Diabetes Technologies
Insulin Pump Calculations 2020

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President, Diabetes Education Services

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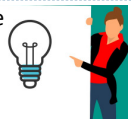
Diabetes Technologies – Insulin Pumps



- 1. Describe critical teaching content before starting insulin pump therapy
- 2. Discuss strategies to determine insulin pump basal rates.
- 3. Discuss how to determine and evaluate bolus rates including coverage for carbs and hyperglycemia.
- 4. State important safety measures to prevent hyperglycemic crises.
- 5. List inpatient considerations for insulin pump therapy and CGMs
- 6. Describe 3 essential steps for emergency preparedness.

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Conflict of Interest and Resources

- **Coach Bev has no conflict of interest**
- **Technology field is rapidly changing**
- Photos in slide set are from Pixabay – not actual clients
- **Resources**
  - AADE Practice Paper 2018- Continuous Subcutaneous Insulin Infusion (CSII) Without and With Sensor Integration
  - AADE Practice Paper 2018- Diabetes Educator Role in Continuous Glucose Monitoring
  - Company web sites – virtual demo
  - AADE – DANA **Diabetes Advanced Network Access** www.diabeteseducator.org Need to be AADE Member to access
  - Diabetes Forecast Consumer Guide 2019
  - Pumping Insulin by John Walsh, PA, CDE – Diabetes Mall
  - Gary Scheiner, MS, CDE – Integrated Diabetes Services

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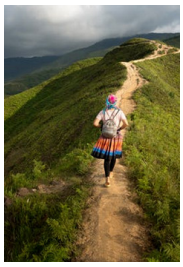
Pump Candidates: Lifestyle Indications and Attributes

- Erratic schedule
- Varied work shifts
- Frequent travel
- Desire for flexibility
- Tired of MDI
- Athletes
  - Temporary basal adjust
  - Disconnect options
  - Waterproof options



AADE Practice Paper 2018- Continuous Subcutaneous Insulin Infusion (CSII) Without and With Sensor Integration

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LifeStyle Indications for Candidate or Parents of Pump Wearer

- Parents and caretakers must have a thorough understanding and willingness and time to understand the pump and work with team to problem solve
- Willingness to work with healthcare provider during pre-pump training
- Adequate insurance benefits or personal resources

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LifeStyle Indications for Candidate or Parents of Pump Wearer

- Physical ability
  - View pump
  - Fill and replace insulin cartridge
  - Insert an infusion set
  - Wear the pump
  - Perform technical functions
- Emotional stability and adequate emotional support from family or others

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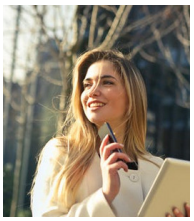
Pre Pump Knowledge / Education

- Establishment of Goals
- Competence in Carb counting
- Insulin Carb Ratios (ICR) & Correction or sensitivity factor (CF)
- Ability to manage hyper and hypoglycemia
- Self-adjust insulin
  - Carbs
  - Correction
  - Physical activity
  - Alcohol intake



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Pre Pump Knowledge / Education

- Ability to fill and insert cartridge/reservoir and insert and change infusion sets
- Ability to detect infusion set and site issues
- Manage sick days, exercise and travel
- Trouble shoot and ability to solve pump issues
- Understand BG Data
- Hypo prevention and treatment
- Basic of basal bolus therapy and how to switch back to injections if needed

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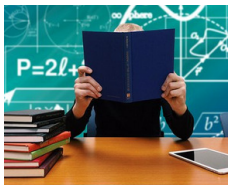
Caregiver education about pumps

- Key Topics
  - Hypo detection /treatment
  - Hyperglycemia trouble shooting
  - Basic bolus procedure
  - Cartridge set change process
  - Understand what alarms mean
  - History recall



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Poll Question 1

- Teenagers benefit from insulin pump therapy for the following reason.
- A. Can increase insulin rate to cover for alcohol intake.
- B. Decreased risk of glucose emergencies
- C. Greater dependence on parents
- D. Match insulin to hormone swings

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Toddlers to Teens Benefit

- Delayed blousing for fussy eaters
- Dosing precision 10ths 20ths and 40ths of a unit
- Reduced hypo risk
- Lockout features

- Teens
  - Basal patterns for hormonal swings
  - Historical data records/ downloading / app sharing
  - Easy snack coverage
  - Greater independence
  - Technical coolness

