Disclosure to Participants

Sugar Surfing: Dynamic Management of Diabetes

Requirements for Successful Completion:

The school nurse should self-report knowledge gain in understanding the benefits and disadvantages of sugar surfing vs. conventional insulin therapies.
To receive contact hours for this continuing education activity, the participant must attend the entire activity and complete and submit the evaluation form.
Once successful completion has been verified, a “Certificate of Successful Completion” will be awarded for .75 contact hours.

Conflicts of Interest:

The activity’s Nurse Planner has determined that no one who has the ability to control the content of this CNE activity – planning committee members and presenters/authors/content reviewers – has a conflict of interest.

Approval Statement:

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Sugar Surfing – Dynamic Management of Diabetes

By

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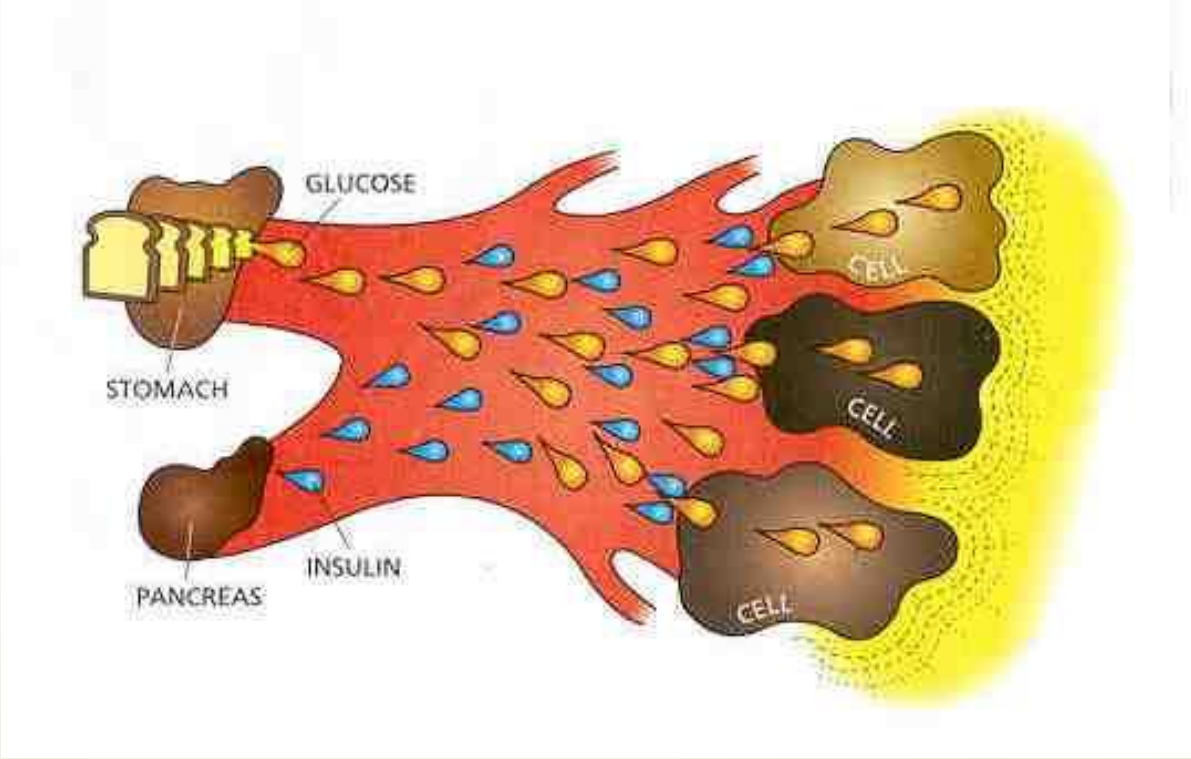
Objective:

To discuss the benefits and disadvantages of “Sugar Surfing” verses conventional insulin therapy approaches

How the body works without diabetes:

- Most of the food we eat is turned into glucose/sugar for our bodies to use for energy
- Pancreas makes insulin, a hormone that helps glucose get into the body's cells

