I Hope You Have Insurance: Diabetes Update 2022

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Big Sky 2022

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Learning Objectives

- DIFFERENTIATE BETWEEN **DIFFERENT TYPES OF INSULIN** AND THEIR COMMON USES
- IDENTIFY **NOVEL ORAL AND NON INSULIN INJECTABLE AGENTS** FOR TYPE 2 DIABETES
- APPRECIATE THE **CARDIOVASCULAR AND RENAL BENEFITS** OF NEW DM MEDICATIONS
- EXAMINE THE VARIOUS **TECHNOLOGY** RELATED DEVICES TO IMPROVE GLYCEMIC

2

SHOUT OUT!

Key Concepts of Type 2 Diabetes Mellitus

Dallas, Texas

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Tullis Tulane Alumni Chair in Diabetes
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Endocrine Center
President, American Association of Clinical Endocrinologists
Dallas, Texas

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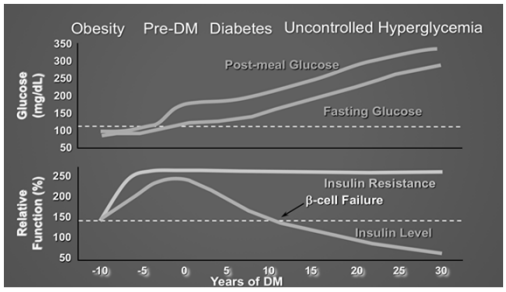
Progressive Condition-Type 2 Diabetes



Adapted from Ferrannini E. ADA Washington. 2006 and Ramlo-Halsted et al. Prim Care. 1999.

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What is the target A1c?

CONTROVERSY

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ADA and AACE Glycemic Targets

Test	Glycemic Control Targets	
	ADA	AACE
HbA1c	<7%	≤6.5%[3]
FPG	80-130 mg/dL	<110 mg/dL[3]
PPG	<180 mg/dL (measured within 1 to 2 hours after the start of a meal)	<140 mg/dL[3] (2-hour value)

HbA1C target should be individualized based on numerous factors, including age, life expectancy, comorbid conditions, duration of diabetes, risk of hypoglycemia or adverse consequences from hypoglycemia, patient motivation, and adherence[1,2]

AACE, American Association of Clinical Endocrinologists; ADA, American Diabetes Association; FPG, fasting plasma glucose; PPG, postprandial glucose.

1. American Diabetes Association. *Diabetes Care*. 2017;40(suppl 1):S1-S135.
2. Garber AJ, et al. *Endocr Pract*. 2017;23(2):207-238.
3. Handelsman Y et al. *Endocr Pract*. 2015;21(suppl 1):1-87.

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American College of Physicians Guided Statement
2018

Guidance Statement 1: *Clinicians should personalize goals for glycemic control in patients with type 2 diabetes on the basis of a discussion of benefits and harms of pharmacotherapy, patients' preferences, patients' general health and life expectancy, treatment burden, and costs of care.*

Guidance Statement 2: *Clinicians should aim to achieve an HbA_{1c} level between 7% and 8% in most patients with type 2 diabetes.*

Guidance Statement 3: *Clinicians should consider deintensifying pharmacologic therapy in patients with type 2 diabetes who achieve HbA_{1c} levels less than 6.5%.*

Guidance Statement 4: *Clinicians should treat patients with type 2 diabetes to minimize symptoms related to hyperglycemia and avoid targeting an HbA_{1c} level in patients with a life expectancy less than 10 years due to advanced age (80 years or older), residence in a nursing home, or chronic conditions (such as dementia, cancer, end-stage kidney disease, or severe chronic obstructive pulmonary disease or congestive heart failure) because the harms outweigh the benefits in this population.*

American College of Physicians

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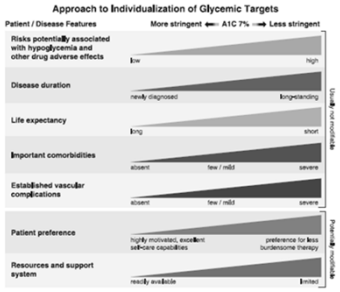
GLYCEMIC TARGETS



Glycemic Targets:
Standards of Medical Care in Diabetes - 2021. Diabetes Care 2021;44(Suppl. 1):S73-S84

