

Insulin Initiation



**BRIAN MOSES, MD, FRCPC
(INTERNAL MEDICINE)
CHIEF OF MEDICINE, SOUTH
WEST HEALTH**

Disclosures



- In the past 12 months, I have received speakers honoraria from AstraZeneca, Boehringer Ingelheim, Bristol Myers Squibb, Eli Lilly, Merck, NovoNordisk, Pfizer, Sanofi Aventis, and Servier.
- I have received travel funding from Pfizer, Sanofi Aventis, Merck, and AstraZeneca
- I have no financial interest in any pharmaceutical company

Objectives



- To identify patients appropriate for insulin initiation.
- To select an appropriate insulin for patients beginning insulin therapy.
- To become familiar with a practical way of initiating and titrating insulin.

Case 1



- Mr. Jones, 58 year old male, 100 kg, BMI 35, T2DM 8 yrs, **A1C = 8.2%**
- On metformin 1gm BID, gliclazide MR 120mg OD, sitagliptin 100mg OD

Breakfast	Lunch	Dinner	Bedtime
10.5	8.5	8.1	8.0

- **Is this patient well controlled?**
 - **Does this patient require insulin?**
- If “yes”...
- **How would you start insulin here?**
 - **How do you titrate the insulin dose?**
 - **What do you do with the oral agents?**

Recommended Targets for Glycemic Control^{*^}

Target	A1C** (%)	Fasting/Pre-meal (mmol/L)	2-hour Post-meal (mmol/L)
Target most patients	☒ 7.0	4.0 – 7.0	5.0 – 10.0
Normal Range Consider for patients in whom it can be achieved safely	☒ 6.0	4.0 – 6.0	5.0 – 8.0

•Treatment goal and strategies must be tailored to the patient, with consideration given to individual risk factors

^Glycemic targets for children ☒ 12 years of age and pregnant women differ from these targets

**An A1C of 7% corresponds to laboratory value of 0.070. Where possible, Canadian laboratories should standardize their A1C value to DCCT levels (0.04-0.06). A1C target of 7.0% refers to approximately 15% above the upper limit of normal

When to initiate insulin



- In people with type 2 diabetes, if individual treatment goals have not been reached with a regimen of nutrition therapy, physical activity and sulfonylurea, sulfonylurea plus metformin or other oral antihyperglycemic agents, insulin therapy should be initiated to improve glycemic control.
- Insulin may be used as initial therapy in type 2 diabetes, especially in cases of marked hyperglycemia (A1C $\geq 9.0\%$)

When to initiate insulin (practically)



- Basically, if adjusting oral agents is unlikely to achieve target.
- For example, if on one oral and A1c is $>8.5\%$, on 2 orals and A1c is $>8.0\%$, or on three orals and above 7.0 (assuming target of 7.0 for the patient).
- After several years of diabetes, it is unlikely that someone suddenly will change lifestyle enough to significantly impact A1c – escalate therapy (e.g. insulin), and later can back off if they really do change and sugars come way down.

Case



- With an A1C of 8.2% and all fasting readings above 7, this patient is not well-controlled.
- As they are already on 3 oral agents at maximum dose, Insulin is appropriate therapy for this person.
- So:
 - What insulin?
 - What dose?
 - What about the orals?