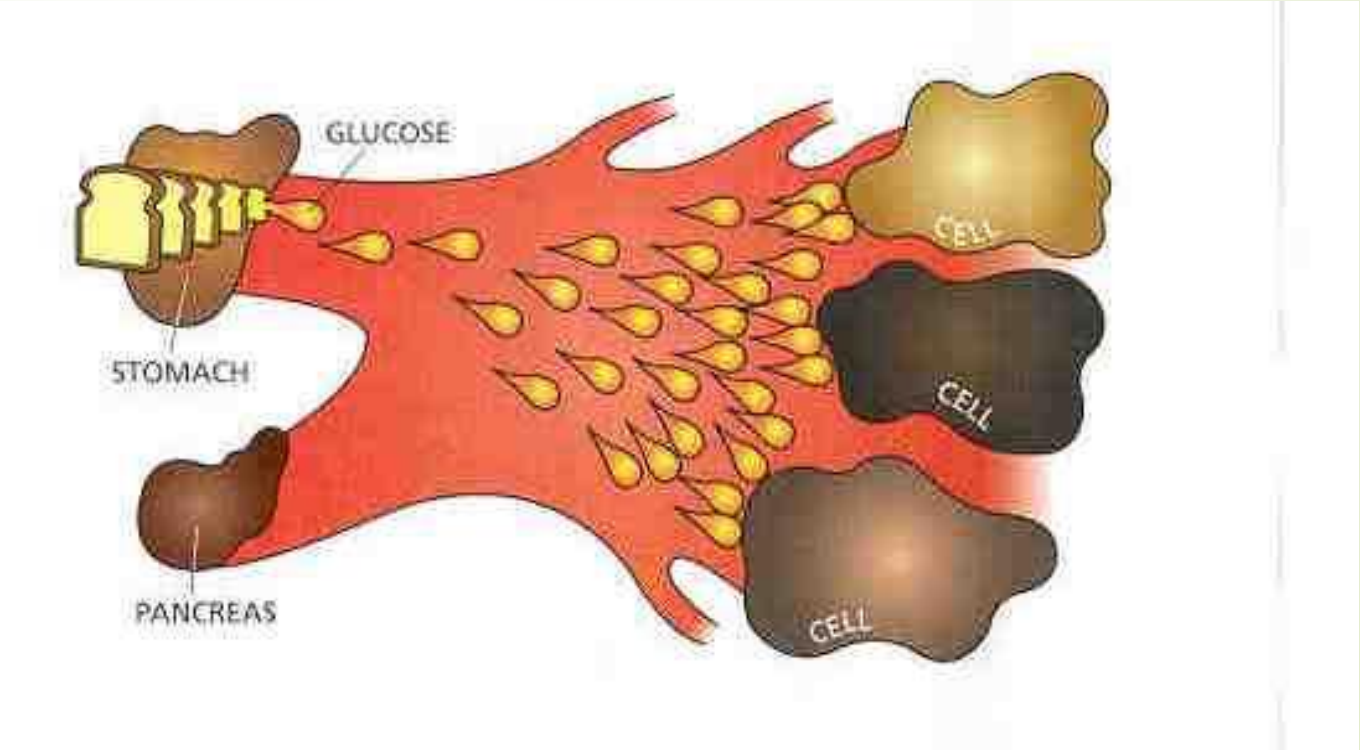


Type 2 Diabetes

- 2 defects happening:
  - The pancreas has “slowed down” in producing enough insulin
  - The body or cell no longer respond to insulin effectively
- Occurs in 90% -95% of those with Diabetes

Type 1 Diabetes

- The pancreas no longer produces insulin
  - Various genetic and/or
  - Environmental factors
  - From progressive beta-cell loss and function loss



Type 1 Diabetes

- Previously know as insulin dependent and juvenile diabetes
- Only occur in 5%-10% of those with diabetes
- Occur in both children and adults
- Children present with classic symptoms of polyuria/polydipsia
  - 1/3 of these children also present in Diabetic Ketoacidosis (DKA)
- Adults at times do not present with these classic symptoms

Diabetes Type 1 Prevalence

- *In 2012*-- 17,900 youth were diagnosed with type 1 diabetes
- *In 2015* -- 1.25 million Americans - children and adults
- *Now*, an estimate 40,000 people will be newly diagnosed each year in the US.