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Written Plan for Pump Use

- Blood glucose checks or CGM Checks
- Record keeping of BG, Carbs, insulin, activity and other issues
- Site-change guidelines
- Restart injections if needed
- When to check ketones and action to take
- Hypoglycemia and Hyperglycemia treatment guidelines

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CGM Time in Range Recommendations

- For most with type 1 or type 2 diabetes
  - > 70% of readings within BG range of 70-180mg/dL
  - < 4% of readings < 70 mg/dL
  - < 1% of readings < 54 mg/dL
  - < 25% of readings > 180 mg/dL
  - < 5% of readings > 250 mg/dL

- For under 25 years, with A_{1c} goal is < 7.5%, time-in-range target is set to about 60%.

Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range
Tadej Battelino et al. Diabetes Care Aug 2019, 42 (8) 1593-1603; DOI: 10.2337/dci19-0028

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Time in Range | Older Adults

- For older adults or those at high risk for hypoglycemia (ie, hypoglycemic unawareness, cognitive impairment, or comorbidities):
  - > 50% of BG within 70-180 mg/dL
  - < 1% of readings < 70 mg/dL
  - < 10% of readings > 250 mg/dL

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Time in Range | Pregnancy

- For those with type 1 diabetes and pregnant:
  - > 70% of BG readings within 63-140 mg/d
  - < 4% of readings < 63 mg/dL
  - < 1% of readings < 54 mg/dL
  - < 25% of readings > 140 mg/dL

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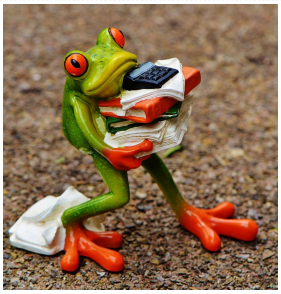
Let's practice calculating basal rates



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Initial Calculations for CSII

TDD: total daily dose

METHOD 1
Pre-pump TDD

Pre-Pump TDD x 0.75

STARTING Pump TDD
Average method 1 & 2

METHOD 2
Patient Weight

Wt (kg) x 0.50

BASAL RATE
Pump TDD x 0.5 / 24

- Start with 1 basal rate, adjust according to glucose trends over 2-3 days
- Adjust to maintain stability in fasting state (between meals & sleep)
- Add additional basals according to diurnal variation (dawn phenomenon)

CARB RATIO
450 / Pump TDD

- Adjust based on low-fat meals with known carbohydrate content
- Acceptable 2-h post-prandial rise is ~60mg/dL above pre-prandial BG
- Adjust carb ratio in 10%-20% increments based on post-prandial BG

CORRECTION RATIO
1700 / Pump TDD

- Sensitivity Factor is correct if BG is within 30 mg/dL of target range within 2 hours after correction
- Make adjustments in 10%-20% increments if 2-hr post-correction BGs are consistently above or below target

Hypoglycemia patients – start at lower value of method 1 & 2
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TDD = Total Daily Dose
TDI = Total Daily Insulin

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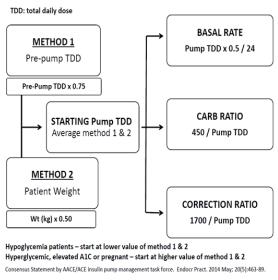
TDD insulin practice – TDD 30 units / 70kg



- Method 1 (TDD)
  - TDD x 0.75
  - 30 units x 0.75 = 22.5
- Method 2 (wt)
  - Pt wt kg x 0.50
  - 70kg x 0.50 = 35
- Final daily dose
  - A1c 6.3% - Method 1
  - A1c 9.2% - Method 2
  - A1c 7.5% - Take avg 1 & 2

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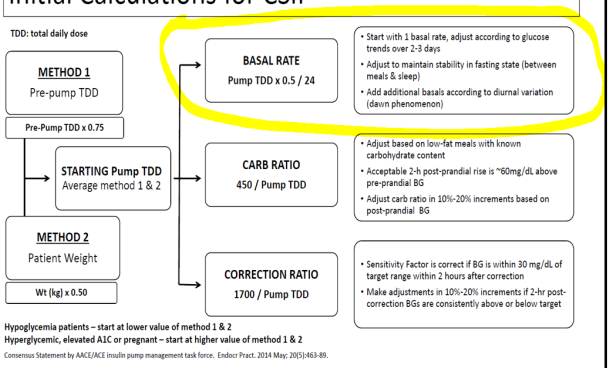
Initial Calculations for CSII