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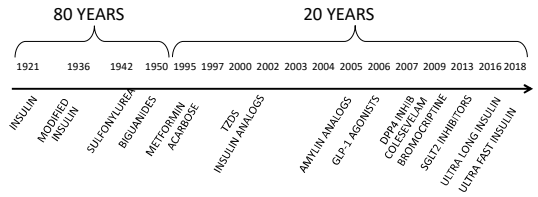
Development of Diabetes Medications



White JR . Diabetes Spec. 2014

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FDA Approved Diabetes Medications

- Biguanides (Metformin)
- Sulfonylureas (Glipizide, Glimepiride, Glyburide)
- DPP-4 Inhibitors (Sitagliptin, Linagliptin, etc.)
- Thiazolidinediones (Pioglitazone, Rosiglitazone)
- SGLT-2 Inhibitors (Canagliflozin, Empagliflozin, etc)
- Meglitinides (Repaglinide, Nateglinide)
- α-Glucosidase Inhibitors (Acarbose, Miglitol)
- Bile Acid Sequestrants (Colesevelam)
- Dopamine-2 Agonists (Bromocriptine)

Orals

- GLP-1 Analogs (Exenatide, Liraglutide, etc)
- Insulin (various)
- Amylin Mimetics (Pramlintide)

Injectables

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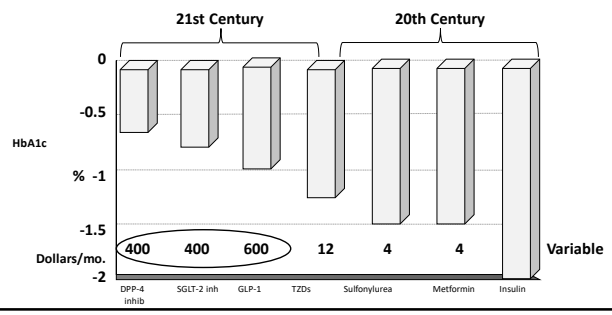
Glycemic Potency vs Cost
Decrease in HbA1c vs Cost



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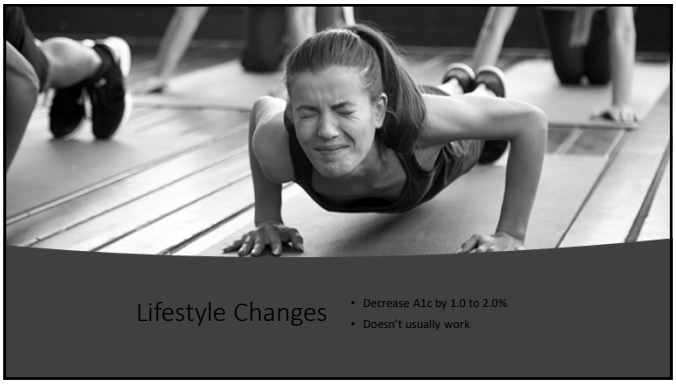

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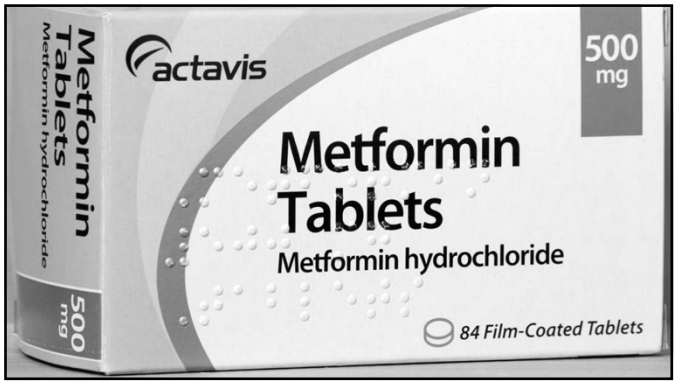

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Metformin

- Expected Decrease 1.0 to 2.0%
- Weight neutral/Mild loss
- Very few excuses not to be on it
  - Change to extended release if GI intolerance

