Cheat sheet for switching to Basal – Bolus regimen with glargine (Basaglar) and lispro (Humalog)

Glargine (Basaglar) is a 24-hour <u>basal</u> insulin analog that covers hepatically produced glucose to prevent high glucose between meals and overnight. Unlike NPH insulin, it does not provide mealtime coverage. Therefore, it is necessary to **take lispro (Humalog), a rapid acting insulin analog as a <u>bolus</u> with all meals**. Basaglar insulin has no peak so there is less risk for hypoglycemia between meals or when food is not available. This regimen also allows the child/young adult to choose the time they eat and vary the meal size. The regimen requires 4 injections a day if the child/young adult eats 3 meals a day. Humalog insulin has its peak action between 1-2 hours, so it provides only limited insulin coverage for small snacks between meals and at bedtime.

- **Basaglar insulin** can be given at any time of the day but must be given at around the same time every day. It can be given with or without food. It can be given at the same or different time as Humalog insulin (at different injection sites). ***Usually* given at bedtime or evening meal (easier to remember).**
- **Humalog insulin** should be injected 10-15 minutes before the start of the meal (or at the same time, if the blood glucose levels are low). The timing before the meal is most important for breakfast. For other meals, you can try giving the dose just before the meal.

How to calculate Basaglar and Humalog doses	**Recommendations**	**Examples**
1. Calculate **total daily insulin dose (TDD)** based on age and pubertal status** **2. Give 40% of TDD as Basaglar and remaining 60% as Humalog insulin.** Divide Humalog between the number of meals eaten per day	****Calculate TDD:** • Children under 3 years of age: start at 0.25 units/kg/day, may need up to 0.5 units/kg/day • Over 3-years of age prepubertal: start at 0.5 units/kg/day; may need up to 1.0 units/kg/day • Pubertal: start at 1.0 units/kg/day, may need up to 2.0 units/kg/day • Post pubertal: 0.4 - 1.0 units/kg/day.	***Example:*** 1. 16-year-old post menarche girl: 56kg x 1.0 units/kg/day = **56 units TDD** 2. 40% of the TDD as Basaglar = 56 x 0.4 = 22 units Basaglar (rounded up) 3. 60% of the TDD as Humalog = 34 units of Humalog; divided into 3 meals = 11 units (rounded); this is the average dose for each meal (see page 2*). 4. Check that the sum of Basaglar and Humalog is the TDD of 56 units.

****Age based calculation of Total Daily Dose (TDD). If child/young adult is new to insulin, <u>start on lower end of dosage range</u>. If transitioning from NPH&R or Premixed insulin, and if in doubt, also start on the lower end of dosage range. Be aware that the dose will probably require further adjustment, so a close follow up of blood glucose levels is required.**

Cheat sheet for Basaglar & Humalog switch - adapted from Basaglar & R guide developed by Dr Debra Cohen & Amanda Perkins NP; 2023; modified by Prof Carine De Beaufort for Life for a Child, 30 April 2024 & revised Jan 2025; reviewed by Dr Yeray Novoa-Medina, and Dr Ragnar Hanas Oct 2025

***Dividing Humalog rapid acting insulin dose between meals**

If the child/young adult does not eat the same amount of carbohydrates with every meal, it is necessary to vary the Humalog dose at the different meals. For example, 3 cooked spoons of rice will require more Humalog insulin than 1 cooked spoon. One bowl of rice will require more insulin than one bowl of soup.

1. Obtain a complete diet history.
2. Determine the size of each meal (small, average, or large) based on the amount of carbohydrate in the meal
3. Divide the **total Humalog dose by** the number of meals to get the **average** meal dose.
4. Increase or decrease the average meal dose (Humalog insulin) depending on the size of the meal.
   - Large meal: Increase average meal dose by 1-2 units.
   - Small meal: Decrease average meal dose by 1-2 units.
   - **Not eating = Do not give Humalog insulin**

Example: The 16-year-old girl eats the smallest amount of carbohydrates at breakfast (e.g. 1 egg on 1 slice of toast), a large amount of carbohydrate at lunch (e.g. large bowl of rice with sauce and 1 slice of bread) and an average amount of carbohydrate at dinner (e.g. small bowl of rice with some chicken and non-starchy vegetables).

If total Humalog is 34 units, she would get 34/3 = 11 units (rounded) for the average meal.
Decrease this by 1-2 units for the small meal (9 units) and increase by 1-2 units for the large meal (13 units). This girl will take 9 units Humalog at breakfast, 13 units at lunch, and 11 units at dinner. If she does not eat a meal, she does not need to take Humalog insulin at that time.