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Example – LS weighs 80 kg, TDD 50 units, A1c 8.2%

Method 1 – Based on TDD

- 50 x.75 = 37.5 units total daily dose
- 37.5 x 0.5 = 18.75 units for basal
- 18.75 divided by 24 hrs = 0.78 units/hr (Basal rate)

- Method 2 – Based on body wt
  - 80kg x 0.5 = 40 units
  - 40 x 0.5 = 20 units for basal
  - 20 divided by 24 hours = 0.83 units/hr (Basal rate)

Which method would you use? Method 2

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Example – JR weighs 70 kg, TDD 30 units, A1c 6.3%

Method 1 – Based on TDD
- 30 x.75 = 22.5 units total daily dose
- 22.5 x 0.5 = 11.25 units for basal
- 11.25 divided by 24 hrs = 0.47 units/hr (Basal rate)

- Method 2 – Based on body wt
  - 70kg x 0.5 = 35 units
  - 35 x 0.5 = 17.5 units for basal
  - 17.5 divided by 24 hours = 0.73 units/hr (Basal rate)

Which method would you use? Method 1

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Example – KL weighs 40 kg, TDD 20 units, A1c 6.2%

Method 1 – Based on TDD
- 20 x.75 = ___ units total daily dose
- 15 x 0.5 = ___ units for basal
- 7.5 divided by 24 hrs = ____ units/hr (basal rate)

- Method 2 – Based on body wt
  - 40kg x 0.5 = ___ units
  - 20 x 0.5 = ___ units for basal
  - 10 divided by 24 hours = ____ units/hr (basal rate)

Which method would you use?

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Example – KL weighs 40 kg, TDD 20 units, A1c 6.2%

Method 1 – Based on TDD
- 20 x.75 = 15 units total daily dose
- 15 x 0.5 = 7.5 units for basal
- 7.5 divided by 24 hrs = .31 units/hr (basal rate)

- Method 2 – Based on body wt
  - 40kg x 0.5 = 20 units
  - 20 x 0.5 = 20 units for basal
  - 10 divided by 24 hours = .416 (.42) units/hr (basal rate)

Which method would you use? Method 1

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Basal insulin

- Drip of rapid insulin very few minutes
- If basal rate is set correctly, stable BG between meals and hs
  - Can skip delay meals
- Delivered auto on 24 hour cycle
- Temporary adjustments may include:
  - lower basal insulin during exercise
  - increase during sick days

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Basal insulin feedback

- Keep glucose steady
  - On average, 5 different basal segments needed
- Basal insulin rate not correct
  - Glucose rises or falls even when not eating
  - Fasting glucose is elevated or low
  - Correction bolus does not get glucose to target
  - To prevent hypoglycemia, not covering for snacks
  - If person is eating to cover for in-between meal hypoglycemia

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Basal Insulin Needs

- Dawn phenomena
  - Higher needs from 3-7am for adults
  - Kids from Midnight to 7am Basal rate can be adjusted to match sleep and work schedule
- Traveling – change clock in pump to match new time

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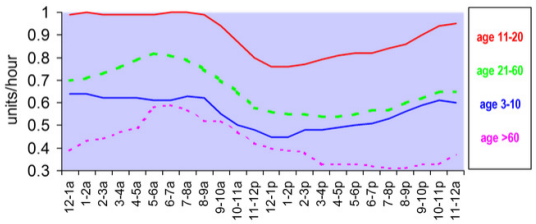
"Typical" Basal Needs

- Growth years: extended peak, evening & overnight
- Adolescent needs >> childhood needs
- Post-growth years: dawn phenonemon
- Senior needs << young adult needs



Diabetes Res & Clin Prac, 69 (2005) 14-21 Gary Scheiner, MS, CDE

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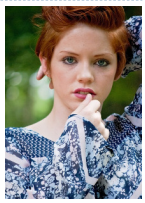
Basal Insulin Dosing – Beyond Basics



- Active, healthy
  - 35-45% of total daily insulin
- Less active, lower carb intake
  - 45-55% of total daily insulin
- Percentage may increase during puberty
- Tends to decrease with advanced age
- Sleep and growth patterns have major influence

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Adjusting basal rates – think ahead

