

Welcome to the 43rd Annual School Health Conference

Friday July 30th, 2021



LOVE WILL.



Attendance Tracking

- Use your camera app and hold up over the QR code to have access to the attendance form OR **click on link in Chat**
- Your information will be used to send a Survey Monkey Survey for:
 - Feedback
 - CNE credit



QR Code for Attendance



<https://cmhredcap.cmh.edu/surveys/?s=NYAP47MCHL>

43rd Annual School Health Conference Disclosures

Requirements for Successful Completion (to receive the 4 contact hour(s) for this activity):

The participant will:

- Complete REDCap attendance form
- Attend the entire conference
- Complete the conference evaluation by August 6

Provider Approval Statement:

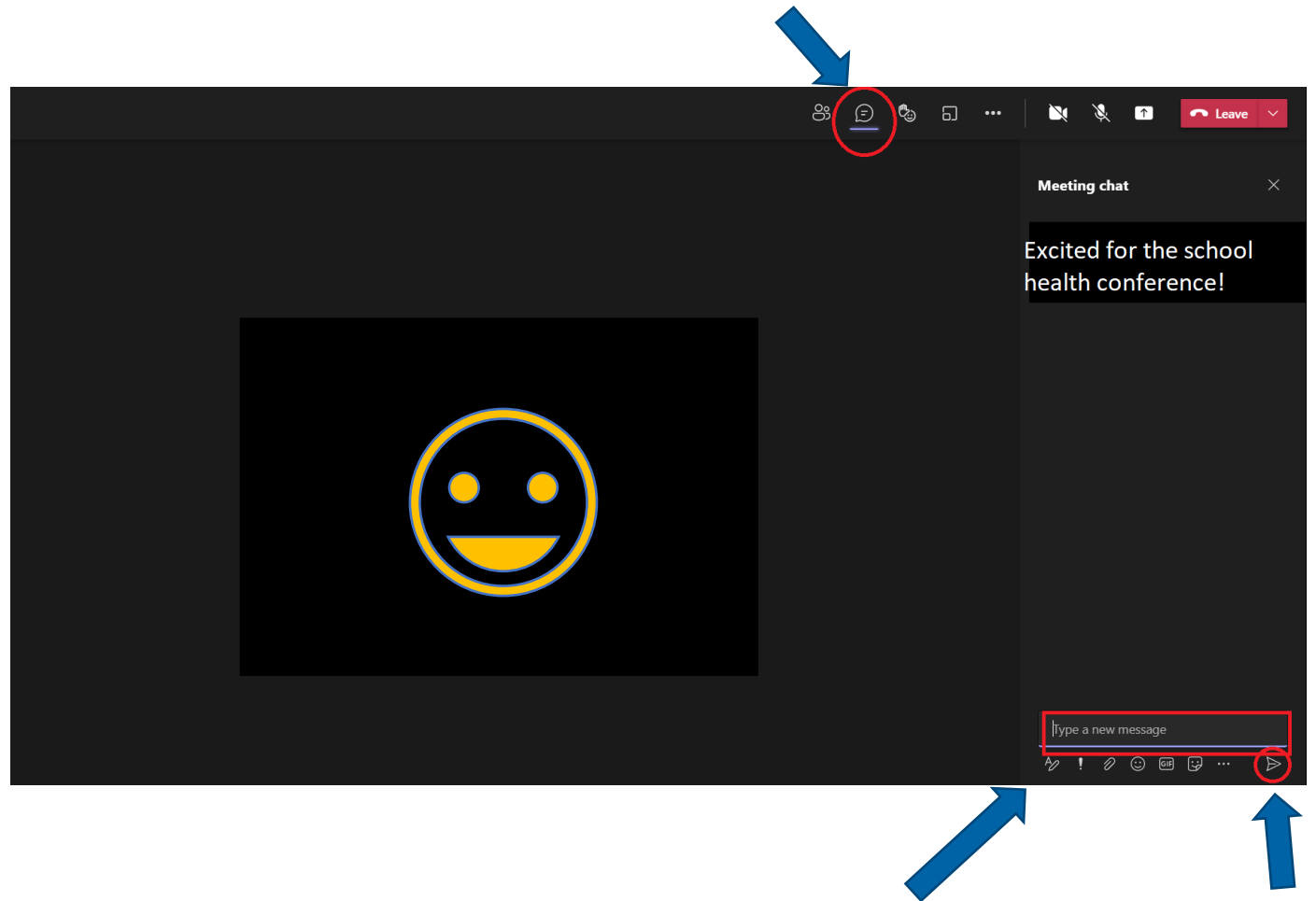
Children's Mercy Kansas City is approved with distinction as a provider of nursing continuing professional development by the Midwest Multistate Division, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

Conflict of Interest:

No conflicts of interest have been identified for the planners or presenters of this activity.

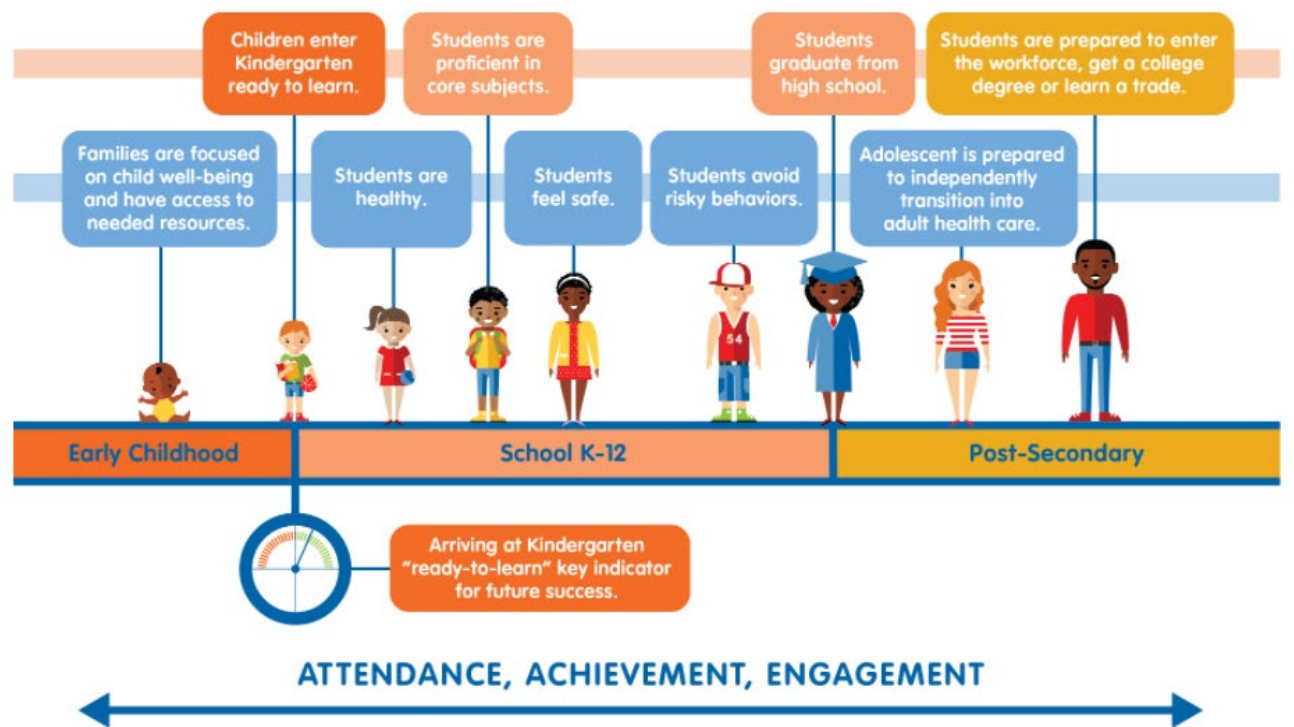
Important Details

- All mics are muted during the conference
- Submit your questions in the chat box
- We will have two Q & A sessions to address questions in the chat box



School Health Support

Growth and Learning School and Health Interactions



School Health Support >

Asthma Education >

Athletic Training Services >

Diabetes Education >

Healthy Schools and
Childcare Program >

Multidisciplinary Food
Allergy Clinic >

Prepped and Ready >

Red Card Bullying Prevention
Campaign >

Weighing In >

In the Community >

COVID-19 School Assistance



[Donate Now](#) > [Information on COVID-19](#) [Research Institute](#) [Health Care](#)

[Your Visit](#) [Departments](#) [In the Community](#) [Ways to Give](#)

Returning to school during COVID-19

Information for educators and school health professionals

Children's Mercy is committed to helping children return safely to school during the COVID-19 pandemic. We have compiled resources for school health care professionals to help children as group activities and facilities re-open.



Guidance for school re-opening

As a community, we're facing decisions about returning to school while our community is still experiencing rises in COVID-19. Experts at Children's Mercy developed resource to help the community - both families and administrators - navigate school reopenings during COVID-19.

[Read the guidebook](#) >



CONSULTATION



ACCESS TO
SPECIALTY
EXPERTS



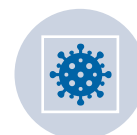
EDUCATION



WALKTHROUGH



VACCINE



TESTING

Have a question about
COVID-19?

Submit it through the [COVID-19 School Assistance Form](#)

COVID-19 UPDATES

News from the Children's Mercy School Task Force



[childrensmercy.org/schools](https://www.childrensmercy.org/schools)

Children's Mercy School Task Force provides regular updates around COVID-19 for schools.

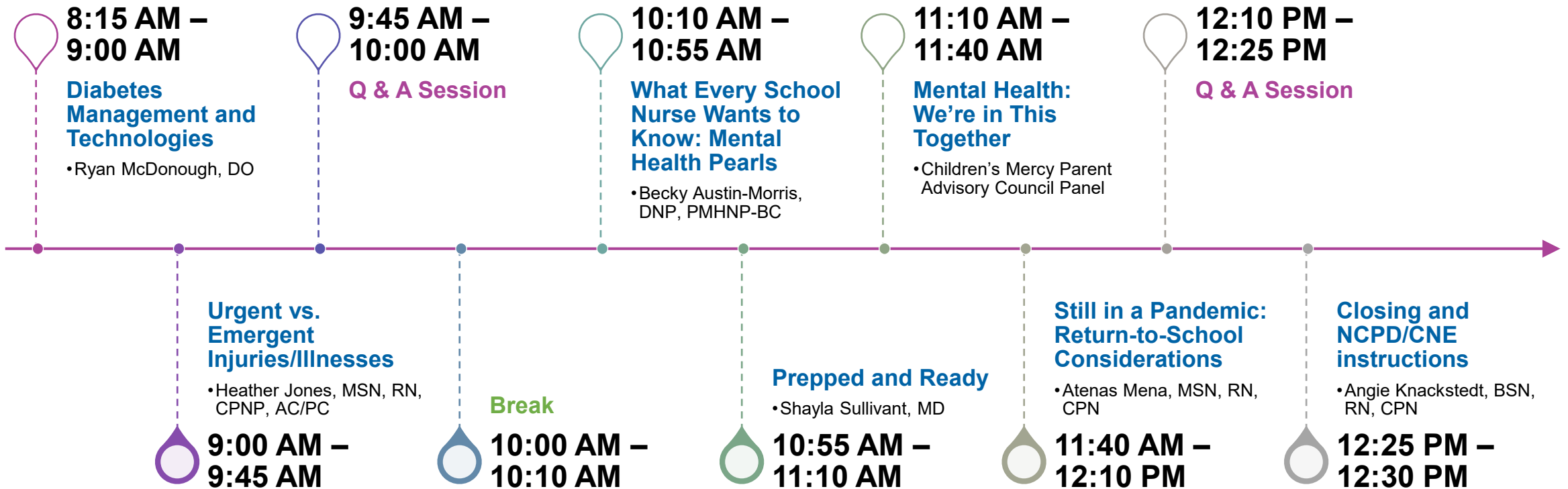
[Subscribe](#) to receive the latest information

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<https://www.childrensmercy.org/health-and-safety-resources/information-about-covid-19-novel-coronavirus/returning-to-community-activities/>



Today's Agenda



The Highs and Lows of Living with Diabetes at School

Laughter is the best medicine... Well, unless you have Type 1 Diabetes. Then, insulin is probably better...



