getting insulin? (site or pump malfunction– consider insulin via injection or change set)
Assess for abdominal pain, vomiting, ketones in blood or urine
Fix the Problem

Ask the student their opinion– what do you think caused this? (be nonjudgmental, problem solve– try not to accuse)

Do not shame or blame

Evaluate blood glucose trends– acute or chronic problem?

Chronic hyperglycemia– increased risk of complications, higher risk for DKA.

Do not let fear of hypoglycemia at school be the driving force...

Communicate with parents and diabetes team– unite efforts.
Managing hypoglycemia in the school setting

- Most frequent emergent condition among children with diabetes
- Use of CGM gives trend information
- Severe episodes are usually avoidable
- Involves training for all school personnel
- Most episodes of low BG can be managed by the student with supervision by a responsible adult. (except very young students)
- In order to have good glycemic control, some low BG are inevitable. (only way to avoid occasional low BG is poor glycemic control!)
Causes of Hypoglycemia

- Imbalance between carbohydrates and insulin or other medication
  - Too little food or too much insulin
  - Using an insulin to carb ratio will reduce risk of hypoglycemia by better matching of insulin to food
  - Timing of dose is important
Causes of Hypoglycemia

- Unusual amount of exercise
  - Can cause delayed hypoglycemia (up to 24 hours later)
  - Avoid this problem by reducing insulin or increasing food on active days
  - Have access to testing supplies and glucose source during activity
Okay okay.. So...
If my blood sugar is high..
and I eat 60 carbs..
And I’m going to go for a run..
And I feel a cold coming on..

How much insulin
do I take right now?
Hypoglycemia Recognition

Symptoms
- early are adrenergic
- later are neuroglycopenic

adrenergic
- shaky, sweaty, hungry, weak, fast heart beat, clammy skin

neuroglycopenic
- sleepy, confused, disoriented, can progress to seizures or loss of consciousness
Moderate Hypoglycemia Symptoms Neuroglycopenic

- Headache
- Behavior change—acting strangely
- Poor coordination
- Blurry vision
- Weakness
- Slurred speech
- Confusion—combativeness
Severe Hypoglycemic Symptoms

- Loss of consciousness
- Seizure
- Cannot swallow—risk of aspiration
Hypoglycemia treatment

- Treat if blood glucose is less than 70 mg/dl
- Don’t over treat a low!
- 15 gm of glucose: glucose tabs or gel, 1/2 cup of soft drink, or juice
  - avoid chocolate to treat lows (fat slows carb absorption)
- Follow with 15 gm starch, or a meal.
YOU'RE FEELING LOW?

NO EATING IN THE CLASSROOM.
GO TO THE NURSE'S OFFICE.
Use of glucagon

- If unconscious or having a seizure—unable to swallow—don’t hesitate to give.
- Intranasal glucagon – pending FDA approval by Lilly
- Prefer IM administration—faster than subcutaneous
- Must first reconstitute—glucagon powder in the vial, syringe contains diluent. Always use the syringe in the kit.
- Dose: 45 lbs or less: 0.5 mg (1/2 the contents)
  - Weight more than 45 lbs: give 1 mg (the entire syringe)
- Common side effect is vomiting – roll to the side to avoid aspiration.
- Short ½ life of glucagon : Give oral glucose as soon as able to swallow.
- OK to be given by trained nonprofessional
Two brands of glucagon kits
Strategies to improve glycemic control

- Insulin works when you take it. (no missed doses or boluses).
- Site rotation helps insulin absorb better.
- Pre-meal dosing is better. All pumpers can give correction dose and at least half of carbs pre-meal. Teens should predict how much they will eat. (even shot givers!)
- Check at least 4–6x per day, or use CGM. Download and review for trends.
- Don’t be complacent, don’t accept high BG as “normal”.
Improving glycemic control

- Exercise improves insulin sensitivity (at least 30 min/day will help)
- Positive feedback for efforts (thank you for checking your BG today)
- Role model problem solving and critical thinking
- Independence is *earned* by being responsible
- TREND MANAGEMENT
- Embrace diabetes, don’t ignore or deny it. (no magic answer to accomplish this task)
- Depression is common, identify and get help
Case Scenario #1 Brad