Takes time for basal rate to affect glucose

- For children: change in basal rate **1 hour prior** to rising or falling glucose
- For adults: change in basal rate **2 hour prior** to rising or falling glucose
- Repeat basal test after adjustment

	Current basal level (units /hr)		
	0.0 – 0.45	0.5 – 1.2	>1.2
Modest Rise/Fall (30-60 mg/dl)	.05	0.1	0.2
Large Rise/Fall (>60 mg/dl)	0.1	0.15	0.3

Gary Scheiner, MS, CDE

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Bolus Rate Calculations are next

- I:C
- Sensitivity
- Timing
- Considerations

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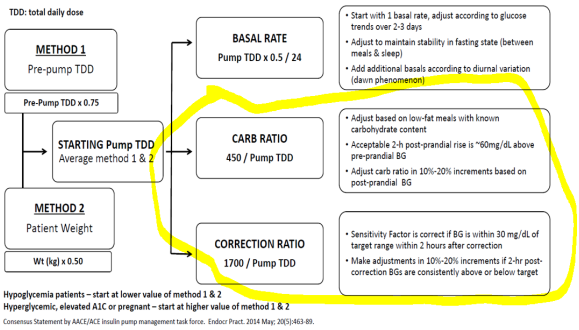
Initial Calculations for CSII



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Bolus Rates - Same for each meal to start

- CHO Ratio
  - Start with 1:15 or
  - 450 divided by TDD= I:C Ratio
- Correction/sensitivity
  - 1700 divided by TDD
- Active insulin/insulin On Board
  - 3-6 hours
- Time in Range target: 70-180 mg/dl

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Insulin to Carb Ratio I :C 450 / Total Daily Dose

- **450 Rule I:C 450/TDD**
  - 450 divided by total daily insulin dose.
  - Equals Gms of carb covered by 1unit insulin.
  - Example:
    Pt takes 45 units daily.
    450 / 45 = 10
  - 1 unit for 10 grams carb

You try
- JR TDD is 90 units
-
- 1 unit for ____ gms carb

You try
- ML TDD is 15 units
-
- 1 unit for ___ gms carb

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Insulin to Carb Ratio I :C 450 / Total Daily Dose

- **450 Rule I:C 450/TDD**
  - 450 divided by total daily insulin dose.
  - Equals Gms of carb covered by 1unit insulin.
  - Example:
    Pt takes 45 units daily.
    450 / 45 = 10
  - 1 unit for 10 grams carb

You try
- JR TDD is 90 units
- 450 / 90 = 5
- 1 unit for 5 gms carb

You try
- ML TDD is 15 units
- 450/15 = 30
- 1 unit for 30 gms carb

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Example – JR injects 30 TDD, A1c 6.7%

- 30 x.75 = 22.5 units total daily dose
- 22.5 x 0.5 = 11.25 units for basal
- 11.25 divided by 24 hrs = 0.47 units/hr
- Basal rate is 0.5 units hr

What is his I:C ratio?

- 450 / 22.5 = 20
- I:C Ratio = 20

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Insulin /Carb Ratio - How does that work?

TDD 40 units, A1c 8.2%

- Method 2 – Based on body wt
  - 80kg x 0.5 = 40 units
  - 40 x 0.5 = 20 units for basal
  - 20 divided by 24 hours = 0.83 units/hr (Basal rate)

Calculate Insulin to Carb Ratio
Use 450 rule
450 / TDD
450 / 40 = 11.25
(round down to 11)
1 unit Humalog for each 11 gms of carb
Insulin/Carb Ratio I:C 1:11

- Uses Humalog insulin
- Dinner
  - 4 ounces steak
  - 1 dinner roll
  - 1 cup mashed potatoes
  - Few sprigs broccoli
  - Glass of white wine

How much bolus for this meal?

What if she ate 60 gms?

BG is 220 – Target is 120

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Covering Carbs with Insulin

- Dose based on:
  - Grams of carb in meal
  - Insulin carb ratio or fixed dose?
- Right dose?
  - Brings glucose to prebolus glucose level within 3-4 hours
  - If BG rises more than 60 - 80 points 2 hours post meal, needs adjustment
  - If BG falls more than 30 points 2 hours post meal, may need adjustment
  - Adjust in small increments (10-20% ideal)

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But wait… what about correction insulin for current glucose level? 1700/TDD - Target 120

TDD = 40 units
BG target is120.
Current BG is 220.
Based on her current BG, how much correction insulin does she need to get to target?

