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How to Switch Insulin Products

Updated January 2025

--See footnote g for general considerations. Information in chart is from product labeling (see footnote a) unless otherwise specified.--

from **NPH**	from **insulin glargine U-100**[b]	from **insulin degludec** (*Tresiba*)	from **insulin glargine U-300** (*Toujeo*)	from **premix**
Switching TO insulin glargine U-100[b]				
• NPH once daily: convert unit-per-unit to U-100 insulin glargine and give once daily.[1] • NPH twice daily: reduce total daily dose by 20% and give insulin glargine once daily.[1]	• Convert unit-per-unit.[1]	• Reduce dose by 20%.[3] • If the insulin degludec (*Tresiba*) dose is >80 units, divide the insulin glargine dose every 12 hours.[3]	• Reduce dose by 20%.[1]	• Add up the total units for each dose and give 70% to 75% as insulin glargine U-100 once daily.[2] • Give 25% to 30% of each premix dose as prandial insulin (regular or rapid-acting) before the meal(s) before which the premix was usually taken.[2]
Switching TO insulin glargine U-300 (*Toujeo*)				
• NPH once daily: convert unit-per-unit to insulin glargine U-300 (*Toujeo*) and give once daily.[f] • NPH twice daily: reduce total daily dose by 20% and give insulin glargine U-300 (*Toujeo*) once daily.[f]	• Convert unit-per-unit and give once daily.[f] • A higher daily dose (about 10% to 18%) of *Toujeo* may be needed to achieve control.[6,f]	• Reduce dose by 20%.[3]	—	No specific guidance is available. • Consider converting to *Toujeo* once daily unit-per-unit based on the long-acting component of the premix insulin, if the premix insulin is given **once daily**.[1,f] Consider giving 80% of the long-acting component as *Toujeo* once daily, if the premix insulin is given **twice daily**.[1,f] • Add prandial insulin, if desired.
Switching TO insulin degludec (*Tresiba*)				
• Convert total daily dose unit-per-unit and give once daily, or reduce dose by 20% (for patients with type 1 diabetes [Canada], twice-daily basal insulin [Canada], or pediatrics [US]) and give once daily.[h]	• Convert total daily dose unit-per-unit and give once daily, or reduce dose by 20% (for patients with type 1 diabetes [Canada], twice-daily basal insulin [Canada], or pediatrics [US]) and give once daily.[h]	—	• Convert total daily dose unit-per-unit and give once daily, or reduce dose by 20% (for patients with type 1 diabetes [Canada], twice-daily basal insulin [Canada], or pediatrics [US]) and give once daily.[h]	No specific guidance is available. • Consider switching based on the long-acting component of the premix insulin, unit-per-unit[1] or with a 20% reduction in dose,[3] then add prandial insulin if desired.[h]
Switching TO NPH				
—	• Convert unit-per-unit,[2] or reduce dose by 20%.[3,i]	• Reduce dose by 20%.[3,i]	• Reduce dose by 20%.[3,i]	• Add up the total units and give 70% to 75% as NPH.[2,i] • Give 25% to 30% of each premix dose as prandial insulin (regular or rapid-acting) before the meal(s) before which the premix was usually taken.[2]

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from **NPH**	from **insulin glargine U-100**[b]	from **insulin degludec** (*Tresiba*)	from **insulin glargine U-300** (*Toujeo*)	from **premix**
Switching TO insulin icodec (*Awiqli* [Canada])				
Multiply total daily dose by seven (rounded to the nearest 10 units) and give once weekly. Titrate subsequent doses based on metabolic need, blood glucose levels, and glycemic goals. • For **first dose only**, an additional 50% of the Awiqli dose can given, depending on glycemic control and hypoglycemia history.	Multiply total daily dose by seven (rounded to the nearest 10 units) and give once weekly. Titrate subsequent doses based on metabolic need, blood glucose levels, and glycemic goals. • For **first dose only**, an additional 50% of the Awiqli dose can given, depending on glycemic control and hypoglycemia history.	—	Multiply total daily dose by seven (rounded to the nearest 10 units) and give once weekly. Titrate subsequent doses based on metabolic need, blood glucose levels, and glycemic goals. • **For first dose only**, an additional 50% of the Awiqli dose can given, depending on glycemic control and hypoglycemia history.	No specific guidance is available. Consider switching based on the long-acting component of the premix insulin, unit-per-unit[1] or with a 20% reduction in dose,[3] then add prandial insulin if desired.
Switching TO premix[e]				
Give same total daily dose,[8] or reduce dose by 20%.[3] Give half with breakfast and half with dinner.[8]	Give same total daily dose,[8] or reduce dose by 20%.[3] Give half with breakfast and half with dinner.[8]	Consider 20% dose reduction.[3]	Consider 20% dose reduction.[3]	Convert unit-per-unit,[2] or reduce dose by 20%.[3] • Premix analogs have a faster onset but similar duration compared to human premixes.[3] *See Comparison of Insulins* (US) (Canada) for specifics of meal timing.

Switching FROM regular or rapid-acting insulin[c] TO regular or rapid-acting insulin[d]

- Convert unit-per-unit, or reduce dose by 20% when switching between regular and rapid-acting insulin.[2,3]
- Rapid-acting insulins have a faster onset of action and a shorter duration of action than human regular insulin. *See Comparison of Insulins* (US) (Canada) for specifics of meal timing.

Switching TO inhaled insulin (*Afrezza* [US])

FROM mealtime subcutaneous insulin regular[c] or rapid-acting[d] insulin TO mealtime insulin inhalation powder (*Afrezza* [US])

- Round each regular or rapid-acting mealtime insulin dose up to the nearest 4 units, then convert unit-per-unit to the *Afrezza* dose (available in 4-unit, 8-unit, and 12-unit cartridges).

