

Standards of Practice: Insulin Management

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Standards of Treatment

Resident Goals

When dealing with diabetes in long-term care residents, the first thing a clinician needs to validate are the resident's goals, including a reasonable A1C, what a fasting blood glucose should be, and where the bedtime blood glucose would be expected. These goals change with the resident characteristics; for example, a healthy person who has few chronic illnesses and a high cognitive level will have different goals compared to someone at the end of life. The table below includes some goal examples.

Goals for Older Adults Diabetes Care 2023;46(Supplement_1): S216–S229 https://doi.org/10.2337/dc23-S013				
Patient Characteristics	Rationale	Reasonable A1C goal	Fasting blood glucose	Bedtime blood glucose
Healthy (few chronic illnesses, intact cognitive/functional status)	Longer life expectancy – prevent future DM related complications	< 7.0 - 7.5%	80-130	80-180
Very complex/poor health (long-term care or end-stage chronic illness or mod- severe cognitive impairment or 2+ ADL dependencies)	Limited life expectancy makes benefit uncertain	Avoid hypoglycemia & symptomatic hyperglycemia	100-180	110-220
End of Life	Goal is comfort	Avoid hypoglycemia and symptomatic hyperglycemia		

Sometimes it is hard to explain to a resident the difference between A1C and blood glucose readings. To make this easier, see the table below.

Hemoglobin A1c - Estimated Average Glucose	
Hgb A1c	Average Blood Glucose(mg/dL)
6%	125
7%	154
8%	183
9%	212
10%	240

Medication Guidance

Once the goals have been set, it's time to determine what medication is the best. This is the time the consultant pharmacist should be engaged. Not all oral or injectables lower blood glucose and Hgb A1c by the same amount. While a medication such as Metformin can lower the A1c % by 1, another drug Dulaglutide(Trulicity) can lower the A1c % by 1.2 – 1.4. Of course, the medication that lowers the HgbA1c by the most is insulin.

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When getting orders for diabetic medications, keep the following tips in mind:

- Metformin is always first line unless contraindications exist.
- DPP4s (end in "gliptin") are well tolerated but only decrease Hgb A1c slightly.
- GLP-1s (end in "tide") and SGLT-2s (end in "gliflozin")
 - Some have cardiac and renal benefits for our younger population.
 - Some are associated with significant weight loss.
 - All brand names – cost can be a barrier if not covered.
- Sulfonylureas (glipizide is preferred agent if needed).
 - Avoid glyburide and glimepiride (long 1/2 life, renally eliminated = high risk for hypoglycemia).
- Thiazolidinediones (Actos).
 - Fluid retention – contraindications in heart failure exist; avoid if at all possible.
- Avoid complex insulin regimens.

When it comes to insulin, the rule is "keep it simple!" See the chart below for the different insulin types:

Insulin Types			
Rapid Acting	Apidra (glulisine) Novolog/Fiasp (aspart) Humalog/Admelog (lispro)	Intermediate Acting	Novolin N and Humulin N (NPH insulin)
Long Acting	Levemir (detemir) Tresiba (degludec) Lantus/Toujeo/Semglee/Basaglar (glargine)	Mixed Insulin	Rapid acting and short acting mixes (70/30 or 75/25)
Short Acting	Novolin and Humulin R (Regular insulin)	U500 Insulin	Humulin R - Kwik pen

Frequently, clinicians order sliding scale insulins. This practice poses several concerns. It is reactive versus proactive. It places the resident at higher risk for hypoglycemia. It is an ineffective practice as it does not improve glucose control. It causes greater discomfort for the resident with frequent finger sticks and multiple injections per day. And it causes a heavier workload for the nurses and greater inefficiency with extra monitoring and injections. Sliding scale cannot catch up.