- Correction/sensitivity
  - 1700 divided by TDD
  - 1700 / 40 = 42.5 or 43
  - **Correction: I unit of insulin lowers BG 43 points.**

220 – 120 = 100 over target
100 / 43 = 2.3 units to correct for hyperglycemia

What if her BG is 320?
320 – 120 = _____ over target
_____units to correct for hyperglycemia

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Correction Insulins Example

Correction Factor Fine-Tuning
Mathematical Approach
The lower the TDI = more insulin sensitive

Correction Scale / TDI	Sensitivity mg/dl 30 units	Sensitivity mg/dl 40 units	Sensitivity mg/dl 50 units
Aggressive (1500) 1500 / TDI	?	38	?
Common (1700) 1700 / TDI	57	43	34
Conservative (2000) 2000 / TDI	67	?	?

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But wait, what about IOB?

- Method 2 – Based on body wt
  - 80kg x 0.5 = 40 units
  - 40 x 0.5 = 20 units for basal
  - 20 divided by 24 hours = 0.83 units/hr (Basal rate)

Insulin to Carb Ratio I:C
450 / TDD
450 / 40 = 11
I:CR = 1:11

Correction/sensitivity
1700 divided by TDD
1700 / 40 = 42.5
Correction: 1:43 points.

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Active Insulin time - IOB

- How much "insulin on board" IOB to prevent stacking and hypoglycemia
- Typical active insulin time is 3-5 hours
  - Average about 4 hours
- Action time shorter in leaner, young, active individuals in hot climates
- Action time is longer, 6-8 hours, for those with renal disease or using regular insulin
- Careful monitoring or CGM to eval if bolus rates set correctly

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Pump Bolus Estimate Features

- Based on glucose and carb data entered by user

Bolus Estimate Details	
Total	8.1 U
Food intake	75 gms
BG	220
Food Dose	6.8 U
Correction Dose	2.3 U
Insulin-On-Board	1.0 U
(Based on BG and Carbs entered by user.)	

ICR 1:11 gms
Correction 1unit for 43
Target BG 120
Active insulin on board (IOB) subtracted from the correction

75 gms carb/11 = 6.8 units
Correction 220-120 = 100/43 = 2.3 units
IOB = 1 unit
6.8 + 2.3 = 9.1 – 1 units = 8.1 units
Bolus delivery of 8.1 units

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What bolus would this person need?

- Plans to eat 75 gms Carb Snack
- BG is 68

Bolus Estimate Details	
Total	U
Food intake	75 gms
BG	68
Food Dose	?.0 U
Correction Dose	?.0 U
Insulin-On-Board	2.0 U
(Based on BG and Carbs entered by user.)	

ICR 1:15 gms
Correction 1unit for 50
Target BG 100
Active insulin on board (IOB) subtracted from the correction

75 gms carb/15 = _____ ?units
Correction __ -100 = ___ /50 ?units
IOB = 2 unit
Total insulin = ___?units

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Poll Question 2

- For case study, how much bolus insulin?
  - A. 3.6 units
  - B. 2.4 units
  - C. 4 units
  - D. Determine activity first

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What bolus would this person need?

- Plans to eat 75 gms Carb meal
- BG is 68

Bolus Estimate Details	
Total	2.4 U
Food intake	75 gms
BG	150
Food Dose	3.0 U
Correction Dose	-.64 U
Insulin-On-Board	2.0 U
(Based on BG and Carbs entered by user.)	

ICR 1:15 gms
Correction 1unit for 50
Target BG 100
Active insulin on board (IOB) subtracted from the correction

75 gms carb/15 = 5 units
Correction 68 -100 = -32/50 = -.64 units
IOB = 2 unit
Total insulin = 2.4 units

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Not using insulin/carb bolus ratios?