FROM mealtime pre-mixed insulin TO mealtime insulin inhalation powder (*Afrezza* [US])

- Add up the total daily dose of pre-mixed insulin, divide by half, and split equally among the three meals of the day. Round each mealtime insulin dose up to the nearest 4 units, then convert unit-per-unit to the *Afrezza* dose (available in 4-unit, 8-unit, and 12-unit cartridges).
- Give the other half of the total daily insulin dose as basal insulin.

Switching FROM regular[c] or rapid-acting insulin[b] TO basal-bolus regimen

FROM subcutaneous regular or rapid-acting insulin (e.g., "sliding scale" or correction doses) TO basal-bolus regimen

- Calculate the average of the daily subcutaneous insulin requirement over the past five to seven days. Start with 70% to 75% as basal insulin.[7]
- Cover meals with oral antidiabetics or mealtime insulin.[7]

FROM intravenous insulin TO basal-bolus regimen

- Estimate the total daily insulin dose based on the insulin infusion rate over a six- to eight-hour period when blood glucose targets were met, then consider reducing the dose by 20%.[9,12] Alternatively, base the dose on home insulin dose.[12]
- As a safety check, compare the calculated dose to typical initial insulin dosing (e.g., 0.5 to 0.6 units/kg/day, or 0.3 units/kg/day in patients with hypoglycemia risk [e.g., kidney impairment, frailty]) as a safety check.[12,13]
- Start basal insulin two hours before stopping the insulin drip.[12]

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Switching FROM U-100 insulin TO U-500 insulin (*Humulin R* U-500 (US), *Entuzity* (Canada)
• U-500 insulin **is only for patients needing >200 units of insulin daily**. See our checklist, *Tips to Improve Insulin Safety*, for special considerations with U-500 insulin. • Determine the total daily dose from all insulin sources combined.[10] If A1c is ≤8%, reduce the dose by 20%.[10] • Divide the dose two or three times daily, given 30 minutes before a meal.[10] Recommended dosing ratios are 60:40 (for breakfast/dinner dosing) or 40:30:30 (for breakfast/lunch/dinner dosing).[10] Other ratios may be appropriate. • It is recommended that daily doses of ≥300 to 750 units be divided three times daily.[11] For doses >750 units, divide four times daily (with meals and at bedtime), with the bedtime dose being smaller than the mealtime doses.[11]
Switching TO long-acting insulin plus GLP-1 agonist (US)
• Switching to **insulin glargine U-100 + lixisenatide** (***Soliqua 100/33*** [US]): for patients on basal insulin <30 units/day, the recommended starting dose is 15 units insulin glargine/5 mcg lixisenatide once daily. For patients on basal insulin 30 units/day to 60 units/day, convert to 30 units insulin glargine/10 mcg lixisenatide once daily. Given within one hour prior to the first meal of the day. • Switching to **insulin degludec + liraglutide** (***Xultophy*** [US]): Dosing recommendations are the same regardless of previous insulin dose. Start with 16 units insulin degludec/0.58 mg liraglutide given once daily.

Footnotes

a. **US product information** used in creation of this chart: *Afrezza* (February 2023), *Humulin R U-500* (February 2024), *Soliqua* (November 2024), *Toujeo* (August 2024), *Tresiba* (July 2022), *Xultophy* (November 2024). **Canadian product monographs** used in creation of this chart: *Awiqli* (March 2024), *Entuzity* (March 2021), *Toujeo* (May 2020), *Tresiba* (October 2022).
b. Insulin glargine 100-U: Lantus, Basaglar, Semglee, Rezvoglar [US]
c. Regular human insulin 100-U: *Humulin R* [US], *Novolin R* [US], *Novolin ge Toronto* [Canada], *Myxredlin* [Canada], *Hypurin Regular* [Canada]
d. Rapid-acting insulin: insulin aspart [*NovoLog* (US), *NovoRapid* (Canada), *Trurapi* (Canada), *Fiasp*, *Kirsty* (Canada)], insulin glulisine [*Apidra*], insulin lispro [*Humalog*, *Admelog*, *Lyumjev*]
e. Premixed: premixed NPH/regular insulin (*Humulin 70/30* [US], *Humulin 30/70* [Canada], *Novolin 70/30* [US], *Novolin ge 30/70* [Canada], premixed protamine/rapid-acting analog (insulin lispro protamine/insulin lispro [*Humalog Mix 75/25* (US), *Humalog Mix 25* (Canada), *Humalog Mix 50/50* (US), *Humalog Mix 50* (Canada)], insulin aspart protamine/insulin aspart [*NovoLog Mix 70/30* (US), *NovoMix 30* (Canada)])
f. Insulin glargine U-300 (Toujeo): It may take ≥5 days to see the maximum effect of the selected dose of *Toujeo*. Do not increase the *Toujeo* dose more often than every 3 to 4 days.
g. General considerations: Switching insulins should be done with prescriber approval and close monitoring. Advise patients to closely monitor blood glucose levels after switching insulins. Pharmacists may need to contact the prescriber before switching, depending on state/provincial regulations. Our FAQ, *Facts About Biosimilars*, addresses questions that may arise about interchangeability. See our chart, *Comparison of Insulins* (US) (Canada), for meal timing, onset, peak, duration of action, and other information.
h. Insulin degludec (*Tresiba*): do not increase the Tresiba dose more often that every 3 to 4 days.
i. Give NPH (*Humulin N*, *Hypurin NPH* [Canada]. *Novolin N* [US], *Novolin ge NPH* [Canada]) twice daily (e.g., 50:50 or 2/3 in AM and 1/3 before dinner or at bedtime).[2-5]

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