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Co-Medical Director, Pediatric Diabetes
Associate Professor of Pediatrics, UMKC
Children's Mercy – Kansas City



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Disclosures

- Financial
 - No financial disclosures
- Academic
 - TrialNet (Type 1 Diabetes research collaborative) has funded travel to research meetings
 - Type 1 Diabetes Exchange (Type 1 Diabetes QI collaborative) has funded travel to learning sessions
- Brand Name/Off-Label
 - Presentation will use proprietary names and images of specific diabetes technologies and insulins. No preference or support of any particular device or brand is implied
 - “Off-Label” use of technologies will be discussed throughout the lecture as most devices are only approved in subsets of pediatric patients

Learning Objectives

- Review the diagnostic criteria, incidence, prevalence and natural history of diabetes mellitus
- Explore the use of advanced technologies, including Continuous Glucose Monitors (CGM) and Insulin Pumps in the management of pediatric diabetes
- Discuss the use of “artificial pancreas” technology
- Understand the rare, but potentially serious, diabetes emergencies at school

DIAGNOSIS

Diagnostic Criteria

- ADA sets standards for dx
- Presence of symptoms is key
- Labs cannot be run on POC for dx
- Thresholds set based on development of retinopathy
- OGTTs are rarely needed for dx

Criteria	Threshold
Symptoms	Present
Fasting BG	≥ 126 mg/dL
Random	≥ 200 mg/dL
OGTT 2hPP	≥ 200 mg/dL
Hemoglobin A1c	$\geq 6.5\%$

Diagnosis & Classification

- Diabetes is a complex metabolic disorder characterized by chronic hyperglycemia
- Results from inadequate insulin secretion, action, or both
- Lack of insulin action results in
 - Decreased glucose disposal
 - Increased hepatic glucose output
 - Increased lipolysis (protective & dangerous)
 - Osmotic diuresis leads to dehydration/lactic acidosis

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Type 1 vs Type 2

- Type 1 Diabetes

- Autoimmune Disease
- Beta-Cell Destruction
- Insulin deficiency
- Any Age, but typically < 45 years old
- More common in children

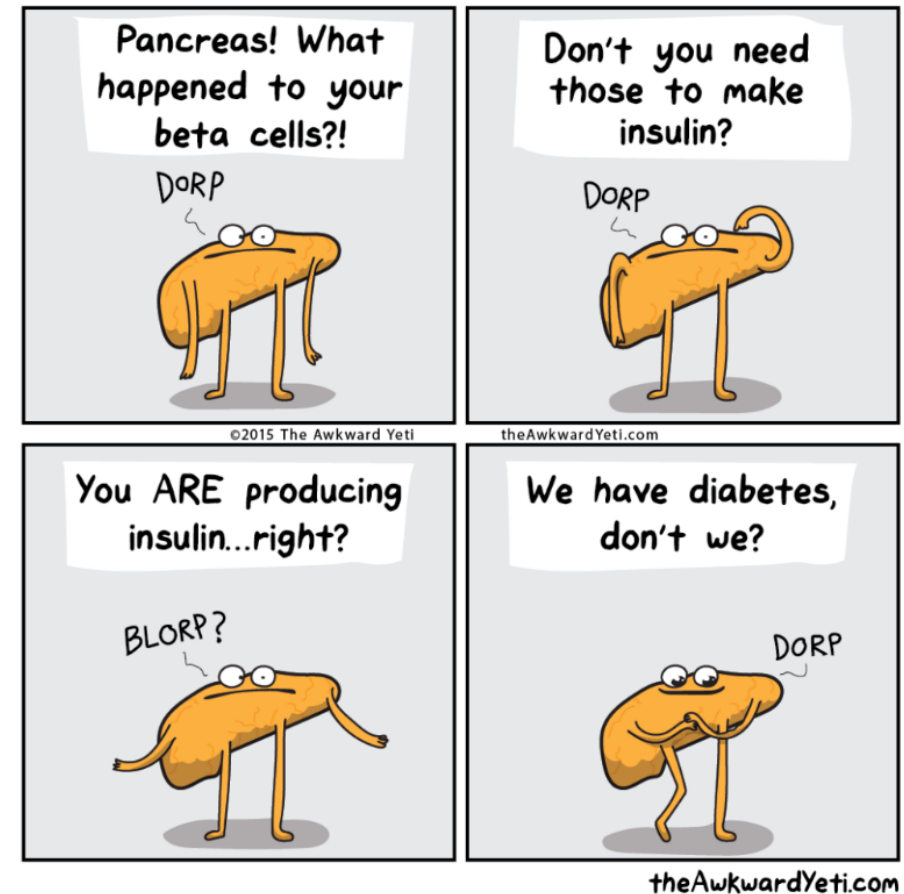
- Type 2 Diabetes

- Diet/Lifestyle driven
- Ineffective use of insulin
- Overweight/Obese
- After puberty
- More common in adult

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Pathophysiology – Type 1

- Beta cell death caused by autoimmune destruction
- 80-90% of the pancreatic cells destroyed before symptoms develop
- Genetic predisposition contributes



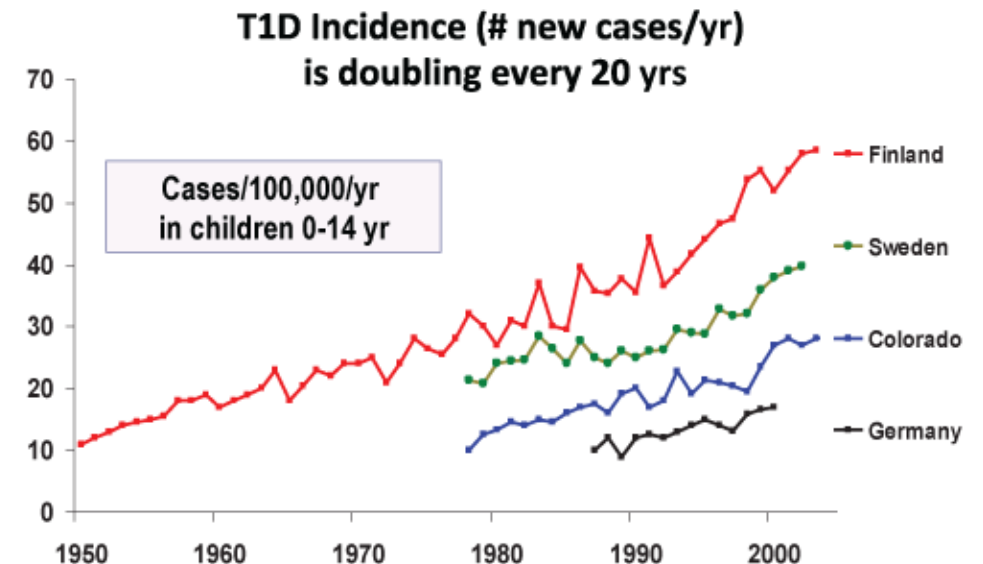
Inheritance

- Familial aggregation accounts for ~10% of T1D
- No recognizable Mendelian pattern of inheritance

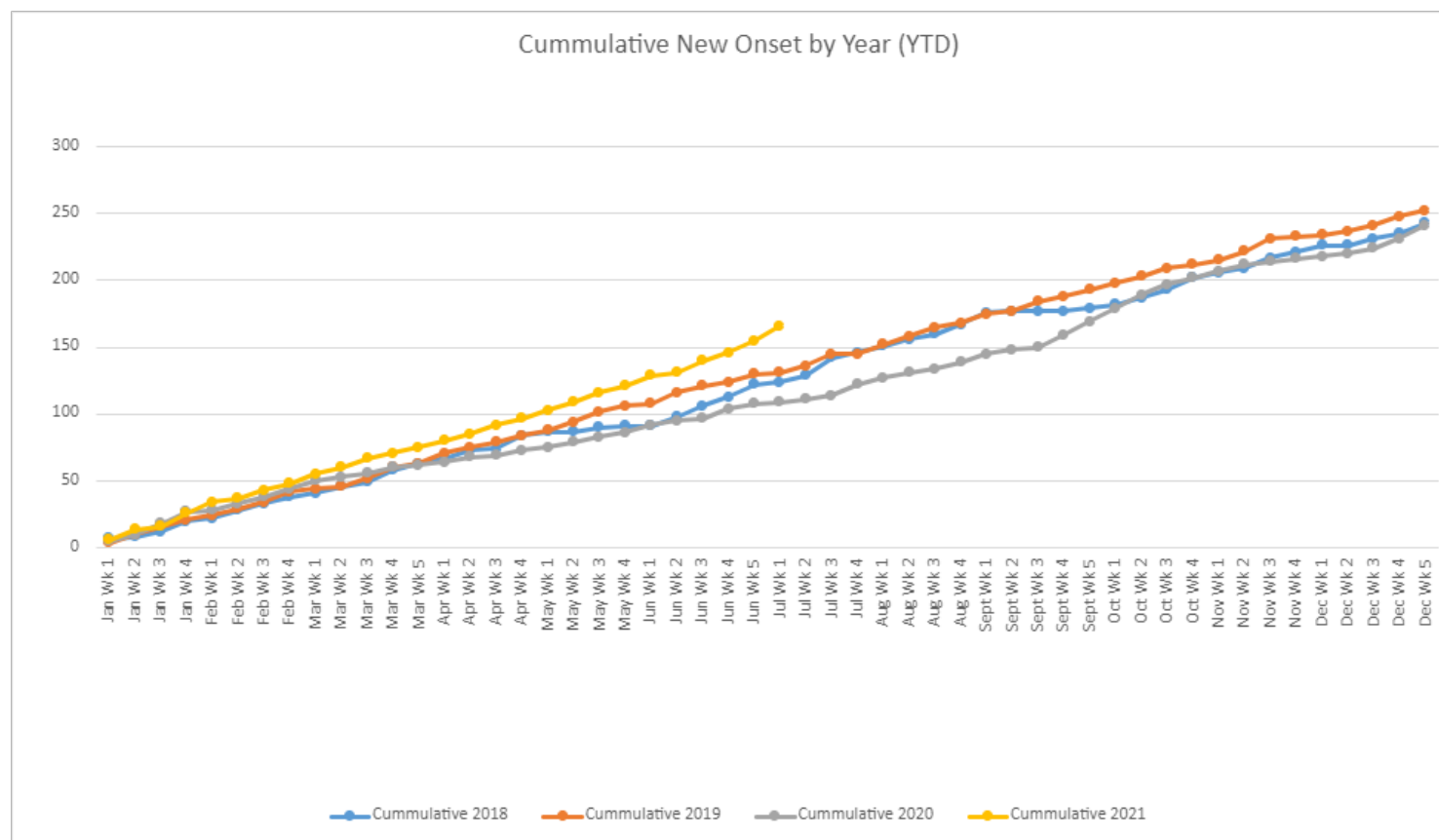
Family Member w/ T1D	Risk of Developing T1D
Mother	1.3 – 3.6%
Father	3.6 – 8.5%
Sibling	4%
Identical Twin	40%

T1D Epidemiology

- 1.54 cases per 1,000 youth
 - Incidence is rising (JDRF)
- Prevalence by Race/Ethnicity
 - 2 per 1,000 in non-Hispanic children
 - 1.34 per 1,000 in Black children
 - 1 per 1,000 in Hispanic children