- Fixed dosing
  - Take half of total daily dose, divide by number of meals to get fixed dose per meal
  - Calculate insulin sensitivity correction factor
    - 1700 ÷ by total daily insulin
  - No target BG – choose acceptable target range

40 units x 0.5 for basal and bolus
20 units/24 for basal = 0.83 hr
20 units for bolus
20 units/3 meals
7, 6, 7 units per meal plus correction
Correction 1700/40 units = 1:43

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Advanced Pump Features

- Prolonged bolus for
  - Gastroparesis, amylin, GLP-1 Receptor Agonists
- Advanced Basal Features
  - Temporary basal rates
  - Secondary, tertiary programs
- Custom alerts examples

A1c of 13% - Alarm at 70
A1c of 8% - Alarm 70 – 300
A1c of 7 % - Alarm 70-250

- Data downloads

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Prolonged bolus

- Standard bolus
  - Delivered within a few minutes
  - Peaks in one hour
  - Lasts for 4 hours
- Prolonged bolus
  - Delivered over a couple of hours
  - Peak delay
  - Duration extended
- Purpose
  - Match insulin to absorption of food
  - Works well with slowly digested food
- Applications
  - Large portions
  - Slow consumption
  - Gastroparesis
  - Use of incretin mimetics

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Prolonged bolus

- Square/extended
  - None of the bolus is delivered up front
  - Common timing is 1-2 hours after start of meal
  - Can last for up to 8 hours
- Dual/combo/ combination bolus
  - 30% delivered up front, the rest of bolus over the next several hours.
  - Lasts about 5 hours

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Insulin coverage for protein?

- Most of time, protein won't affect glucose
- If person on low carb diet, protein may start impacting blood glucose levels
  - Bolus for 50% of protein grams
- If large protein portion consider extended bolus

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Problem solving

- Prevent missed boluses
  - 1 missed meal bolus over a month raises A1c 0.5%
  - Get in habit of pre-bolusing – 15 minutes before meal works best
  - Use reminder alerts on pumps
- If basal or bolus is more than 65% of total daily dose, usually indicates need to recalculate ratios

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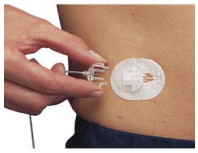
Disconnecting from Pump



With pump therapy, there is no background insulin on board

- BG rises about 1 mg/dl a minute when disconnected
- Avoid extended disconnection since can lead to ketones and hyperglycemia
- Strategies
  - Short term disconnection < 1 hour
    - Bolus to replace missed basal insulin
  - Long term >1 hour and bolus missed basal insulin hourly
  - Protective caps usually not necessary

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Safety guidelines

- Review signs and treatment of hypo
- If frequent lows, may want to set pump alarm at 90
  - Try not to suspend pump when low, unless no treatment available
- Diabetes Ketoacidosis
  - Those with negative c-peptide at higher risk
  - Insulin pump interruption for 2-3 hours can lead to DKA
  - Provide education to prevent, detect and reverse

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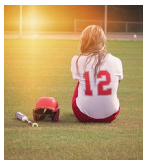
Poll Question 3

- AL is on an insulin pump. Her BG at 10am is 108, at 11am, 219 and noon 298. She has not eaten anything since breakfast. What is best action?
- A. Program insulin pump to deliver 3 units bolus stat
- B. Increase basal rate starting at 8am
- C. Go to emergency room
- D. Check for ketones



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Prevent DKA and Hyperglycemia

- Eval sites for malabsorption, make sure to change site and infusion sets every 2-3 days
- Protect insulin from overheating
- Tubing or infusion set clogs – change site
- Check for leaks, smell for insulin, use angled sets
- Make sure to purge air bubbles before priming tube
- Inspect daily for dislodgement
- Correct priming technique when changing infusion set
- Extended pump suspension or disconnect?
- Limit suspension to one hour, always have back-up syringes

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Action in Case of Hyperglycemia for Pump Users

- Unexplained hyperglycemia
- Ketone negative
- Ketone positive

Check for Ketones

Bolus with pump

Inject insulin
Drink H20
Change out pump

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Ketone Testing Options

- Urine ketostix or diastix
  - More than 15 mg/dl = positive ketones
- Blood sampling
  - Novamax or Precision Xtra blood meter
  - More than 0.5 mmol/l β – hydroxybutyrate indicates action and insulin needed

https://www.novabio.us/nova-max-plus/

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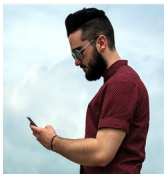
Keeping connected - Pump Users need to contact clinical staff if:



- Severe or repeated hypo
- Ketosis
- Signs of infection
- Call pump company if technical difficulties
- See pumper in 1-2 weeks, download device, troubleshooting
- At 3-4 weeks review more advanced features

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Hospital Stay for Insulin Pump Users

- Staff to assess:
  - How long using pump?
  - Who adjusts pump settings?
  - What type of insulin is used?
  - How much insulin is in pump now?
  - When is next site change? Who does it?
  - Basal rates? I:C ratios? Correction?
  - Have your supplies?
  - When usually check BG or CGM?