Case Study

- Stacy is a 16-year-old finishing up 10th grade. She lives at home with her parents and 2 older brothers. Stacy was diagnosed with Type 1 diabetes at the age of 7 and has been using an insulin pump for the last 2 years.

Insulin Treatment Approaches

Sliding Scale Insulin

- 3-4 injections of short acting insulin with meals, and sometimes at bedtime
- Typical sliding scale
  - 150 – 200 ---- 1 unit
  - 201 – 250 -----2 units
  - 251 – 300 -----3 units
  - 301 – 350 ---- 4 units
  - 351 – 400 ---- 5 units

Sliding Scale Insulin Disadvantages

Inflexible routine

- It only considers a high blood sugar
- NO consideration for:
  - carbohydrates that are about to eaten
  - If the person has done any exercises
  - The blood sugar between injections

Frequently have both highs and lows blood sugars

Sliding Scale Insulin - Benefit

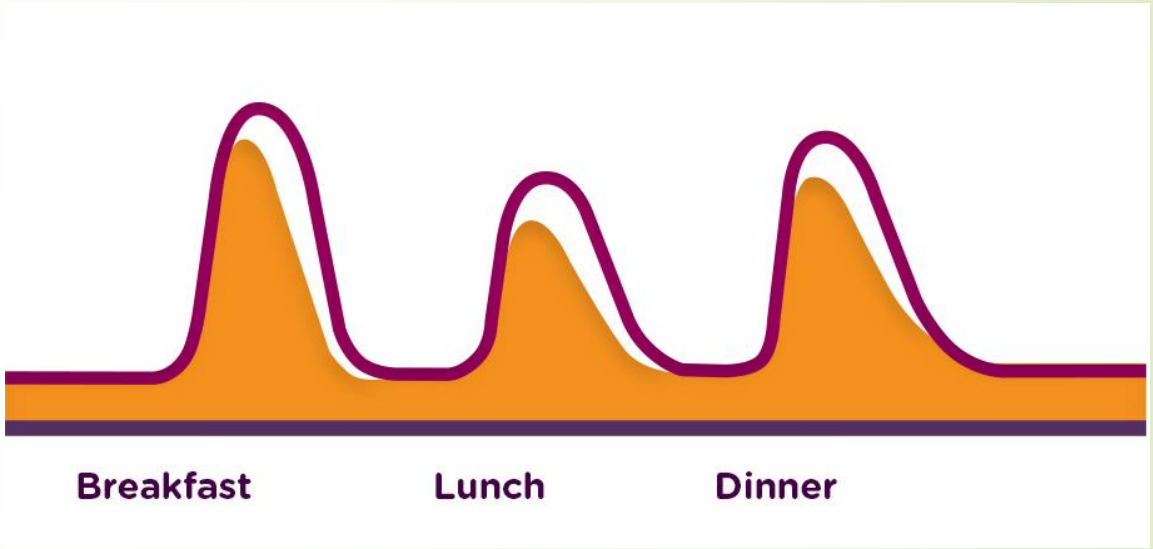
Temporary use:

- If out of long acting insulin

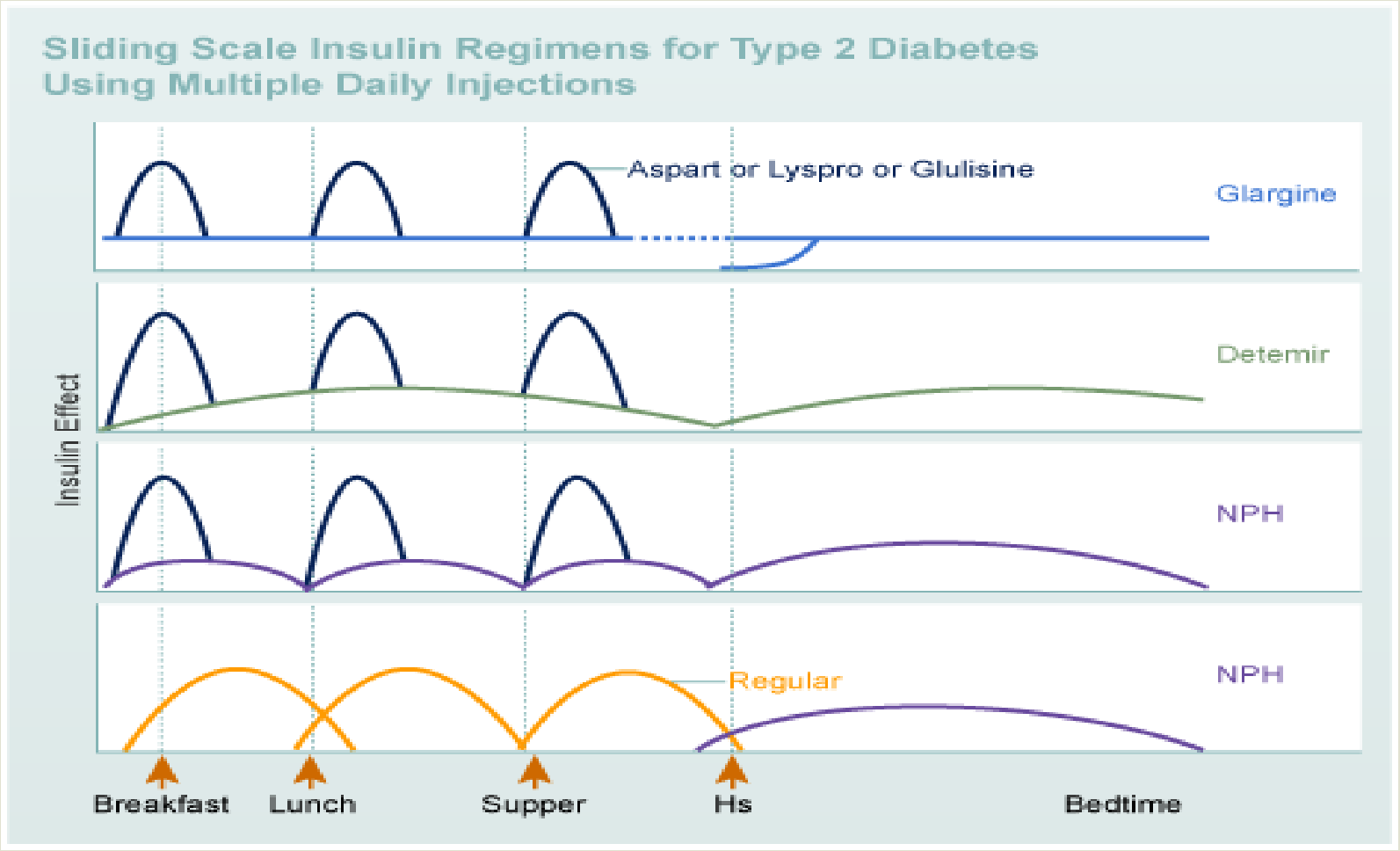
Rarely used

Basal - Bolus Conventional Therapy

- 2-3 injections of short or rapid acting insulin with meals
- 1- 2 injections of long acting insulin
- Or use 2 injections of mixed insulins:
  - 50/50; 70/30; or 75/25



How insulin works in the body:



Basal - Bolus Conventional Therapy Disadvantages

- Still a rigid routine – NO Consideration for:
  - The amount of carbohydrates that are about to eaten
  - If the person has done any exercises
  - With 2 injections – a meal is not covered by insulin

Basal - Bolus Conventional Therapy Benefits:

- The basal insulin is addressing the in-between meal sugars
- Closer to how a normal pancreas would work