COVID & New Onset Diabetes



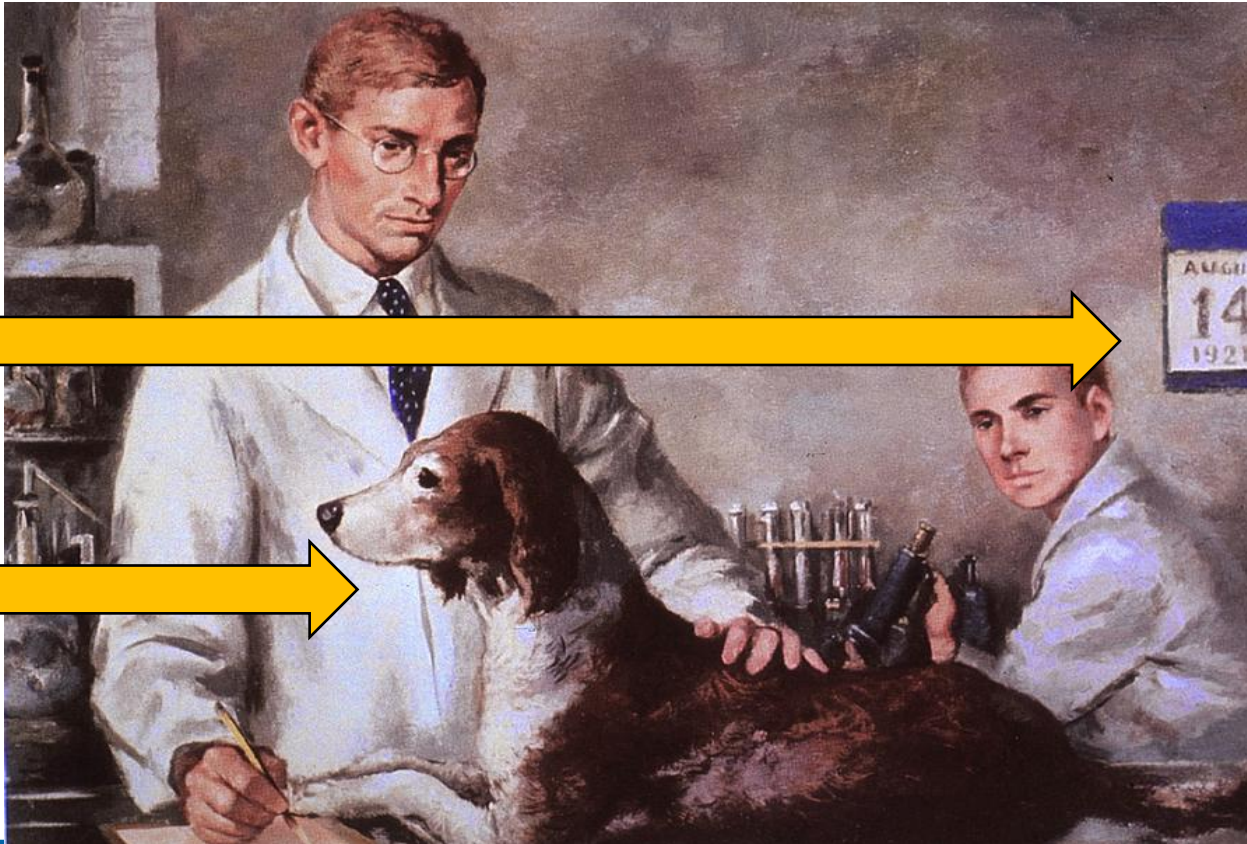
INSULIN TREATMENT

Insulin Treatment, eh?

FUN TRIVIA!

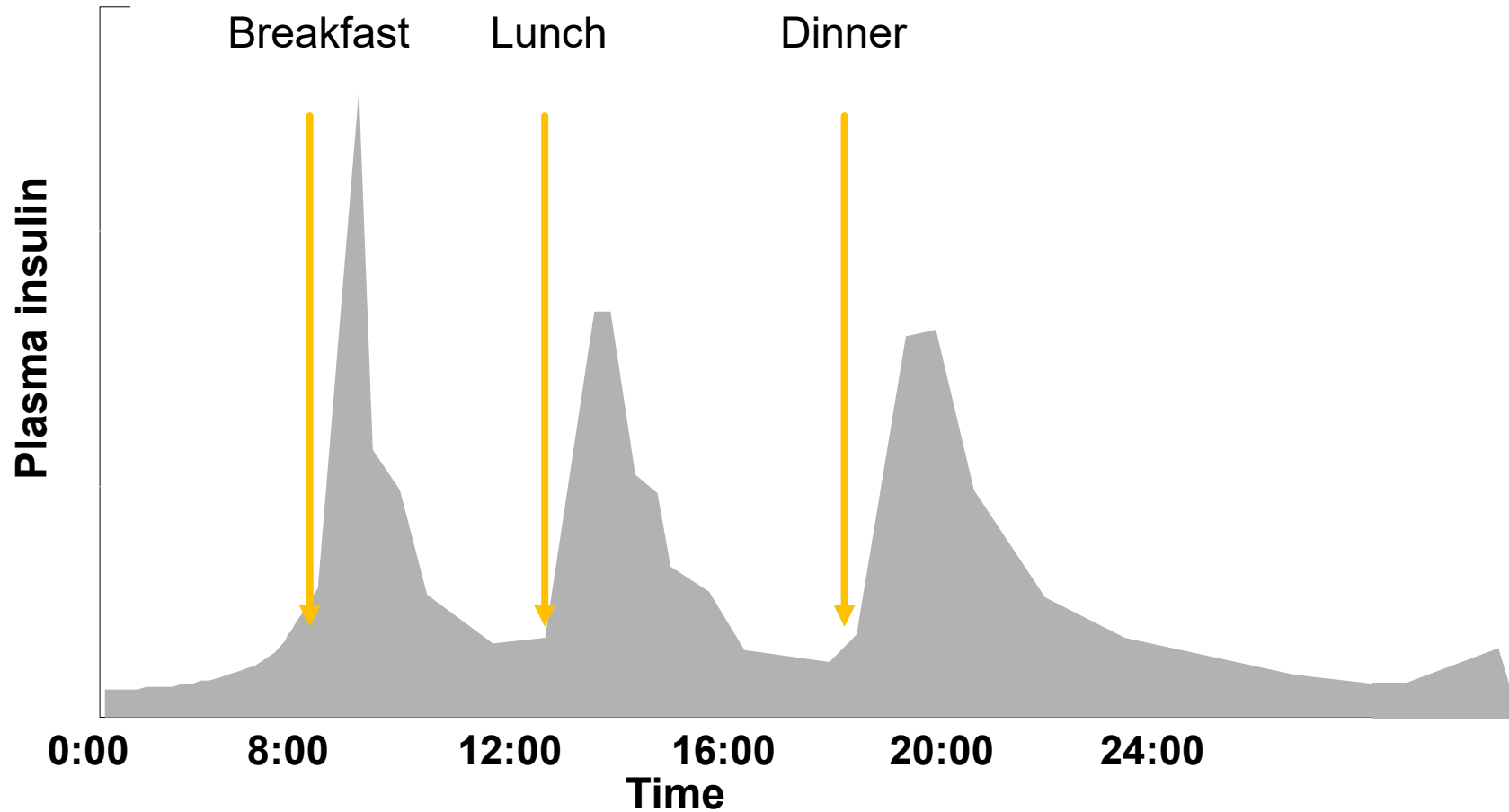
When was insulin discovered?

What is the dog's name?



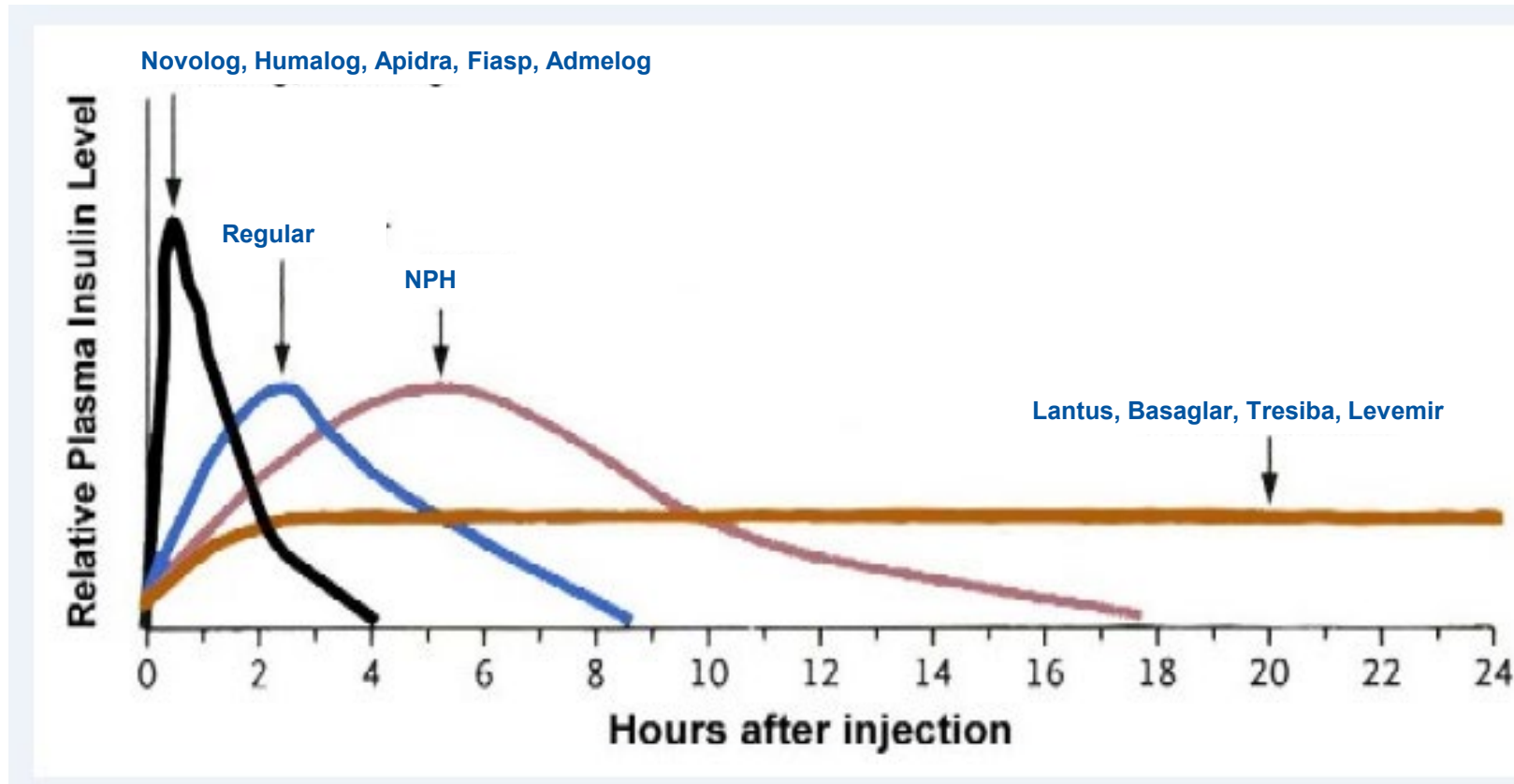
Where was insulin discovered?

Normal Insulin Secretion

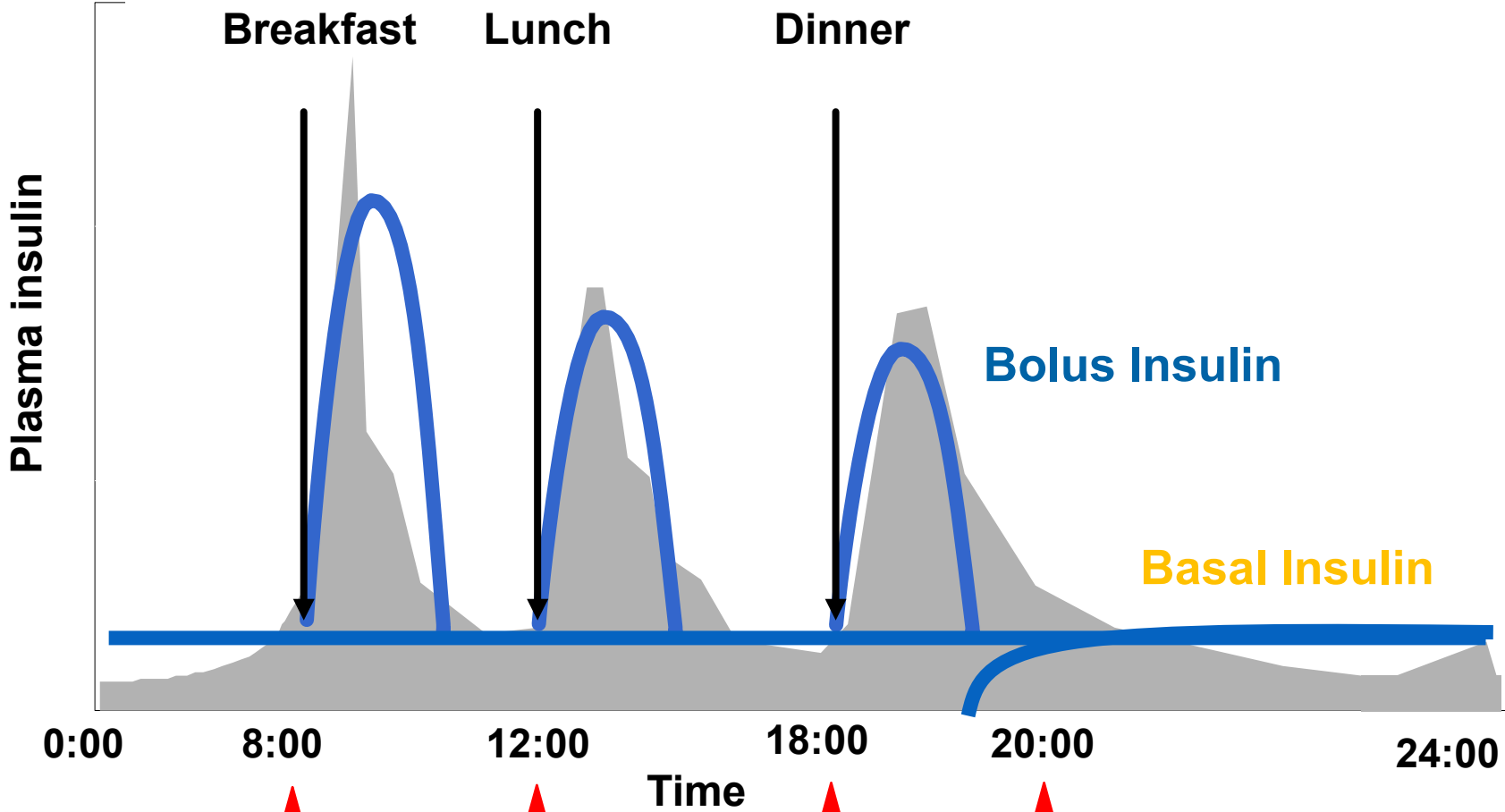


Insulin Treatment

- Insulin Action Times



Insulin: Injections



Dosing Vocabulary

- **Basal Insulin:** long-acting insulin given typically once per day to provide some insulin in the “background” all the time
- **Bolus Insulin:** short/rapid-acting insulin given several times per day to account for carbohydrate intake and to lower high glucose