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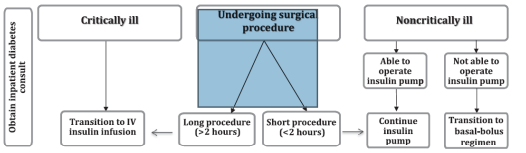
Patient With Insulin Pump Admitted to Hospital



Changes to Pump Therapy With Imaging Studies	
X-ray/CT	Pump should be covered by lead apron
MRI	Pump and metal infusion set should be removed
Ultrasound	No need to remove pump but transducer should not be pointed directly at the pump
Cardiac catheterization	Pump should be covered by lead apron
Pacemaker/automatic implantable cardioverter defibrillator (AICD)	Pump should be covered by lead apron
Colonoscopy/EGD	Pump can remain in place
Laser surgery	Pump can remain in place

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Hospital Stay - Need orders

- Backup plan in case pump can't be used
- Don't stop pump without administering rapid insulin first (or IV insulin).
- Designate surrogate programmer(s)
- Specify frequency and carb count for meals/snacks
- Keep pump and programmer outside room during MRI, CT Scan, Xray.
- Don't aim Echo/US transducer at pump
- CGM - Remove infusion set and sensor for MRI
  - Hospital meter to determine BG levels

Refer to individual tech user manual for more detailed info

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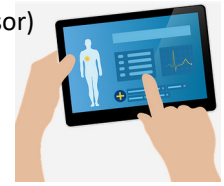
Pumpers Responsibility in Hospital

- Provide own pump (and sensor) supplies
- Change pump reservoirs and infusion sets
- Provide staff with SMBG and insulin doses
- Notify staff of adjustments to standard doses
- Respond to alarms



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Backup Plan if pump isn't working

- Immediate basal insulin injection
- Mealtime rapid insulin injection
- Keep written log of I:C ratios, correction and meal boluses
- Keep log of off-pump activity
- Resume pump when basal insulin wears off

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Poll Question 5

- JL is on an insulin pump and CGM and asks the diabetes educator how to best prepare for emergency situations. What is the most critical step to take in case of an emergency evacuation?
- A. Have back up energy source
- B. Keep insulin on ice
- C. Know the CDCs info line number
- D. Alert local emergency responders of status

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Medical Diabetes Identification

- Speaks when you cannot
- Necklace, bracelet or watch band
- A wallet card is additional identification only

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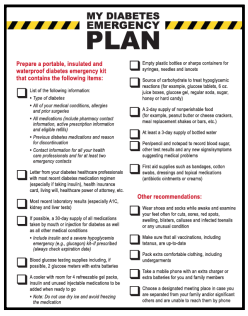
Prepare A Portable Emergency Kit


MY DIABETES EMERGENCY PLAN

Prepare a portable, insulated and waterproof diabetes emergency kit that contains the following items:

- List of the following information:
  - Type of diabetes
  - All of your medical conditions, allergies and prior surgeries
  - All medications (include pharmacy contact information, active prescription information and eligible refills)
  - Previous diabetes medications and reason for discontinuance
  - Contact information for all your health care professionals and for at least two emergency contacts
- Letter from your diabetes healthcare professionals with most recent diabetes medication regimen (especially if taking insulin), health insurance card, living will, healthcare power of attorney, etc.
- Most recent laboratory results (especially A1C, kidney and liver tests)
- If possible, a 30-day supply of all medications taken by mouth or injection for diabetes as well as all other medical conditions
  - Include insulin and a severe hypoglycemia emergency (e.g., glucagon) kit–if prescribed (always check expiration date)
- Blood glucose testing supplies including, if possible, 2 glucose meters with extra batteries
- A cooler with room for 4 refreezable gel packs, insulin and unused injectable medications to be added when ready to go
  - Note: Do not use dry ice and avoid freezing the medication
- Empty plastic bottles or sharps containers for syringes, needles and lancets
- Source of carbohydrates to treat hypoglycaemic reactions like example, glucose tablets, 4 oz. juice boxes, glucose gel, regular soda, sugar, honey or hard candy)
- A 2-day supply of non-perishable food (for example, peanut butter or cheese crackers, meal replacement shakes or bars, etc.)
- At least a 3-day supply of bottled water
- Pen/pencil and notepad to record blood sugar, other test results and any new signs/symptoms suggesting medical problems
- First aid supplies such as bandages, cotton swabs, dressings and topical medications (antibiotic ointments or creams)