Vanessa Howe, MSW, LCSW
Case Scenario #1 Brad

- Brad is 11 years old, diagnosed last winter with type 1 diabetes
- Lives with grandparents, who are his guardians, grandmother is a retired nurse.
- Brad’s BG readings almost always in target–low 100s.
- A1C at his last diabetes visit in April was 6.8%
- Brad is emotionally mature for his age and very conscientious in his care.
Case Scenario #1 Brad

- Brad returns to school after summer break.
- His grandmother notes how proud she is of Brad and his BG have been “running so good” all summer.
- At school, his pre-lunch BG readings are consistently out of range, often over 250 mg/dl.
- Brad says he doesn’t have any explanation for these high readings and he “never” has high readings at home.
- He has a diabetes clinic appointment later this month.
Case Scenario #1 Brad

What would your plan of action be?
A. Call grandmother and discuss BG readings at school.
B. Tell Brad to bring in a new meter, as this one is not working right.
C. Call diabetes clinic for dose adjustment.
D. Don’t do anything until after the visit.
You call grandmother to discuss readings at school.

She is surprised that his readings are high at school, but neither she nor Brad has an explanation of why this is happening.

You give her the readings from school to take along to the visit.
Case Scenario #1 Brad

- A1C at his diabetes visit is 10%.
- Logbook review – BG generally in the low to mid 100s. Only high readings are at school.
- His home meter is downloaded – BG do not correlate with readings in the logbook. Readings in the meter are over 200 mg/dl, frequently over 300 mg/dl.
- Brad bursts into tears – confesses he was writing down “good” numbers because his grandmother was so happy and he didn’t want to disappoint her.
- Grandmother shocked, hurt and feels she was “duped”.


Case Scenario #1 Brad

Discussion: Very common problem
- Important to be specific with your words. BG readings should be described as high vs. low as opposed to good vs. bad
- Approach children and adolescents in non-judgmental manner re: diabetes care
- What is getting in the way?
- Helpful to look at the meter together, not just log book
- Ask & discuss how adults can help w/ care especially during times of burn out
- Consider additional supports (i.e. counseling resources)
Case Scenario #2 Kayla

Ann Vander Woude, APRN, CDE
12 year old girl diagnosed about 2 months ago with type 2 diabetes.

She takes Lantus 20 units daily (at home) and metformin 1000 mg bid— with breakfast and dinner. Dose has been gradually increased to max dose. (no short acting insulin)

She just started having PE 3 days per week at school.

Every day after she has PE, she comes to the office to check her BG and c/o feeling hungry, weak and “needs a snack”.

Her readings at this time are usually in the range of 80 mg/dl.

What would you recommend?
Case Scenario #2 Kayla

A. Tell her to eat a 30 g snack before PE from now on.

B. Tell her to eat more carbs at lunch to avoid low BG after PE.

C. Tell her to skip PE to avoid her BG going low.

D. Communicate with parent and suggest she call diabetes team to adjust insulin dose.
Case Scenario #2 Kayla

- Best answer is D:
- Ideally, she needs less insulin: suggest parent call diabetes team: reduce Lantus dose to avoid the need for extra snack.
- OK to give her a snack—12–15 grams carb, although 70 is borderline low. (not 30g)
- Look at trend and communicate with parent—suggest they call diabetes office for dose adjustment.
- She needs exercise, so do not allow hypoglycemia (or fear of low BG) to be an excuse to skip PE.
Case Scenario #3 Taylor

Martha Upchurch, RD, LDN, CDE
Case Scenario #3 Taylor

- Taylor is a 3\textsuperscript{rd} grader at your school who has had type 1 diabetes for 2 years.
- She eats school breakfast every day—often choosing Pop Tarts, chocolate milk, and sugary cereal.
- Her packed lunch from home consists of uncrustable PB and J sandwich, Cheetos, a fruit roll up, chocolate milk and bottled water.
- Today is the Valentine's Day party at her parents have sent in cupcakes.
Case Scenario #3 Taylor