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Bolusing Vocabulary

- Carb Dosing
 - **Carb Ratio:** amount of short/rapid-acting insulin given per # of grams of carbohydrate
- Correction Dosing
 - **Insulin Sensitivity Factor (ISF or “correction factor):** how much someone’s blood glucose would drop if given 1 unit of short/rapid-acting insulin
 - **Target Blood Glucose:** blood glucose patient is “aiming” for when giving corrections for high blood glucose
 - **Threshold:** blood glucose level above which extra insulin is given to correct hyperglycemia
 - **Insulin On Board/IOB/Active Insulin:** amount of insulin that is still working in the body

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Example Insulin Dosing

Pre-Meal Values

- Pre-Meal BG: 250
- Target Glucose: $-$ 150
- BG above Target: 100
- ISF: 50

Meal Values

- 1/2 cup Mac & Cheese: 23g
- 1 cup green beans: 4g
- 1 cup milk (8oz): 13g
- 2 Double Stuff Oreos: 21g
- Total Carbs: 61g
- Insulin: Carb Ratio 1:15

Final Dose

- Correction Dose: 2
- Meal Dose: $+$ 4
- **Rapid acting insulin dose:**

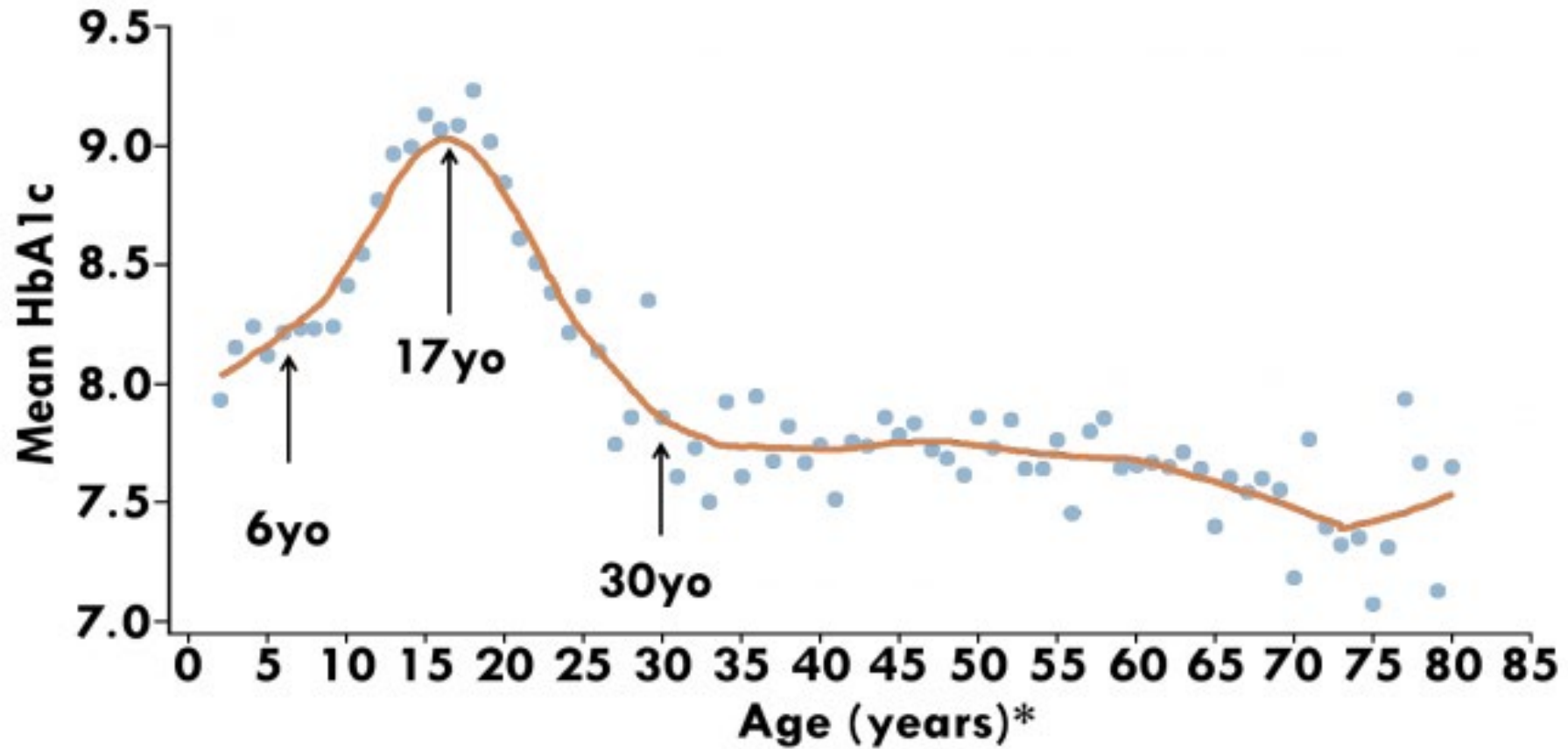


Treatment Goals

- American Diabetes Association Recommendations
 - A1c < 7.5% until 18 years
 - Tighter control (lower A1c) is encouraged provided avoidance of hypoglycemia
 - A1c < 7% in adulthood
 - A1c < 6% (normal) for people with T2D has been recommended
 - Few patients are meeting the goal (at CMH ~23%)
 - > 70% of time “in range (70 – 180 mg/dL)

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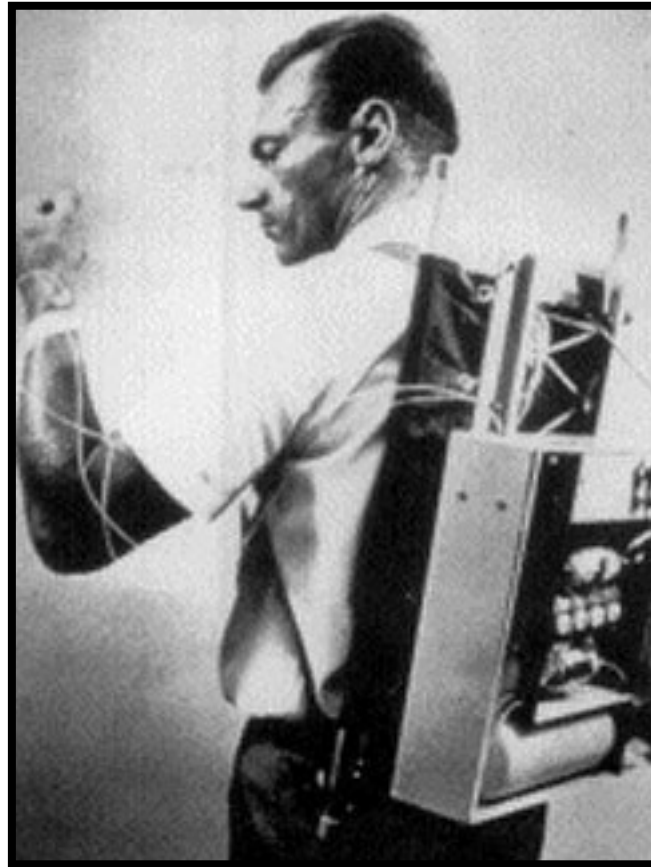
Treatment Goals



* ≤ 2 years old and ≥ 80 years old are pooled

INSULIN PUMPS

The First Pump: 1978



Insulin Pumps



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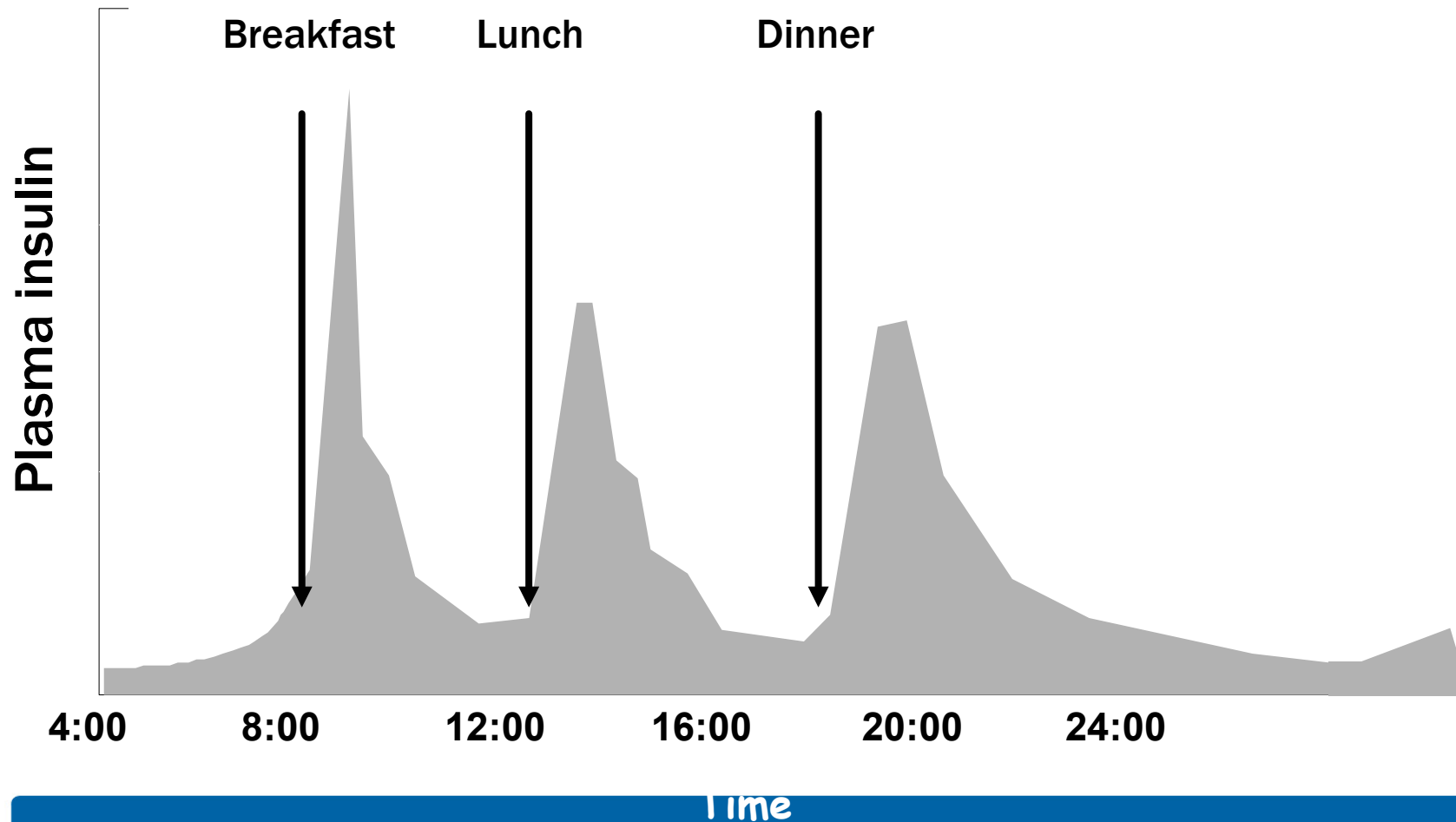