Insulin Therapy Options Increased

Rapid –acting

- Humalog
- Novolog
- Apidra

Short-acting

- Humulin R

Intermediate-acting

- NPH (Humlin N)

Long-acting

- Lantus
- Levemir
- Tresiba

Basal – Bolus Intensive Therapy

Basal insulin

- 1 -2 injections daily, depending on the brand of insulin

Rapid or short acting insulin

- correctional insulin dose
- Coverage for food

Can also be achieved through insulin pump therapy

Basal – Bolus Intensive Therapy Benefits

- Now you can address:
  - Carbohydrates that are about to eaten
  - Exercise – past or future
    - Injections
    - Insulin pump
  - The blood sugar between injections
- Increased flexibility
- Much closer to how the pancreas would work

Sugar Surfing:

- Is a process used to maintain blood sugars within a blood glucose range, by treating blood sugars “in the moment”.
- Is a dynamic process that allows one to adjust their management style to best fit whatever situation they may
  - Very Individualized

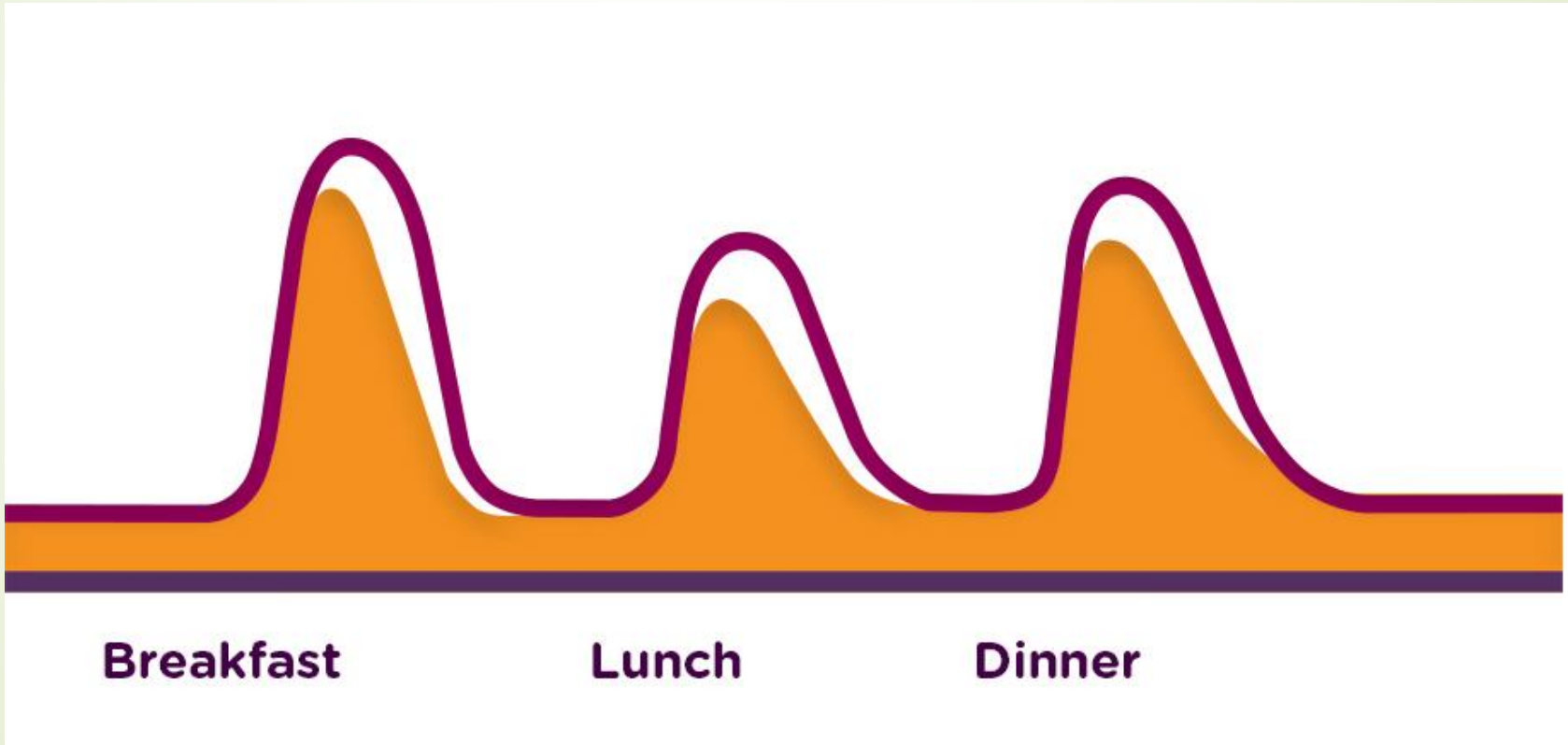
Sugar Surfing Requirements:

- Continuous Glucose Monitor (CGM)
  - Without a CGM one would have check their blood sugar >20 times a day
  - Checking BG trends between 40-50 times a day
- Insulin delivery
  - Insulin pump – simplest
  - Multiple injections (with rapid acting and long acting insulin)
- Mindset
  - Strong desire to have control of diabetes management
  - Patience
  - Personal consistency
  - Resiliency

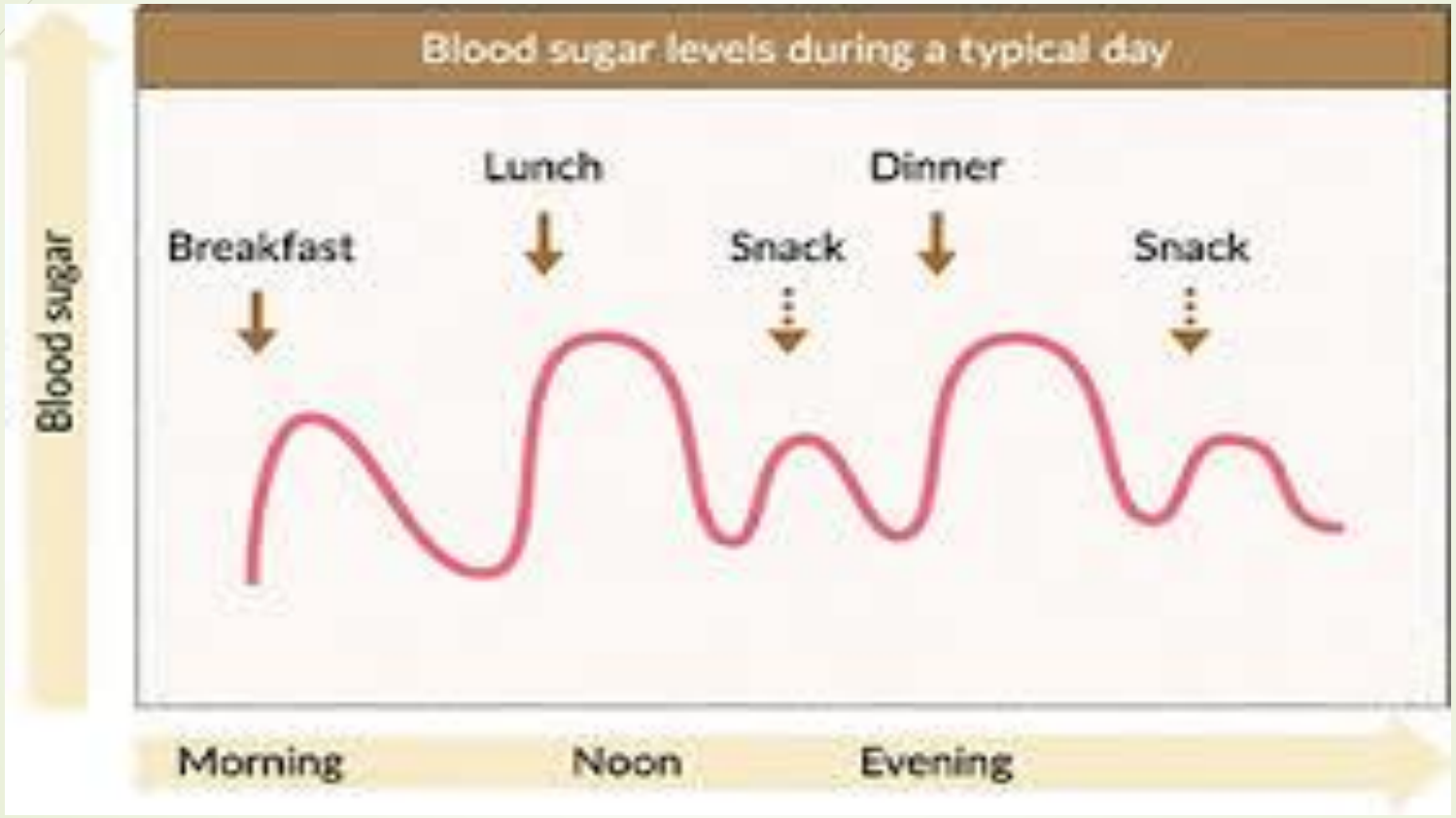
Case Study

- Stacy Pump Settings:
  - Insulin Sensitivity Factor(ISF): how much 1 unit of insulin will drop the blood glucose is: **25**
  - Insulin to Carb ration (I:C) = 1unit for 15 grams of carbs
  - Basal rate 24 hr total – 8 units
- Decided to try "Sugar Surfing"