- She comes to your office to receive a shot for the party food she ate consisting of a cupcake without the icing, a chocolate chip cookie and Takis.
- She tells you that she did not eat the icing on the cupcake as her parents told her to scrape it off because “it has too much sugar”.
- What are the most effective ways to help Taylor?
Case Scenario #3 Taylor

- A. Provide education to the staff regarding healthy food choices
- B. Work with school cafeteria/district dietitian to consider purchasing lower sugar cereals and breakfast items.
- C. Discuss icing on the cupcake is covered with insulin.
- D. Ask a local dietitian to come to school for a few nutrition education days to help students learn more about healthy, balanced meals.
Case Scenario #3 Taylor

- All of the above!
- Children with diabetes should be treated like other students whenever possible
- Children with diabetes should not be left out of school parties or made to eat low carb food
- Healthier food choices would be advisable for all students, not only those with diabetes
- School nurses’ role includes promoting behavior change for a healthier school
Case Scenario #4 Jasmine

Susan Schultz, RN, CDE
Jasmine is a 13 year old girl with T1D, last A1C 7.7%.
She has been wearing an insulin pump for the last three years. (no CGM)
She has been very independent with her diabetes care, including her insulin pump.
She comes to you one morning at 10AM because her pump is alarming.
The message on the pump says “button error”
She checked her BG: 95 mg/dl.
Case #4: Jasmine –

which answer is *not* correct??

- A. Since her BG is in normal range, take off the pump and ask her mother to call the pump company after school.
- B. At lunchtime, let her eat with her class and give Novolog injection using her ICR and correction factor.
- C. Call mother to bring a vial of Lantus to school and give her a dose asap. (the total of her 24 hour basal insulin)
- D. Have Jasmine or her mother call the pump company (# on the pump) immediately and arrange for a new pump to be sent. (usually will arrive within 24 hrs).
A is not correct.
If her pump is giving such an alarm, it must be removed.
Even though her BG is in range now, she needs basal insulin replacement with Lantus asap.
She can eat lunch as usual and take Novolog via injection using usual formula.
The sooner her pump company is called the better, as she will be using injections until it arrives.
Resume the basal rate on her new pump about the same time she took the Lantus dose.
Case Scenario #5: Julie

Vanessa Howe
17 year old girl, senior in high school
Has had type 1 diabetes for 5 years
Glycemic control is poor with A1C 9.2%
She is independent in administering her insulin
She has refused to check her BG, says she knows it is OK by how she feels
Her mother is supportive of her decision, saying “she is almost an adult”
What would you do?
Case Scenario #5– Julie

A. Ask her mother to sign a waiver, releasing you from liability.
B. Require Julie to demonstrate to you that she is checking her BG by having her come to the office once/month.
C. Call the diabetes team to get an order that she does not have to check her BG.
D. Problem solve with Julie about barriers to checking her BG and possible solutions.
Case Scenario #5– Julie

- Problem solve with Julie about barriers and try to find a workable solution.
  - Yes, she is *almost* an adult, but she is not making a good decision for her health
  - What is getting in the way?
  - Assess for needs/barriers
  - Help Julie identify specific goal for diabetes care that she is willing to work on (meet her where she’s at)
  - Continue to support, discuss possible solutions, and build rapport
Case Scenario #6 Alex

Ann Vander Woude, APRN, CDE
Case Scenario #6 Alex

- Alex is a fifth grader with type 1 diabetes.
- He comes in to your office every morning when he arrives to say “hi”.
- You ask him to check his BG daily on arrival.
- You realize his readings are usually in the range of 240–280 mg/dl.
- He does not eat breakfast at school.