MDI vs Pump

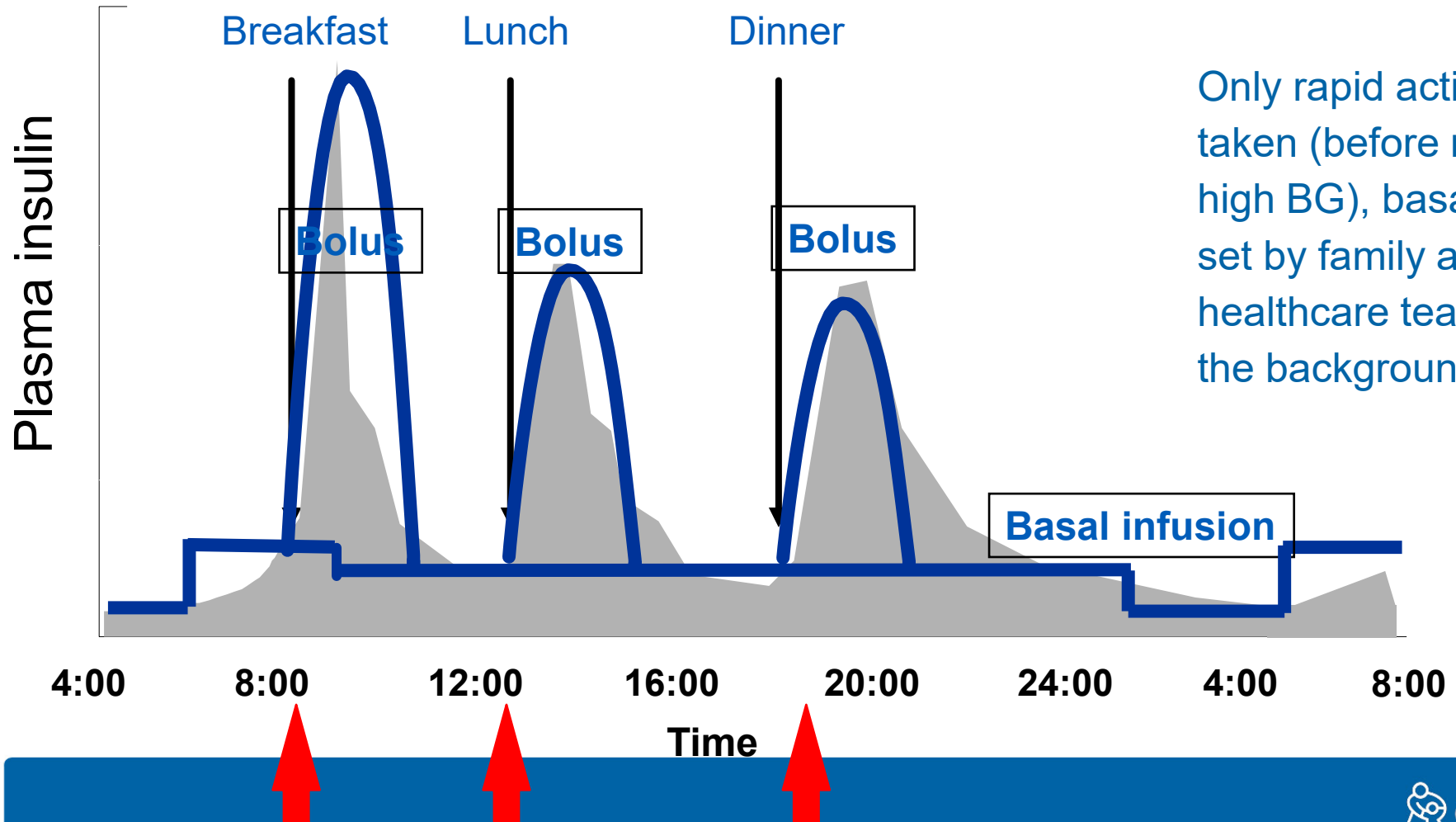
- Continuous Subcutaneous Insulin Infusion (CSII) is more physiologic
- CSII has increased treatment satisfaction, but does not show difference in glycemic control
- DKA rate is variable between studies, but generally higher in “pumpers”
- Artificial Pancreas Technology

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Normal Insulin Secretion



Insulin: Pump Regimen



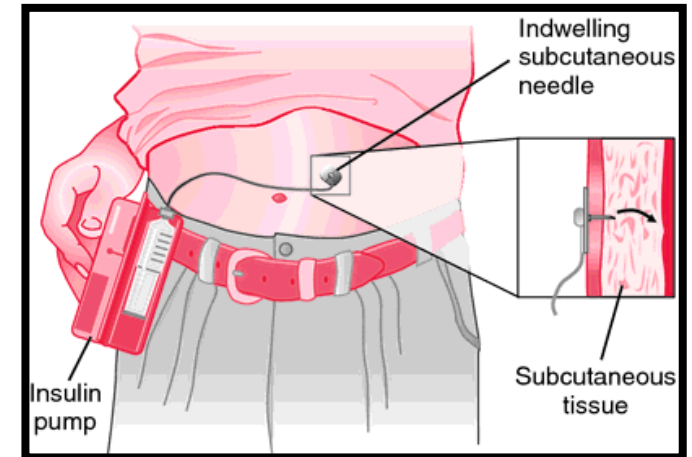
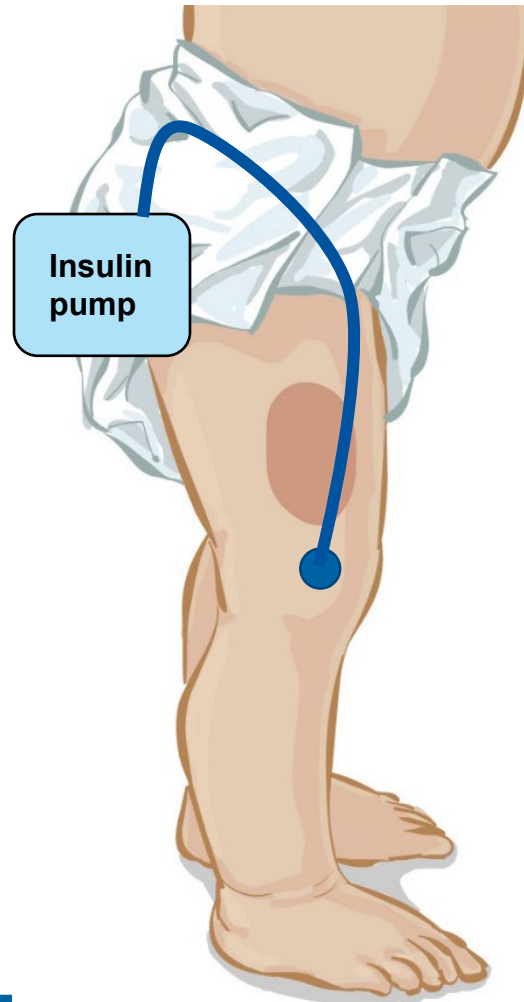
No more basal injections!



- Patient must always remain attached to pump at all times (even while sleeping), in order to receive basal insulin
- 30–60-minute breaks are acceptable for bathing and some exercise

Tubed Pumps

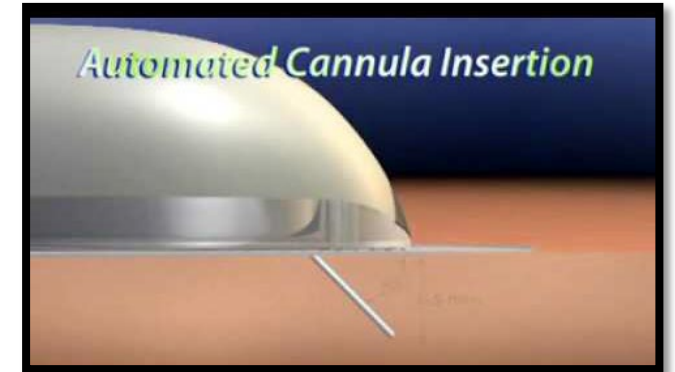
- Reservoir filled with enough insulin to last 2-3 days
- Insulin travels into body through flexible tubing
- Plastic (or steel) cannula is inserted under the skin and is changed every 2-3 days



- The cannula is held in place by an infusion set (to secure the cannula to

Tubeless Pumps

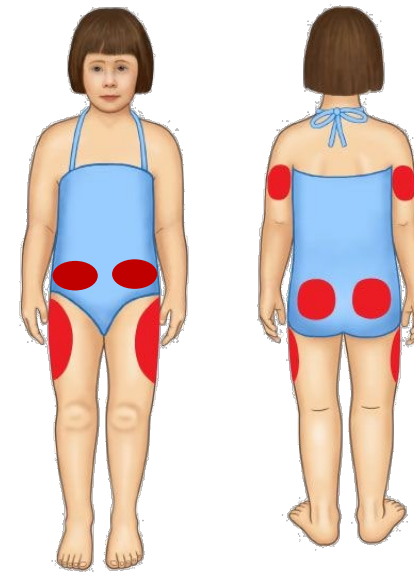
- “Pod” is filled with enough insulin to last 2-3 days
- Insulin travels into body through SQ cannula
- Controlled by handheld device, thus no tubing
- If controller is lost, no bolus insulin can be given



- Often denied by state insurances
- No need to disconnect for activities or bathing

Where Might You Find a Pump?

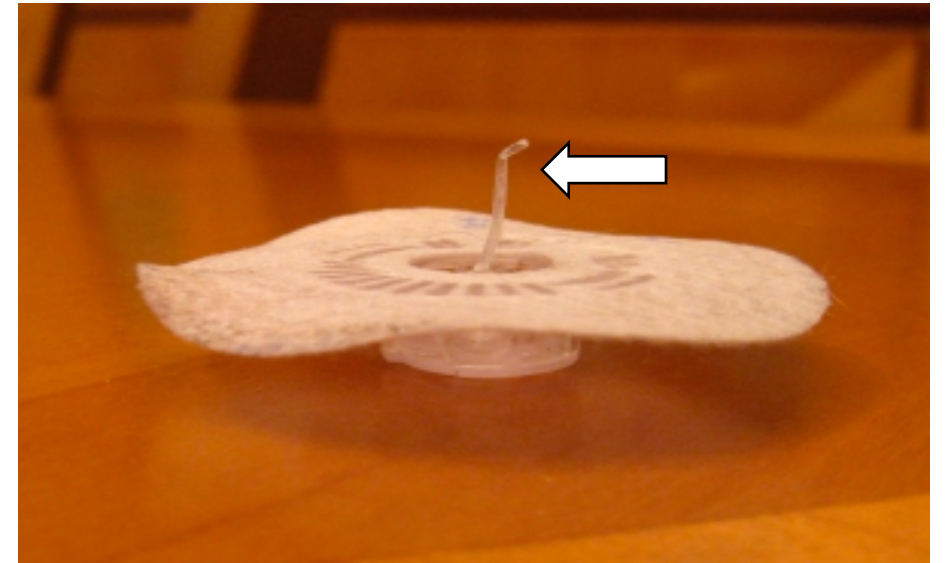
- Can be placed anywhere an insulin injection can be given
 - Outer arm
 - Abdomen
 - Hip area
 - Thigh
 - Buttocks



- Site rotation mandatory for insulin absorption and to avoid lipohypertrophy

Problems w/ Pumps

- Pumps ONLY delivery fast acting insulin
- Pumps sometimes break!
- Sites can “go bad” (see picture)
- Pumps DO NOT take away diabetes, or allow someone to “set it and forget it”
- Not all patients are good candidates for pumps
- Pumps will not fix non-adherence or prevent DKA/hospitalization
- Pumps have been shown to improve quality of life



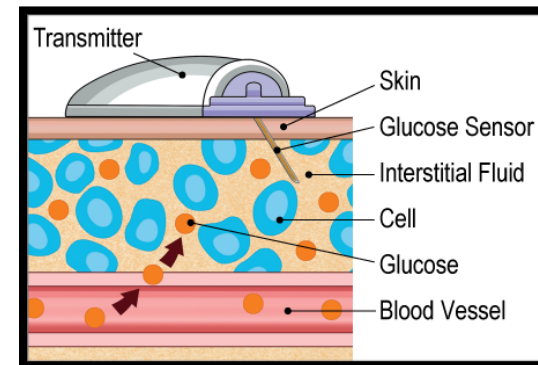
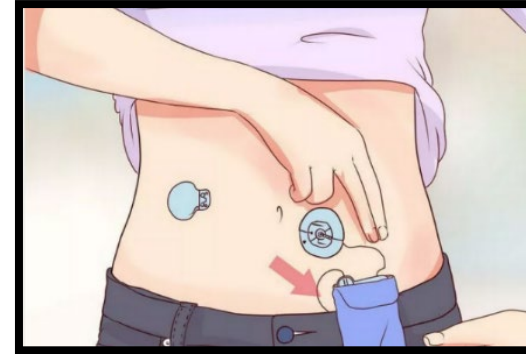
CONTINUOUS GLUCOSE MONITORS (CGM)

CGM



How do sensors work?