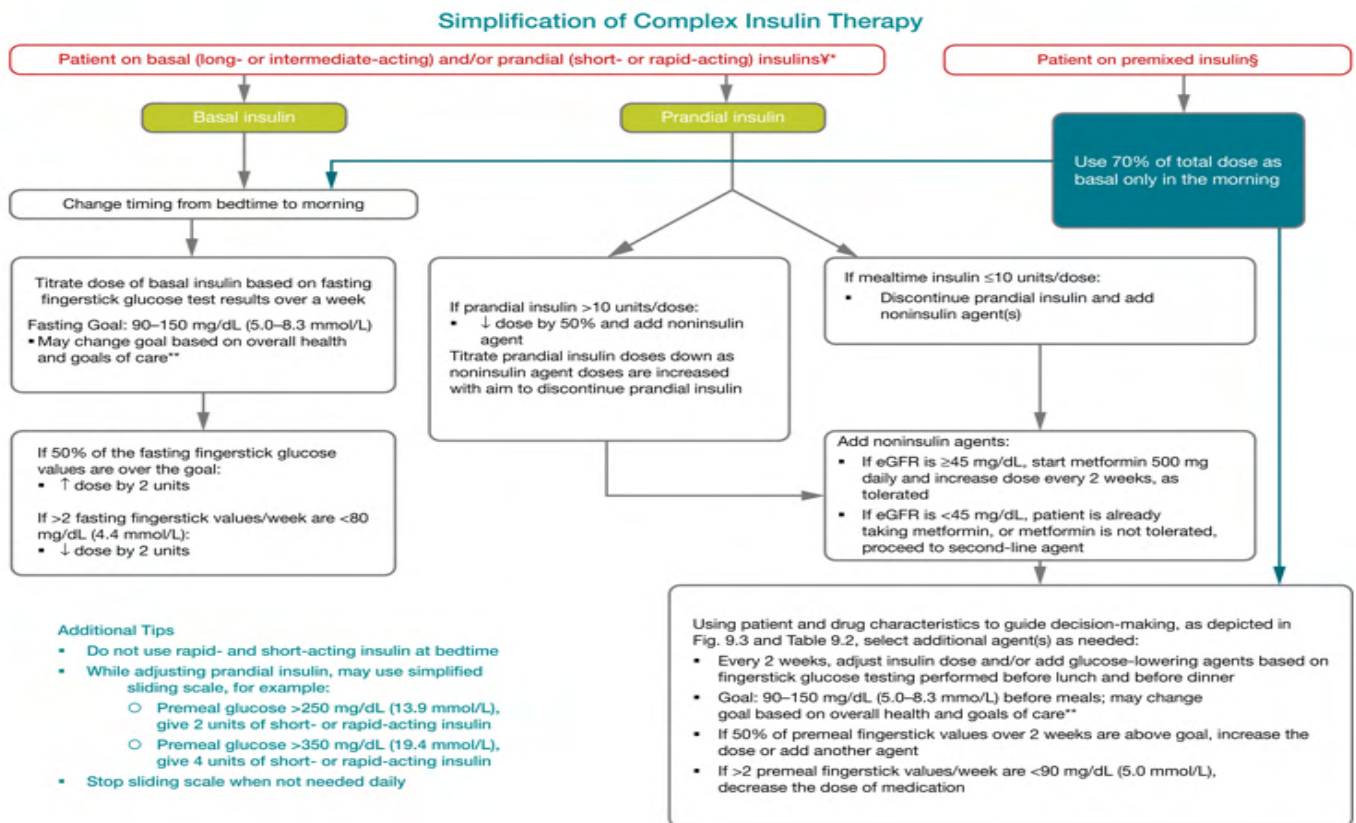
So, the question that gets asked is, if insulin scales aren't used, how do we improve the insulin dosing?

Here are some steps to follow:

- Make sure that the resident has a goal. (Basic goal is to keep the resident from having a hypo or hyper glycemic event.)
- Make adjustments on a weekly basis.
- When starting insulin, the following is recommended;
 - Start with the basal insulin (Lantus) first. Start with 0.2 units/kg or 10 units every bedtime (glargine, detemir, degludec).
 - Then adjust dose every week until fasting blood glucose is at goal (90-150 mg/dL).
 - If 50% of fasting finger sticks are over goal, increase the dose by 2 units
 - If >2 fasting fingerstick <80 mg/dL, decrease dose by 2 units
 - Discontinue oral medications that promote insulin release (glipizide, glyburide, glimepiride); they aren't beneficial any longer
- When adjusting current insulin dosages, this process can also be used.

Standards of Practice: Insulin Management Cont.

See the table below from the American Diabetes Association for Simplification of Complex Insulin Therapy.



Some tips for successful insulin therapy are:

- Avoid sliding scale.
- Start conservatively and adjust frequently.
- Start fasting with lowering the fasting blood glucose using basal insulin.
- Review if continuing oral agents is beneficial (usually metformin continues to have benefit, but others can often be discontinued). Engage your pharmacist!
- Once basal insulin dose is optimized, start with rapid acting mealtime (prandial) insulin.
- Basal plus 1 – prior to main meal of the day (if basal alone doesn't meet goals).
- DPP4s (end in "gliptin") are well tolerated but only help Hgb A1c slightly.
- Generally okay to discontinue or avoid with transition to insulin if resident not meeting goal.
- GLP-1s (end in "tide") and SGLT-2s (end in "gliflozin") – Some have cardiac and renal benefits for our younger population.
- Can be helpful when simplifying insulin regimens; cost/coverage can be a barrier.
- Long-acting basal insulin once daily is often enough to meet goals.
- Try to avoid complex regimens with multiple injections and glucose checks especially if the plan is to return home or to an assisted living facility.

So far, we have talked about the standards of treatment of diabetes. Let's move on to the standards of administration.

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Standards of Practice: Insulin Management Cont.