What would you do?
Case Scenario #6 Alex

- A. Give him a correction dose using his lunch scale
- B. Give him a correction dose but make sure he also eats something, since he is getting insulin
- C. Call his mother to review his morning plan and review BG readings
- D. Call the diabetes office to ask for a dose change, as these readings are too high.
Case Scenario #6 Alex

- Best Answer is C.
- Call his mother to ask about morning routine
  - Is he eating breakfast at home?
  - Does he check his BG before eating at home?
  - Is someone supervising his dose?
  - Is he dosing before or after eating?
  - What time does he eat—maybe it is just too close to breakfast to check his BG again?
Case Scenario #7: Lucy
Martha Upchurch, RD, LDN, CDE
Case Scenario #7 Lucy

- First grader with type 1 diabetes, diagnosed about one year ago.
- She is using injections, taking Lantus at home and Novolog with all meals.
- Today is the Halloween party at school, which starts one hour after lunch.
- The parents will be bringing cupcakes, cookies, ice cream, grapes, cheese, celery and carrot sticks, chips and dip.
- How should you handle this with Lucy?
Case Scenario #7 Lucy

- A. Allow Lucy to eat cheese, celery and carrot sticks. Then pack a cupcake (without icing) in her backpack that she can eat with dinner at home when she will get her next injection.
- B. Allow her to eat what she wants, but call her parents to warn that her BG will be high this evening & probably need extra insulin.
- C. Allow her to pick out what she wants to eat and dose Novolog for her carbs only.
- D. Allow her to participate & eat what she wants, but keep it under 15g carb.
Answer: C

Children with diabetes should be treated the same as other students whenever possible.

She will feel left out if everyone eats treats and she gets celery and carrot sticks.

She can eat the treats, but will need insulin to avoid high BG. (most children will choose an injection vs. not being allowed to eat treats).

It is not ok to let her BG run high all afternoon.
Case Scenario #8 Abby

Susan Schultz, RN, CDE
Case Scenario #8 Abby

- 7 year old girl with type 1 diabetes of 2 years’ duration
- She has been wearing an insulin pump for about 3 weeks
- She has been playing outside at recess, now comes in for pre-lunch BG check and her reading is 344 mg/dl.
- Her BG is not usually high, so you begin to investigate and find that her pump catheter has been pulled out.
- She has back up supplies in the office, including another catheter but Abby is not able to place her own site.
Case Scenario #8 Abby

What should you do?

A. Have Abby eat lunch, call her mother and have her come to school to deal with it
B. Dose her insulin with a syringe (carbs and correction) and have her go eat lunch with her class
C. Call her parents to come replace the catheter and keep her in the office until one arrives
D. Replace the catheter yourself as this is a site and pump with which you are very familiar (after lunch)
B, then D.

She likely is hungry and wants to eat lunch with her class, so give her an injection so she can do so. (including carbs and correction for high BG)

After lunch and you have spoken with her parent, change out the catheter if you are comfortable doing so.

If not, then a parent should come and put a new site in asap.
FAQs

- When should we give a correction dose between meals? (injections vs. pumpers?)
- What about using CGM readings for correction doses or to treat low BG?
- What does it mean to check ketones after 2 consecutive readings over 240 mg/dl? (how long apart?)
- Why is pre–meal dosing preferred? What if they don’t eat all of their lunch?
- Why wont’ you sign our district’s special school form?
Summary and Goals

- Keep students with diabetes in school, in the classroom, and fully participating in all activities of their choosing.
- Manage diabetes to prevent long and short term complications.
- Advocate for students with diabetes—facilitate communication with all involved parties.
- Educate teachers about needs of students with diabetes.
- Support students and families in gradually assuming more responsibility for their own care.
- Show respect for teens and involve them in problem-solving about their diabetes, when possible.
The Children’s Diabetes Program At Eskind / MCJCHV

- Innovative Team Care
  - 15 Endocrinologists
  - 4 Nurse Practitioners
  - 2 Nurse Case Managers
  - 6 Nurse Educators
  - 4.5 FTE Dietitians
  - 2 Social Workers
  - Child Life Specialist

- ADA Recognized Education Program
  - since 1996 – through 2018

- Unique Relationships with Providers
  - BCBST and Tristar Center of Excellence

- Among the Largest Children’s Diabetes Programs in the US
  - 2700 Patients from 8 states
  - 85% Type 1
Outreach Diabetes Clinics—

- Jackson, TN Oct 2015 (once/mo)
- Cookeville, TN March 2016 (once/mo)
- Murfreesboro, TN Aug 2016 (twice/mo)
- Clarksville, TN tbd
- Huntsville, AL ?
Thank you for coming today.
We hope it has been helpful
Thank you for all you do for kids with diabetes