- Bio-filament (wire-like probe) placed subcutaneously
- Continuously measures interstitial glucose
- Algorithm converts reading to “blood sugar”
- Displayed with directional arrows and able to alarm when BG is high, low, rising, or falling
- Contains 3 parts: sensor, transmitter, and receiver
- FDA approved to wear for 7-10 days

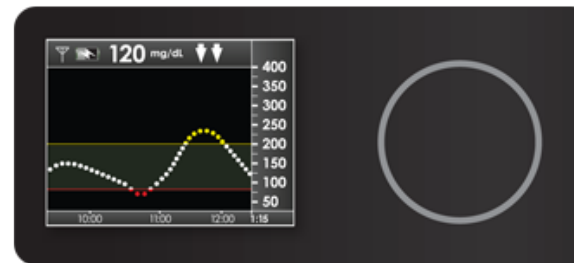


CGM Gives More Data

- Calibration: most recently approved devices do not require calibration
- CGM gives directional context to a BG that a finger stick cannot
- CGM can observe effects of exercise, food choices, etc. on blood glucose

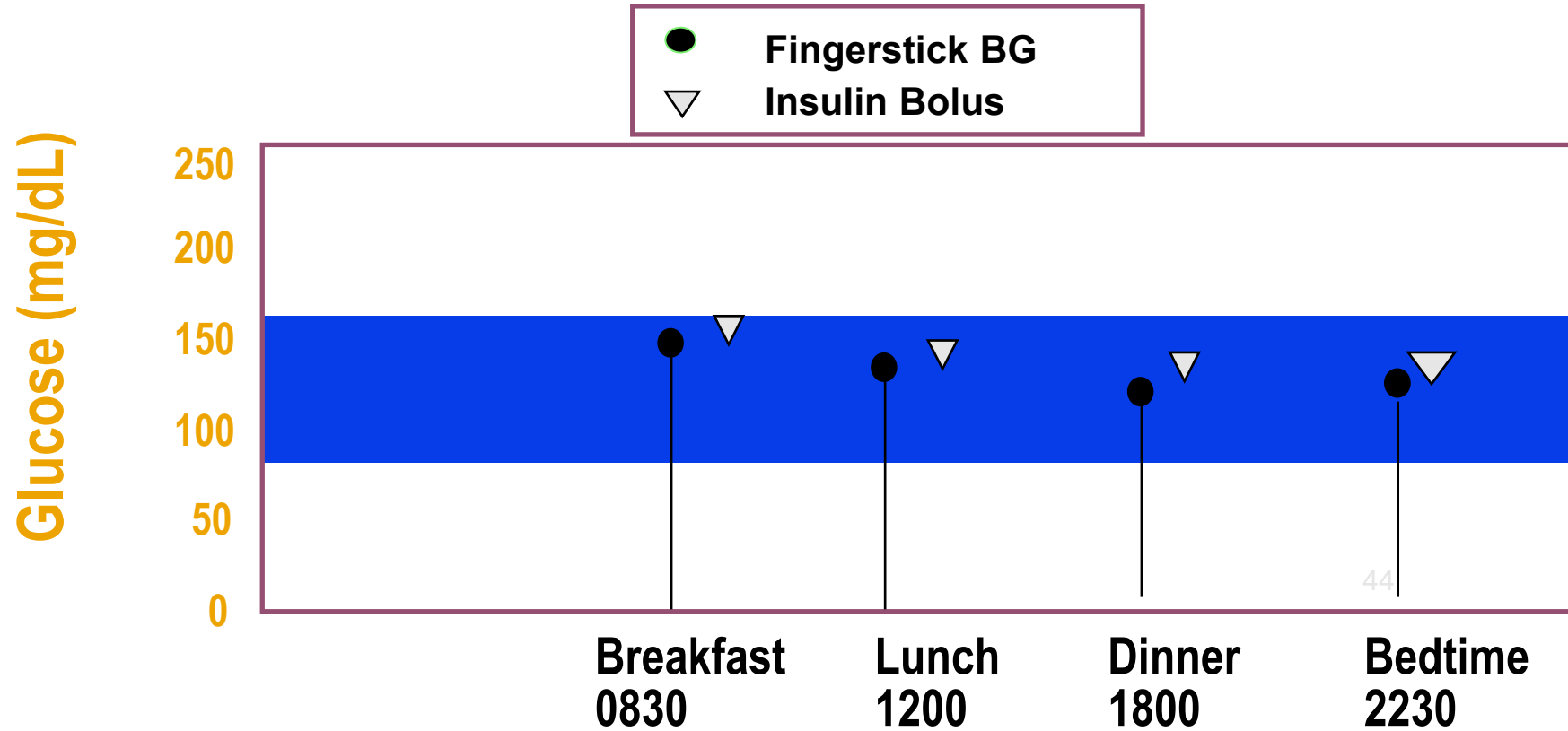


If you saw this number, what would you do?

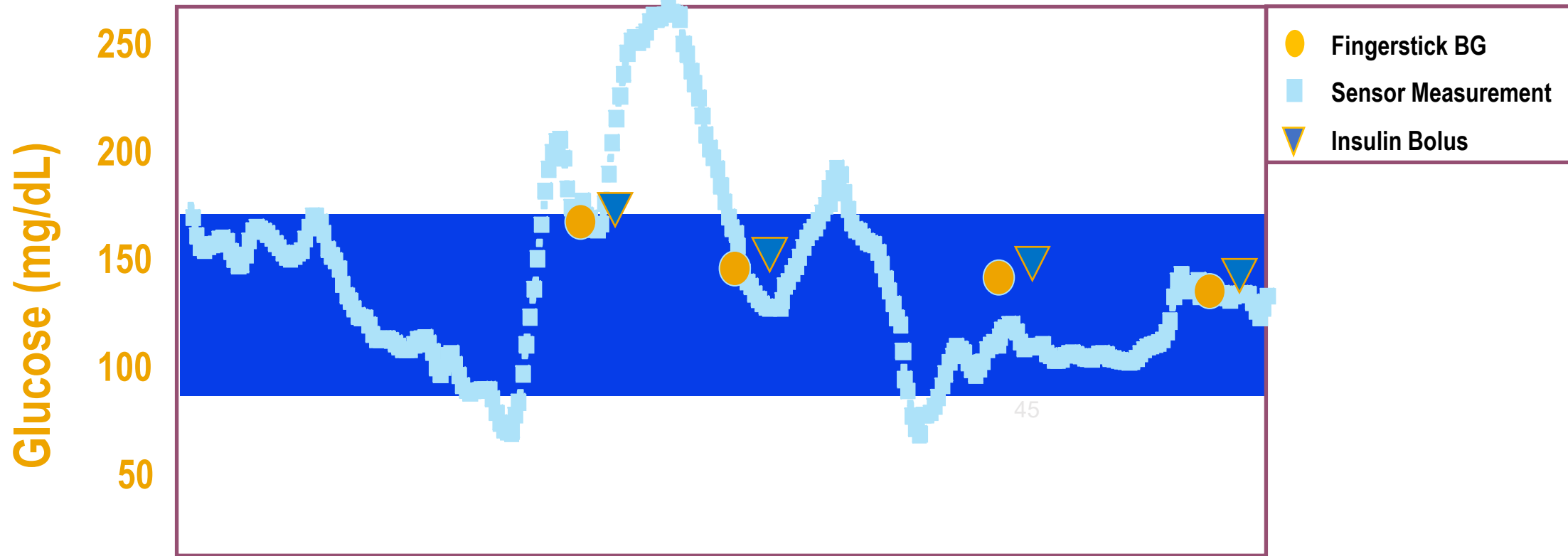


If you saw this instead, would you do something differently?

CGM



CGM



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Breakfast
0830

Lunch
1200

Dinner
1800

Bedtime
2230

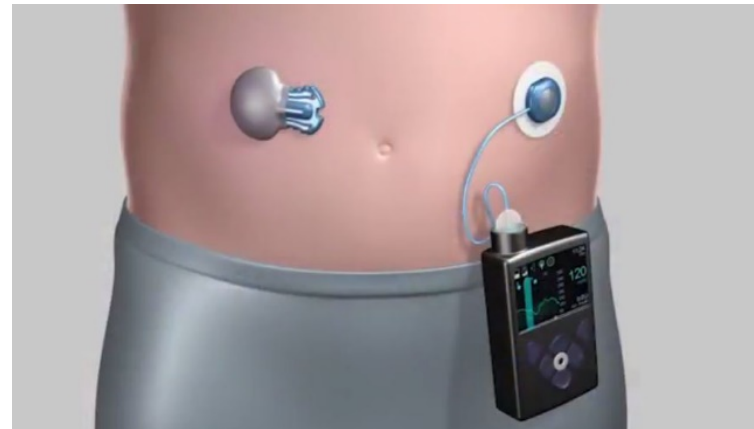
What do those arrows mean?

Dexcom G5/G6*		Guardian Connect		FreeStyle Libre		Eversense	
Arrow	Meaning	Arrow	Meaning	Arrow	Meaning	Arrow	Meaning
↑↑	Glucose rapidly rising >3 mg/dL/min >0.2 mmol/L/min	↑↑↑	Glucose rapidly rising >3 mg/dL/min >0.2 mmol/L/min	—	—	—	—
↑	Glucose rising 2-3 mg/dL/min 0.1-0.2 mmol/L/min	↑↑	Glucose is rising 2-3 mg/dL/min 0.1-0.2 mmol/L/min	↑	Glucose rapidly rising >2 mg/dL/min >0.1 mmol/L/min	↑	Glucose rapidly rising >2 mg/dL/min >0.1 mmol/L/min
↗	Glucose slowly rising 1-2 mg/dL/min 0.06-0.1 mmol/L/min	↑	Glucose slowly rising 1-2 mg/dL/min 0.06-0.1 mmol/L/min	↗	Glucose rising 1-2 mg/dL/min 0.06-0.1 mmol/L/min	↗	Glucose slowly rising 1-2 mg/dL/min 0.06-0.1 mmol/L/min
→	Glucose steady Increasing/decreasing <1 mg/dL/min <0.06 mmol/L/min	—	Glucose steady Increasing/decreasing <1 mg/dL/min <0.06 mmol/L/min	→	Glucose steady Increasing/decreasing <1 mg/dL/min <0.06 mmol/L/min	→	Glucose steady Increasing/decreasing <1 mg/dL/min <0.06 mmol/L/min
↘	Glucose slowly falling 1-2 mg/dL/min 0.06-0.1 mmol/L/min	↓	Glucose slowly falling 1-2 mg/dL/min 0.06-0.1 mmol/L/min	↘	Glucose slowly falling 1-2 mg/dL/min 0.06-0.1 mmol/L/min	↘	Glucose slowly falling 1-2 mg/dL/min 0.06-0.1 mmol/L/min
↓	Glucose falling 2-3 mg/dL/min 0.1-0.2 mmol/L/min	↓↓	Glucose is falling 2-3 mg/dL/min 0.1-0.2 mmol/L/min	↓	Glucose rapidly falling >2 mg/dL/min >0.1 mmol/L/min	↓	Glucose rapidly falling >2 mg/dL/min >0.1 mmol/L/min
↓↓	Glucose rapidly falling >3 mg/dL/min >0.2 mmol/L/min	↓↓↓	Glucose rapidly falling >3 mg/dL/min >0.2 mmol/L/min	—	—	—	—