Action Profiles of Bolus & Basal Insulins

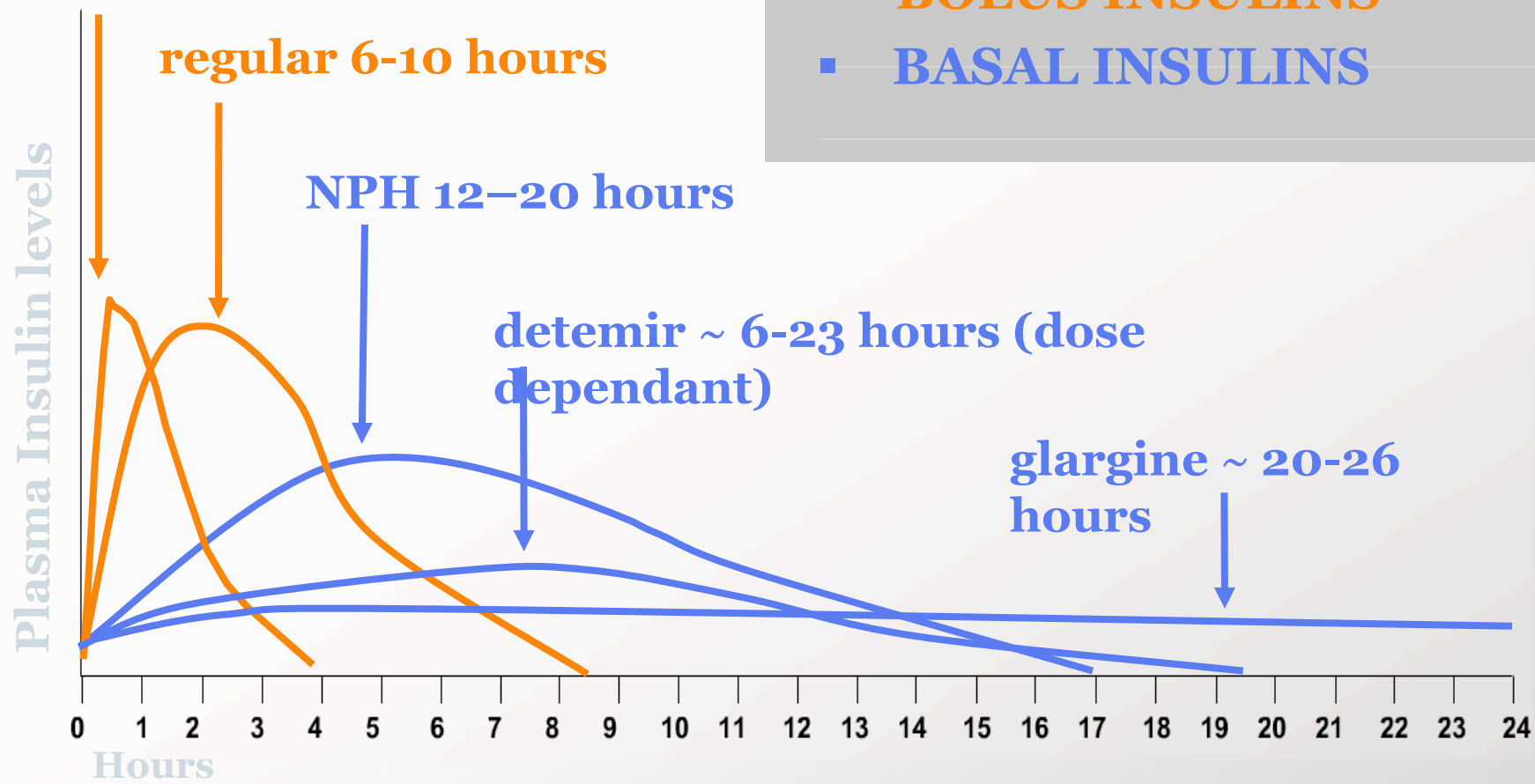
lispro/aspart/gulisine 4–6 hours

regular 6-10 hours

NPH 12–20 hours

detemir ~ 6-23 hours (dose dependant)

glargine ~ 20-26 hours



- **BOLUS INSULINS**
- **BASAL INSULINS**

Note: action curves are approximations for illustrative purposes. Actual patient response will vary.

Basal selection



- NPH
 - Pros: Cheapest, covered by Pharmacare, similar A1c results
 - Cons: Inferior in terms of overall hypoglycemia, especially nocturnal hypoglycemia.
- Glargine
 - Pros: Cheaper than detemir, truly 24 hours, minimal hypoglycemia
 - Cons: More expensive than NPH, more weight gain than detemir
- Detemir
 - Pros: Sometimes 24 hours, minimal hypoglycemia, least weight gain
 - Cons: Most expensive, often not 24 hour?

Bottom line on basal



- **If no drug coverage:**
 - Start with NPH, only switch if hypoglycemia is a problem.
- **If drug coverage:**
 - Select basal of your choice. I would generally use an analogue.

Case



- Mr. Jones is on family pharmacare.
- You elect to start NPH
- What dose?

Case



- You give Mr. Jones a prescription for NPH 10 units subcutaneously at bedtime.
- You send him to the diabetes education centre for insulin teaching and instructions for titrating insulin by one unit every 1-2 days if his sugars remain above 7.0 in the morning, or until he is experiencing lows.