Standards of Administration

Insulin Receipt and Storage/Labeling

Store unopened vials/pens in refrigerator at 36-46 °F. Ensure you have temperature monitoring in place. If temperature excursions happen, contact your pharmacy for guidance. Insulin pens and vials should be individually labeled on the vial or pen (avoid pen cap). If utilizing an emergency kit, have a mechanism to label with the resident's name, date opened, and a "refer to MAR for directions" sticker available. Once opened, label with the date; check expiration date before administration. Store at room temperature once it is opened. Ensure physical barrier exists between resident's insulin when stored (dividers, plastic bags, manufacturer box from the pharmacy).

Blood Glucose Monitor Use

Before use, check the expiration date of the test strips. DO NOT use expired test strips. Clean and disinfect the meter with an EPA-approved disinfectant, such as micro kill wipes, and follow the manufacturer's instructions. If using the blood glucose monitor on multiple residents, clean and disinfect the meter before use, after use, and between patients. If it is a single use monitor, clean and disinfect before and after testing. Calibrate and run a blood glucose quality control test following manufacturer's instructions for daily calibration or when opening a new box of test strips. Perform hand hygiene before and after use, select puncture site, usually fingertip (avoid cold, cyanotic or swollen sites), wipe the site with alcohol wipe and allow to dry. Document the results in the medical record.

Fatty Tissue

Insulin is meant to be delivered into the fat layer just below the skin, usually abdomen (remember to stay two finger widths away from umbilicus), outer thighs, hips, upper buttocks, in the lower back, and back of arms. For best results, stick with a consistent body part. Select an area that is easy to reach and rotate the sites in that area to avoid a buildup of fatty tissue which, can occur if always injecting in the same spot. It can change how insulins are absorbed, which can affect blood sugar results. Avoid injecting insulin into scar tissue, moles, swelling, and inflammation.



Standards of Practice: Insulin Management Cont.

In the table below, find some pearls of wisdom for the two types of Insulin administration.

Pearls for Insulin Administration	
Syringe and Vial	<ul style="list-style-type: none"> • If insulin needs to be mixed, such as NPH or premixed, roll it before use. Always check the appearance of the insulin before use. Do not use if it looks different or is cloudy when it should be clear. • Use the adage “clear to cloudy” when mixing insulin. The rapid or short-acting insulin is clear and should be drawn up first, then the intermediate insulin is cloudy. The reason is that it prevents the intermediate-acting insulin (cloudy) from getting into the rapid or short-acting insulin, which would affect the onset, peak, and duration. • Double-check the insulin order prior to administering. Always have another nurse check the dosage. This practice can prevent errors. Any error involving insulin can cause significant harm. Some of the errors include omission of insulin, delayed insulin, incorrect insulin type (rapid acting vs long acting), and incorrect dose. • Incorrect product, omissions, delayed insulin administration, or dosing can lead to either hypoglycemia or hyperglycemia. Monitor for adverse reactions after insulin administration, and monitor meal intake for patients on sliding scales. Clarify unclear orders, don’t accept orders with the abbreviation “u” in place of units. • Never interchange insulins without consulting the healthcare provider. • Know the onset, peak, and duration for all insulin products that you are administering. • Use only insulin syringes when drawing up insulin.
Pens	<ul style="list-style-type: none"> • Store unopened pens in refrigerator; once open, store at room temperature. • Always date when opened; check beyond use dating for expiration date. • Never use the pen for more than one resident or as an insulin vial to remove using a conventional needle and syringe. • Swab with alcohol prior to attaching needle. • Prime every time; most pens have 2 units (you need to see insulin come out of the needle or repeat). • Inject at 90 degrees (straight in) and count to 10 once injection button is fully depressed before removing needle (note – check each specific manufacturers guidance on duration required).



Standards of Practice: Insulin Management Cont.

Common Survey Citations

Some common survey issues/citations related to insulin administration are:

- Rapid acting (mealtime): must have food or juice within 10-15 min of administration.
- Short acting (Humulin R/Novolin R): must have food or juice within 30 min of administration.
- Need an order if administering immediately after meals; should be using rapid acting insulin. May be best practice for residents that refuse meals unexpectedly.
- Sliding scale insulin ordered without any basal insulin or plan in place to taper/discontinue will likely be considered an unnecessary medication.

Key Takeaways:

- Focus on establishing goals of therapy for your residents. Medication optimization will not occur without a goal of therapy.
- Avoid sliding scale insulin – request help from your pharmacist and providers.
- Insulin dosing – keep it simple!
- Encourage collaboration with facility staff, DONs, providers, and pharmacists.

Keep these standards of practice in mind when reviewing your policies and procedures related to diabetes and treatment. Involve your consultant pharmacist for additional input. These standards will help facilities provide the best quality care for our residents, which is the goal for all of us.

ADA Guidelines – Standards of Care in Diabetes 2023

<https://professional.diabetes.org/content-page/practice-guidelines-resources>

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