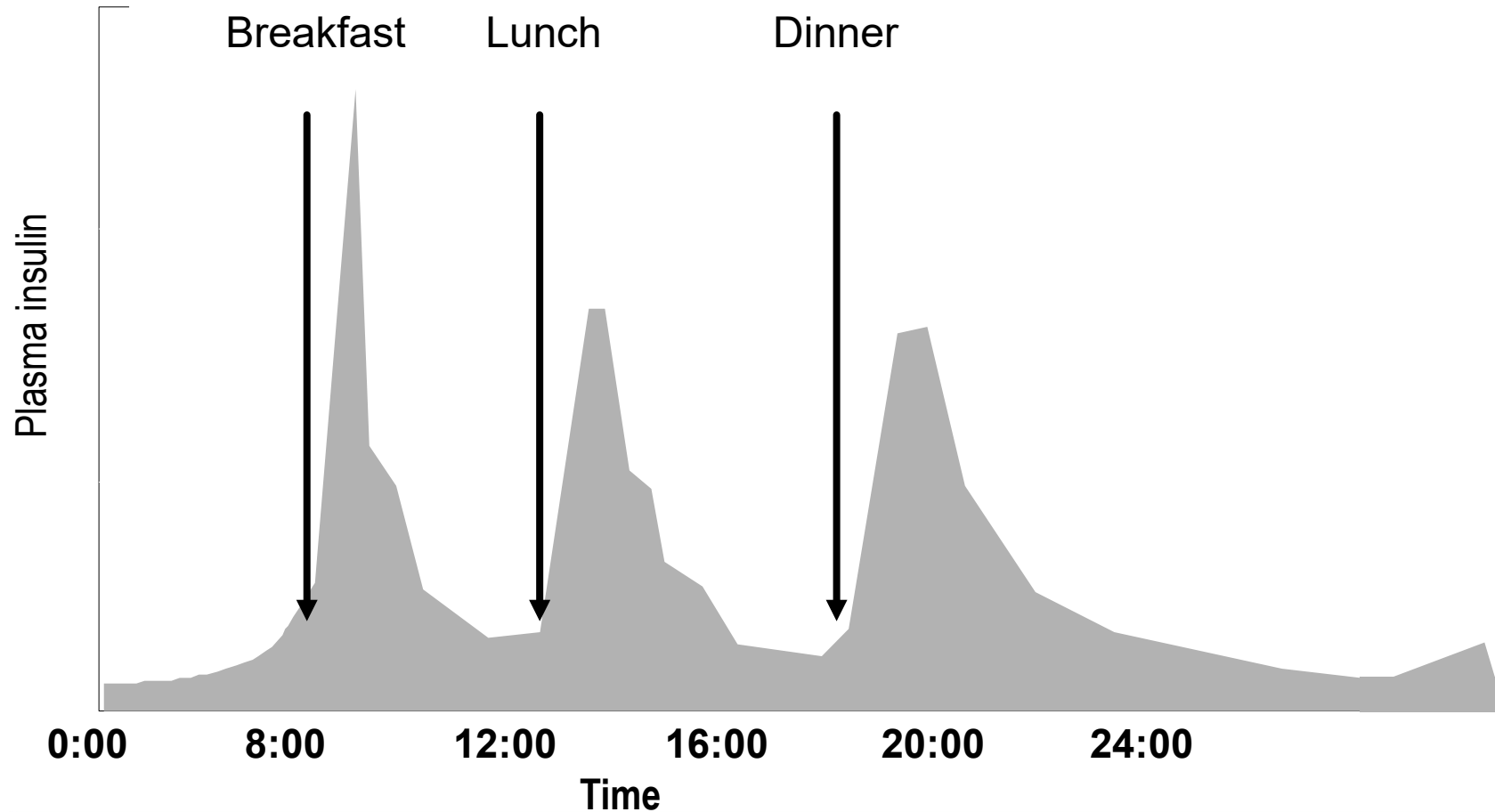
INTEGRATED TECHNOLOGIES

“Artificial Pancreas”

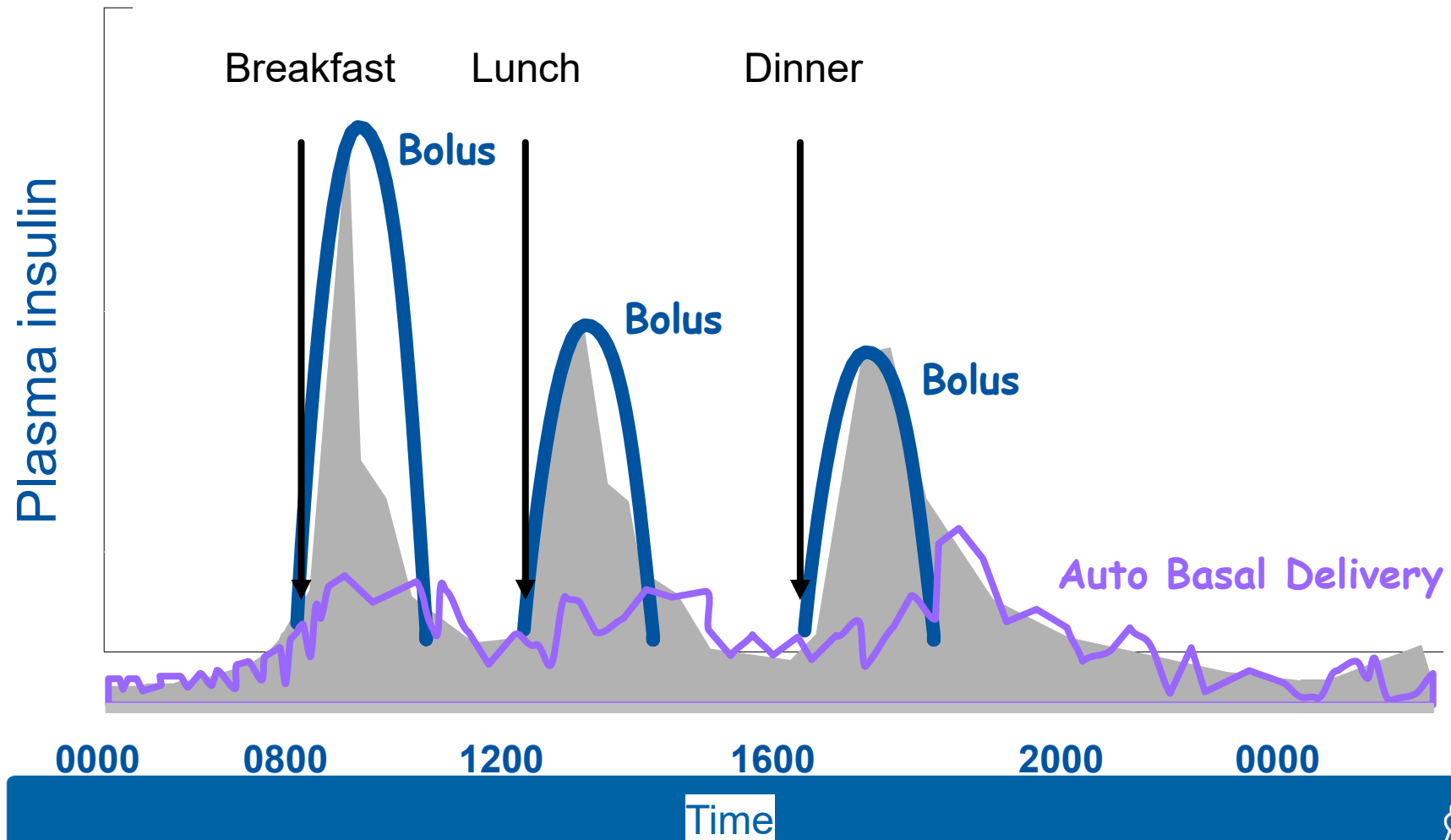
- “Artificial pancreas” options (in ascending order of automation)
 - Sensor augmented pumping
 - Low glucose suspend
 - Predicted low glucose suspend
 - Hybrid Closed Loop
 - Full Closed Loop “aka “artificial pancreas”
 - Dual Hormone pumps



Normal Insulin Secretion



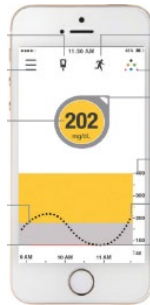
Insulin: “Artificial Pancreas”



Choices Choices!



A) A pump alone



B) A CGM alone (to use with shots or with any of the pumps)



C) A pump w/ augmented CGM

D) A pump that has integrated or controlling CGM



E) Multiple Daily Injections

DIABETES EMERGENCIES

Hyperglycemia

- Symptoms
 - Abdominal pain, vomiting, breathing quickly, fruity odor to breath
- Blood Glucose > 200 mg/dL (or outside target)
 - Need a correction dose to bring BG down
- Blood Glucose > 240 mg/dL
 - Check for ketones
- Treatment
 - Ketone dosing (Need to know TDD of insulin)
 - Drink water!!!
 - Pumpers: Change pump site!
- Emergency Treatment
 - If ketones are not clearing after 2 correction doses, call parent/Diabetes Team
 - If vomiting, needs to be evaluated in ED to rule out DKA

Hyperglycemia

- No acute harm for BG > 200 mg/dL without ketones
- Can continue to participate in school activities/testing
- If ketones present, then delay testing and avoid intense physical activity
- Some kids have poor control, and they may “live” in the 200’s or higher
 - Only about 25% of kids at CM are meeting glycemic targets
 - Sometimes the only insulin they reliably get is at school!

Hypoglycemia

- Blood Glucose < 70 mg/dL
- Symptoms
 - Dizzy, lightheaded, hungry, irritable, aggressive, sweaty, shaky
 - Do not send to RN Office unaccompanied!
- Treatment
 - 15/15 Rule: 15 grams rapid acting carbs, repeat BG check in 15 minutes
 - Caveat: some kids, particularly those on HCL systems, do not always need a full 15 grams
- Emergency Treatment
 - Seizures/Unconscious: Give glucagon, **THEN** call 911
 - Glucagon comes in multiple forms now!!!



Thank you!

Mom: "Her a1c was what?!"



Me: "Act natural. Act natural."

Pediatric Illness & Injury

Urgent vs. Emergent

Heather L. Jones, MSN, RN, CPNP-AC/PC



Disclosure

- I have no disclosures.



Objectives

- Discuss the indications for recommending Urgent vs Emergent Care
- Categorize injury into Urgent or Emergent conditions
- Categorize illness into Urgent or Emergent conditions
- Identify local resources for care

Urgent Conditions

- Urgent conditions do not involve *compromise or failure* of systems.
- Symptoms in the system (i.e., wheezing, dehydration, headache, etc.) may be present but the patient's body system is able to compensate.
- Urgent conditions may evolve into emergent conditions if left untreated.