Making the Switch:

Day of starting Basaglar and Humalog	**Example**
1. Morning dose: - Substitute Humulin Regular (short acting) insulin for Humalog (either same or adjusted dose, depending on the dose conversion method used. See Basaglar-Humalog switch guide). - The young girl takes usual morning dose of intermediate acting Humulin NPH then eats as usual - If on Humulin 70/30 - Premixed insulin; take normal morning dose without Humalog	Existing dose: A 12-year-old girl takes 9 units of Regular and 18 units of NPH before breakfast and 5 units Regular and 8 units NPH before the evening meal. **Her TTD is 40 units**. Give 40% of TDD as Basaglar and remaining 60% as Humalog insulin Her new doses/regimen are: • 16 units Basaglar at bedtime and • 8 units Humalog insulin at each average meal (including lunch), or adjust according to her meal sizes (24 units of Humalog in total) **However**, **her morning insulin on the day of starting Basaglar is her 'existing' dose of 9 units of Humalog and 18 units NPH.**
2. Lunch dose: If the young girl has been taking Regular at lunch, this can be done as usual **but with Humalog** insulin	This young girl takes no insulin at lunch time with her current regime. However, since glargine gives less of a peak at lunchtime compared to NPH, she will probably need a small dose of Humalog for lunch. If she usually takes a meal insulin (Regular) at lunchtime, she could take her usual dose but switch to Humalog on this day.
3. Evening meal dose: Give Humalog according to new calculations prior to evening meal	She takes 8 units Humalog for an average evening meal
4. Give new dose of Basaglar at bedtime (or evening meal whatever is most convenient and easiest to remember)	She takes 16 units Basaglar at the evening meal (e.g., 22:00)
Check Blood Glucose level (BGL) at a minimum: before each meal, at bedtime, and at least once at 2-4am for the first two weeks after starting Basaglar.	

What to do if your child/young adult misses Basaglar in the evening and remembers on waking in the morning:	**What to do if your child/young adult misses Basaglar and the next dose <u>is due in less than 6 hours:</u>**
1. Give half the dose of missed Basaglar in the morning	1. Do not give missed dose at all
2. Test for urine ketones (if available); call clinic if ketones present +	2. Test urine for ketones; call clinic if +
3. "Correct" a high morning blood glucose level with Humalog insulin according to the correction factor given to child/young adult	3. "Correct" a high blood glucose level with Humalog insulin at the next meal according to the Insulin Sensitivity Factor given to child/young adult (see below under Advanced Topics)
4. Resume usual Basaglar dose at regular time	4. Resume usual Basaglar dose at regular time

ADVANCED TOPICS

Using Insulin Sensitivity Factor (ISF) as correction scale for child/young adults:

The **Insulin Sensitivity Factor (ISF)** also referred to as Correction Factor**,** is the amount that 1 unit of rapid acting insulin drops the blood glucose level, for example: an ISF of 100 means 1 unit of rapid acting insulin will drop the blood glucose level by 100 mg/dL

To calculate the ISF use the 1800 rule (or 100 rule if using mmol/L):

Example:

Child has **Total Daily Dose** (TDD) of 19 units for an average day (i.e. 8 units Basaglar, 5 units of Humalog for breakfast, 3 units for lunch and 3 units for the evening meal)

- **If using mg/dL - 1800 divided by the TDD**: 1800 ÷ 19 = 95 this means that 1 unit of Humalog insulin drops the blood glucose level by 95 mg/dL.
- **If using mmol/L – 100 divided by the TDD:** 100 ÷ 19 = 5.2 this means that 1 unit of Humalog insulin drops the blood glucose level by 5mmol/L (rounded down).

Suggestion if calculating the Insulin Sensitivity Factor is too complex, create a table to give to parents/young adult to take home:

- If blood glucose level is > 200 – 300 mg/dL (> 11 - 16 mmol/L*) take 1 extra unit of Humalog insulin with meal.
- If blood glucose level is > 300 - 400 mg/dL (> 16 – 22 mmol/L*), take 2 extra units of Humalog insulin with meal.
- If blood glucose level is > 400 mg/dL (> 22 mmol/L*), take 3 extra units Humalog of insulin with meal.

Add the extra Humalog insulin to the meal dose before eating a meal.

*rounded numbers

NOTE: Only use rapid acting insulin (or short acting if rapid acting is not available) to 'correct' high blood glucose levels

Adjusting Insulin in the Clinic

Principles of Insulin Adjustment

Parents/young adults should bring blood glucose level log and meter with them to every visit. Check meter against written record.
Review blood glucose level history, looking for patterns.
Keep in mind blood glucose level targets:

Time of day	Target (mg/dL)	Action Needed if	Target (mmol/L)	Action Needed if
Before meals	70-126	<70 or >180	4-7 mmol/L	<4 or >10
After meals	90-180	<70 or >200	5-10 mml/L	<4 or >11
At bedtime	108 -180	<108	6-10 mml/L	<6
At 3am	90-144mg/dL	<80	5-8mmol/L	<5

Source:LFAC/ISPAD/IDF Pocket book guidelines, 2017

NOTE: Before making insulin adjustments, consider external or temporary factors: insulin storage, lipohypertrophy, illness, physical activity, menstrual cycle, change in food consumed or no food.

Which insulin to adjust:

If the blood glucose level is **high**…..	**increase** ……..
Before breakfast	Basaglar
Before lunch	Morning Humalog dose
Before dinner	Lunch Humalog dose
At bedtime	Dinner Humalog dose

If the blood glucose level is **low**……	**decrease**……
Before breakfast	Basaglar
Before lunch	Morning Humalog dose
Before dinner	Lunch Humalog dose
At bedtime	Dinner Humalog dose

- Adjust Humalog insulin by 1 to 2 units, depending on whether child/young adult is taking small or large amount of insulin.
- Adjust Basaglar by 1 to 2 units, depending on whether child/young adult is taking small or large amount of insulin.

Disclaimer

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