Difference in Sugar Surfing

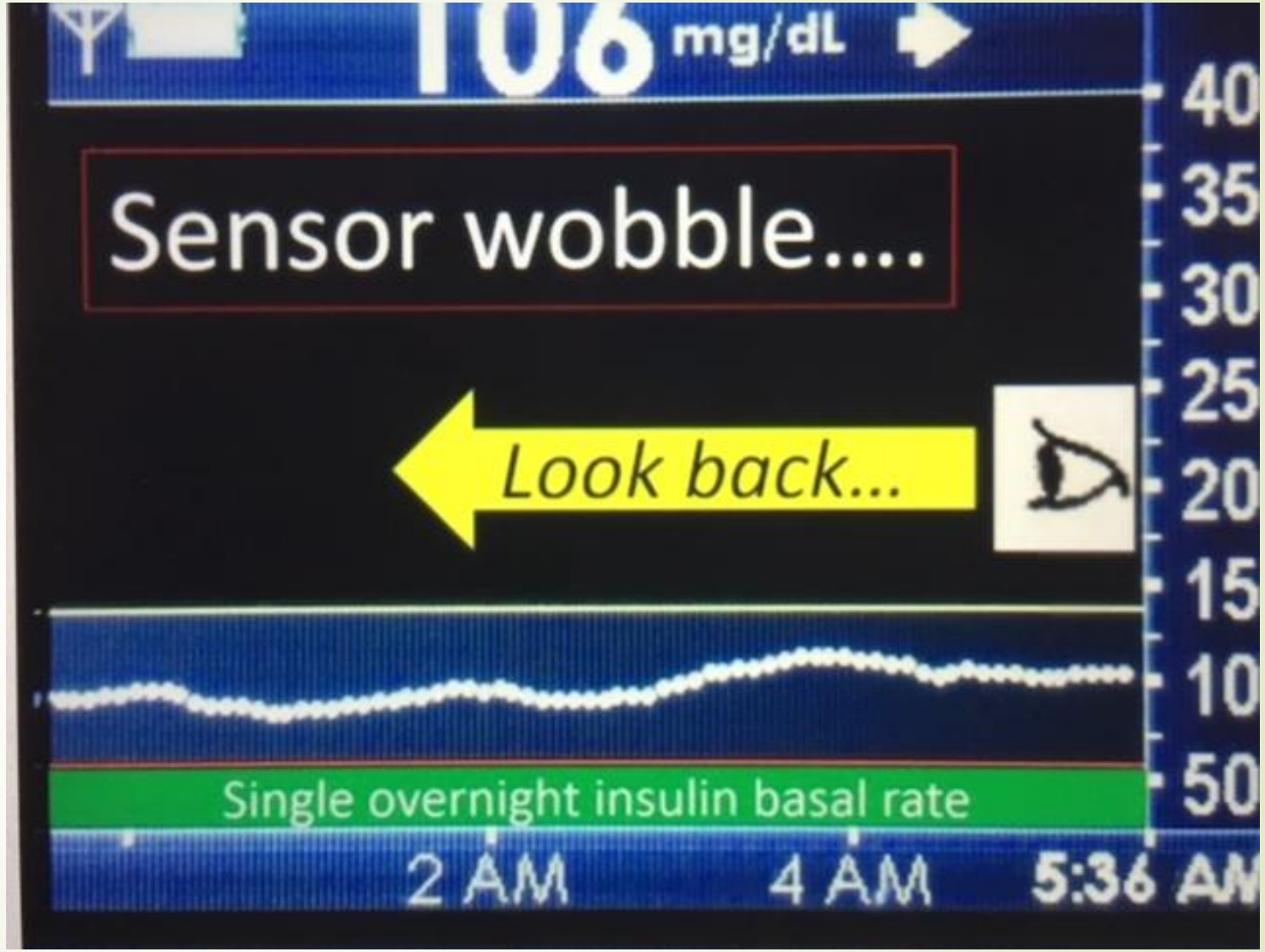


Difference in Sugar Surfing



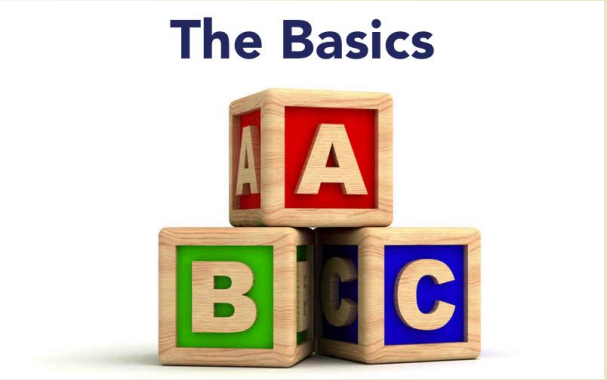
Sugar Surfing – Goal

- "Time in range" - KEY
  - Blood glucose range = 70-180
- For kids A1c <7.5%



Sugar Surfing Basics- APIE

- Frequent "nudging" to range
  - Carbs/Exercise/Insulin based on CGM readings
- ***Assess***
  - ***Continuously looking back***:
  - "Was I exercising, that is why the BG is trending low?"
  - "Did I eat a high carb meal, that is why the BG is trending high?"
  - "Did I just have an intense conversation with my teacher about a grade last period and that's why the CGM is trending up?"
  - ***Currently*** What am I about to do now?



Sugar Surfing Basics - APIE

- **P**lanning

Sugar Surfing Basics - APIE

- Implement
  - Food, exercise, or insulin
  - Example – the stress of taking an exam
    - Stacy has learned that -↑↑ the glucose level by 75 mg/dL on the CGM - stays elevated for several hours
    - Learn she can walk the hall way twice to bring her BG down within 30 minutes – 1 hr
    - Or she can give 1.5 units of insulin
  - Example: eating a candy bar may temporally increase blood glucose by 150 mg/dL
    - Returns to the range

Sugar Surfing Basics - APIE

- Evaluating
  - The action taken bring the blood sugar back within range?
  - If yes, GREAT!!
  - If no, why not?

Does micro-managing the blood sugar cause stacking of insulin and lead to a low blood sugar?

Disadvantages to Sugar Surfing:

It is not a quick process for fast results

Requirements:

Patience	Personal consistency	Resiliency

Conclusion

- Different Insulin treatment approaches
  - Sliding scale
  - Basal bolus
    - Conventional
    - Intensive Therapy
  - Sugar Surfing
    - More freedom
    - Better diabetes control.

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