Emergent Conditions

- Compromise or failure of the Respiratory
- Cardiovascular or Neurologic Systems

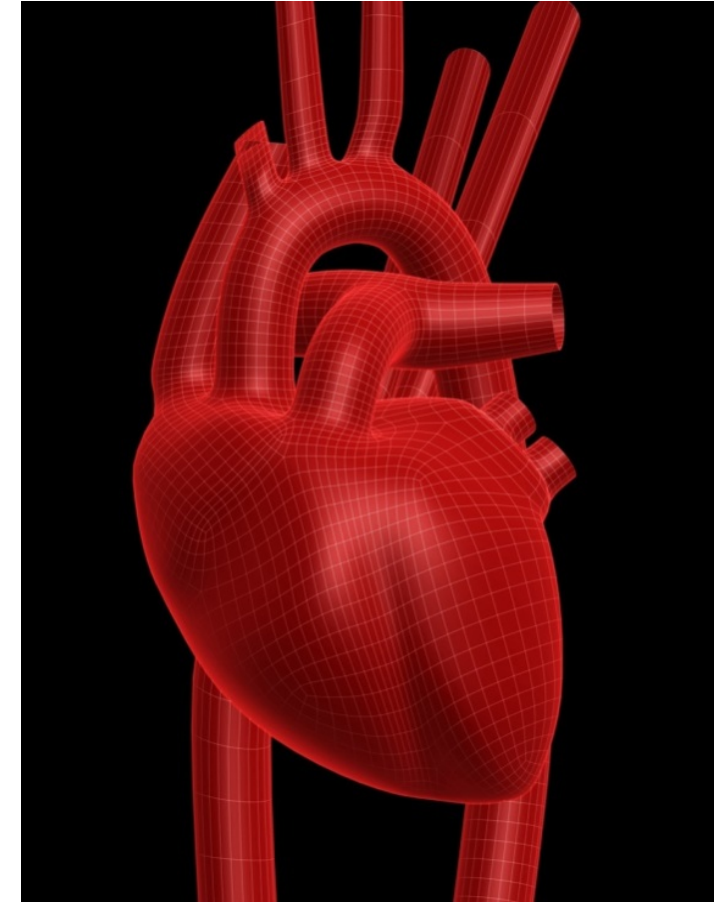
Respiratory Compromise

- Increased work of breathing
- Altered rate of breathing
- Diminished breath sounds
- Inability to speak in full sentences
- Grunting or Stridor
- Circum-oral cyanosis
- Altered LOC



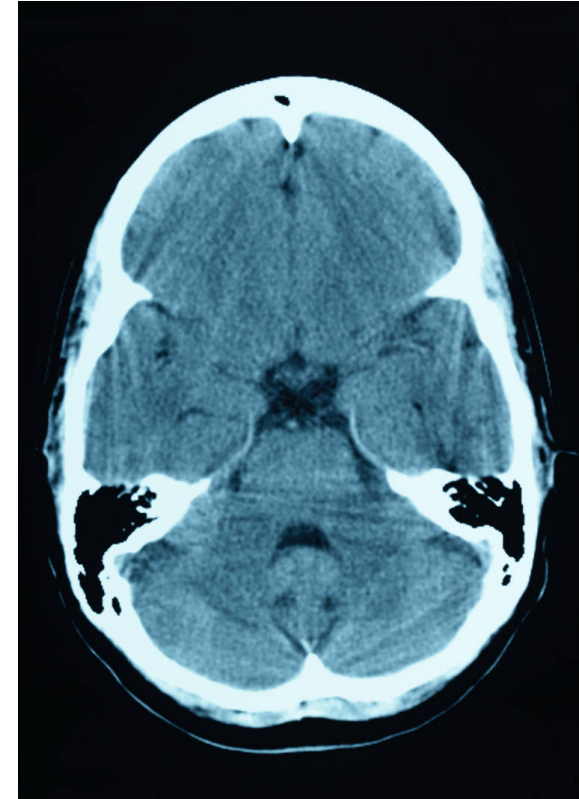
Circulatory Compromise

- Infrequent except in case of congenital heart disease
- Altered Heart Rate
- Hypotension
- Altered LOC
- Syncope



Neurological Compromise

- Altered LOC
- Seizure
- Weakness/numbness in arms or legs
- Slurred speech
- Change in behavior
- Headache



Injuries



Head Injuries: Common Symptoms

- Headache
- Nausea/Vomiting
- Dizziness
- Sleepiness
- Scalp Hematoma (goose-egg)

Head Injuries: Abnormal Findings

- Child acts confused or unusual
- Seizures/convulsions
- Weakness in extremities
- Eye or pupil abnormalities
- Emesis > 3 times in 12 hours
- Difficulty walking or talking
- Worsening headache

Head Injuries: Treatment

- Emergent-Call 911
 - Any loss of consciousness
 - Fall from height or high-impact injury
 - Protect airway
 - Protect C-spine
 - Control bleeding

Head injuries: Treatment

- Initial
 - Cold pack
 - Treat lacerations or abrasions
 - Tylenol for pain (avoid ibuprofen)
 - Sips of fluids
 - Rest

Head Injuries: Treatment

- Initial

- Monitor for abnormal or worsening findings

If worsening symptoms occur



- Urgent referral to a facility with CT capabilities, most likely an ER, is indicated

Head injuries: Concussion

- A concussion is a brain injury causing a temporary disturbance of brain function. Caused by a bump, blow, or jolt to the head or body
- If a concussion is suspected, seek care
- Concussion is common with head injury

Head injuries: Concussion

- Headache
- Vomiting
- Dizziness
- Blurred vision
- Balance problems
- Sensitivity to light and noise
- Confusion
- Drowsiness
- Difficulty concentrating or remembering
- Fatigue
- Irritability
- Emotional issues: nervous, anxious

Head injuries: Concussion

- Symptoms of a concussion can last up to

3 weeks!

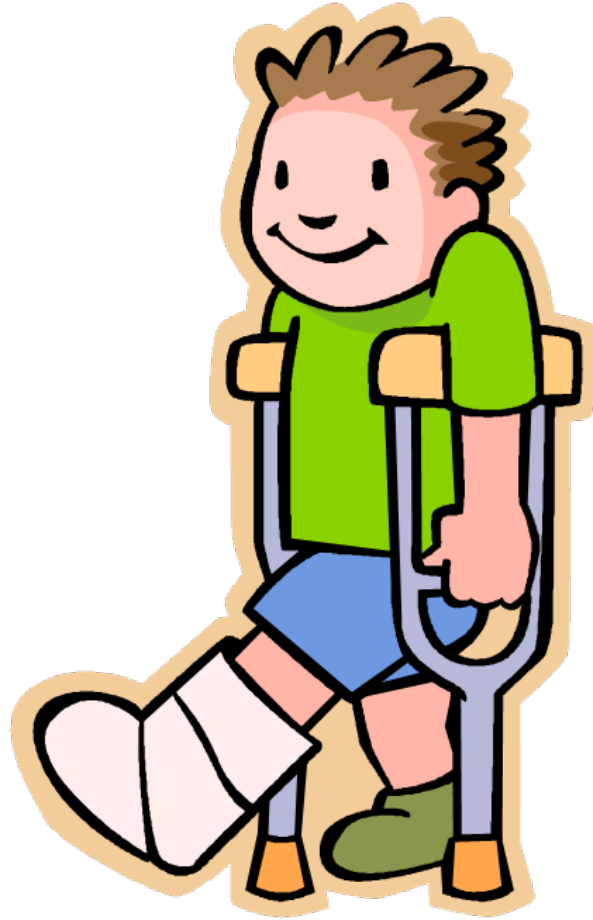
- Treatment may include restricted schoolwork, shortened school days and decreased physical activity
- Initial evaluation and follow up care needed

Head injuries: Concussion

- Seek immediate care in this period for:
 - Worsening headache
 - Increased drowsiness
 - Difficulty recognizing people or places
 - Repeated vomiting
 - Unusual/irritable behavior
 - Seizures
 - Weakness/numbness in arms/legs
 - Slurred speech



Common Injuries



Bone and Joint Injuries

- Soft tissue injury, such as a sprain or strain of a joint space or muscle
- Torn ligament or tendon
- Fracture or broken bone

Assessment

- Deformity
- Swelling
- Sensation
- Perfusion (pulses, cap refill)
- Range of motion



Soft Tissue Injury

- Usually without point tenderness
- + Swelling, tenderness with ROM, normal sensation
- Neurovascularly intact, no deformity
- Treat with (RICE) Rest, Ice, Compression (splint or wrap), Elevation and anti-inflammatory medication (Ibuprofen)

Ligament or Tendon Injury

- Can be mild or severe
- Mild may only require RICE (rest, ice, compression (splint or wrap), elevation) and anti-inflammatories
- Severe may require surgery – will have loss of ROM if ligament or tendon is severed

Fractures: Most common

- Finger
- Distal radius (Buckle Fracture)
- Nursemaid's elbow common in < 5-year-olds
- Supracondylar (humerus)
- Clavicle
- Lateral malleolus (ankle)

Fractures: Emergent

- Open fracture
 - Think Basketball.....**Kevin Ware**...
- Surgical emergency
- Cover with sterile gauze and send to ED
- Deformity, compromised pulses or cap refill also indicate need for emergent evaluation

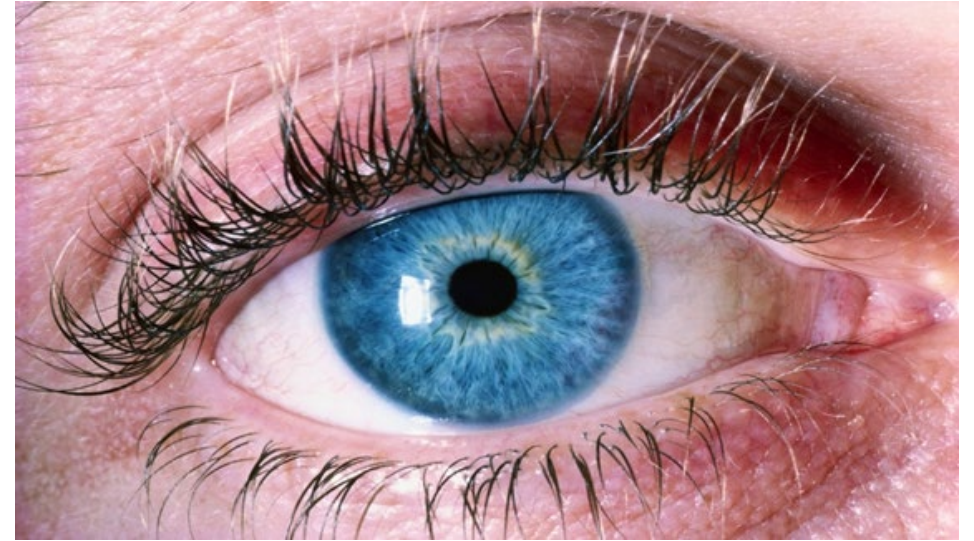
Fractures: Urgent

- Injuries with point tenderness may indicate a fracture and should have an x-ray
- + Fracture may require splinting or casting or a combination of both
- Return to regular activity is determined by the provider



Eye Injuries

- Corneal abrasion
 - Symptoms:
 - Tearing
 - Pain
 - Feeling as if something is in the eye
 - Sensitivity to light



Corneal Abrasion

- Needs evaluation, including exam of the eye with fluorescent stain.
- Good candidate for Urgent Care or Primary Care visit.
- Treatment depends on location of the abrasion on the cornea, may need to see ophthalmologist for follow up

Ruptured Globe of the Eye

- Caused by blunt or penetrating trauma to the eye
- Medical Emergency to the ER
- Do not attempt to remove any foreign body from the eye (i.e., tree branch, BB)
- Do not apply any pressure to the eye

Nose Injury / Nose Bleeds

- Nose injury:
 - check for septal deviation; treatment may be deferred until edema subsides
- Nosebleeds:
 - Pressure to nose x 10 minutes, reassess
 - Apply pressure for 10 more minutes as necessary
 - Further evaluation if bleeding does not subside after 20 minutes of direct pressure

Lacerations / Abrasions

- Hold pressure to stop bleeding
- Assess severity
- Clean with soap and water
- Apply non-stick dressing
- Evaluate at an urgent care for sutures if wound is gaping open or bleeding does not stop

Lacerations

- Lacerations to lips, tongue, inside of mouth, generally do not require sutures
- If laceration crosses the Vermilion Border of the lip, sutures are necessary



Lacerations: Home Care

- Keep area clean and dry
- Monitor for signs of infection
- Scar care as needed (massage, sunscreen)







Common Acute Illness: Urgent or Primary Provider Bound

Common Respiratory Conditions

- Asthma
- Croup
- Allergy
- URI



Asthma: Clinical Practice Guideline

- [Childrensmercy.org](https://www.childrensmercy.org)
- Search under “for health care professionals”
- Evidenced Based Practice
- Clinical practice guidelines (CPG)
- Asthma ED/UC CPG

ENT Conditions

- Ear FB
- Ear drainage
- Nosebleeds
- Sore throat



Eye Conditions

- Conjunctivitis
- Stye



Conjunctivitis: New Recommendations

- Recommendation for a delayed treatment option
- Pink Eye often self-limiting condition
 - If symptoms remain for 3 days, then evaluate and treat.

Skin Conditions

- Poison Ivy
- Eczema
- Scabies
- Viral Exanthem



Neurological Condition

- Headache
- Seizure





Urgent Care

vs

Emergent Care

- Conditions requiring prescriptions
- Injuries self-limited care
 - Simple fractures
 - Simple lacerations
- Common acute illness

- Resuscitation
 - Cardiopulmonary failure
 - Anaphylaxis
- Acute change in LOC or behavior
- Conditions requiring sedation
- Cervical spine injuries

Our Locations



LOVE WILL.

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Q & A

Use Chat Box to submit your questions