Other recommendations:

- Wear shoes and socks while awake and examine your feet often for cuts, sores, red spots, swelling, blisters, calluses and infected toenails or any unusual condition
- Make sure that all vaccinations, including tetanus, are up-to-date
- Pack extra comfortable clothing, including undergarments
- Take a mobile phone with an extra charger or extra batteries for you and family members
- Choose a designated meeting place in case you are separated from your family and/or significant others and are unable to reach them by phone

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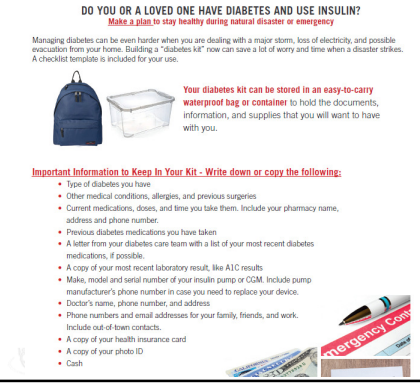
www.diabetesdisasterresponse.org



Please check out this Diabetes Disaster Response Resource Page.

Let's help get people ready for the worst.

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Disaster Readiness

- **American Red Cross Shelters:** Contact the American Red Cross directly at 1-800-RED-CROSS.
- **Resource For Health Care Providers**:
  - **Insulin Supply Hotline:** During a disaster, call the emergency diabetes supply hotline 314-INSULIN (314-467-8546) if you know of diabetes supply shortages in your community (i.e. shelter, community center). Hotline is for health care providers only.

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Disaster Readiness

- **Have an Emergency Diabetes Kit Ready**:
- People with Diabetes can download the Diabete Disaster Response Coalition's (DDRC) Diabetes Preparedness Plan.
- **Stay Updated**: Visit JDRF Disaster Relief Resources and Diabetes Disaster Response Coalitions Facebook page with information on how to access medical support, shelters, and open pharmacies during time of disaster.
- **Know where to get help**:
- Call 1-800-DIABETES (800-342-2383).
- American Diabetes Association Center is open, MON.-FRI. 9 a.m. TO 7 p.m. ET.
- Representatives regularly updated with information on how to access medical support, shelters, pharmacies

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Thank You

- Please email us with any questions.

bev@diabetesed.net

- www.diabetesed.net

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Extra info for further reading

- Traveling with Diabetes

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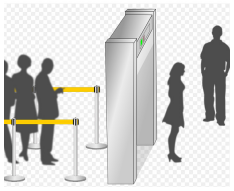
What about diabetes Tech and Security?

- Refer to training manual for each manufacturer
- To be safe, ask for pat down if wearing pump, CGM or both



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Travel Suggestions from Diabetes.org

- Pack medications in a separate clear, sealable bag. Bags that are placed in your carry-on-luggage need to be removed and separated from your other belongings for screening.
- Keep a quick-acting source of glucose to treat low blood glucose as well as an easy-to-carry snack such as a nutrition bar
- Carry or wear medical identification and carry contact information for your physician

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Travel: What items allowed?

- Insulin and insulin loaded dispensing products (vials or box of individual vials, jet injectors, biojectors, epipens, infusers and preloaded syringes)
- Unlimited number of unused syringes when accompanied by insulin or other injectable medication
- Lancets, blood glucose meters, blood glucose meter test strips, alcohol swabs, meter-testing solutions
- Insulin pump and insulin pump supplies (cleaning agents, batteries, plastic tubing, infusion kit, catheter and needle)—insulin pumps and supplies must be accompanied by insulin

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Travel: What items allowed?

- Glucagon emergency kit, Urine ketone test strips
- Unlimited number of used syringes when transported in Sharps disposal container or other similar hard-surface container
- Sharps disposal containers or similar hard-surface disposal container for storing used syringes and test strips
- Liquids (to include water, juice or liquid nutrition) or gels
- Continuous blood glucose monitors
- All diabetes related medication, equipment, and supplies

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Travel Suggestions from Diabetes.org

- Review TSA's website for travel updates
- Download My TSA Mobile App
- Whenever possible, bring prescription labels for medication and medical devices (while not required by TSA, making them available will make the security process go more quickly)
- Consider printing out and bringing an optional TSA Disability Notification Card.

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