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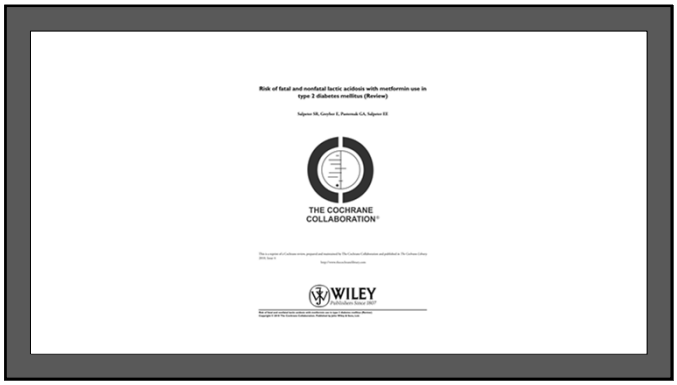

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Super safe

Proposed use of metformin in renal disease

eGFR* level	
>60	Maximum daily dose of 2,550 mg Monitor renal function annually
45-60	Maximum daily dose of 2,000 mg Monitor renal function every 3-6 months Avoid in patients with rapidly decreasing renal function
30-44	Maximum daily dose of 1,000 mg Check renal function every 3 months Do not initiate therapy (can continue patients who are on it)
<30	Do not use

*estimated glomerular filtration rate

Note: Adapted from JAMA 2014;312:2668-75 and Diabetes Care 2011;34:1431-7.

FrontLine Medical News

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Sulfonylureas

- Expected A1c decrease 1.0 to 2.0%
- Works right away
- Weight gain
- Risk of hypoglycemia
- Favorite: glimepiride

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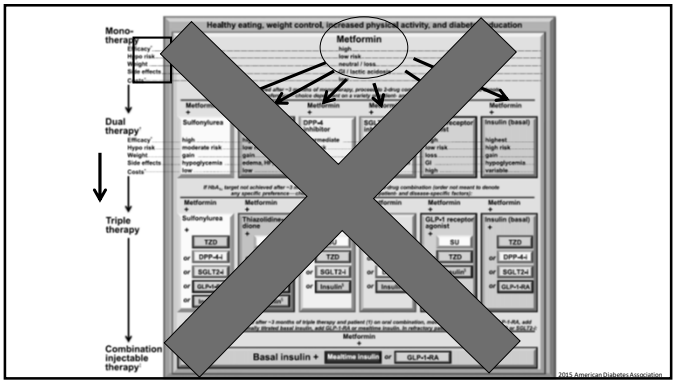

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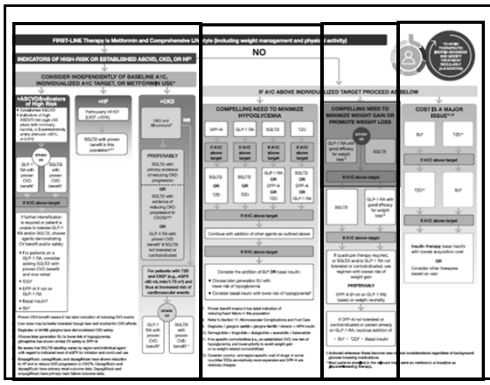

Glucose-lowering Medication in Type 2 Diabetes: 2021 ADA Professional Practice Committee (PPC) adaptation of Davies et al. and Buse et al.

Pharmacologic Approaches to Glycemic Management: *Standards of Medical Care in Diabetes - 2021. Diabetes Care* 2021;44(Suppl. 1):S111-S124

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Glycemic targets

Table 6.3—Summary of glycemic recommendations for many nonpregnant adults with diabetes

A1C	<7.0% (53 mmol/mol)*#
Preprandial capillary plasma glucose	80–130 mg/dL* (4.4–7.2 mmol/L)
Peak postprandial capillary plasma glucose†	<180 mg/dL* (10.0 mmol/L)

*More or less stringent glycemic goals may be appropriate for individual patients. #CGM may be used to assess glycemic target as noted in Recommendation 6.5b and **Fig. 6.1**. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations (as per **Fig. 6.2**). †Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals. Postprandial glucose measurements should be made 1–2 h after the beginning of the meal, generally peak levels in patients with diabetes.

Glycemic Targets:
Standards of Medical Care in Diabetes - 2021. Diabetes Care 2021;44(Suppl. 1):S73-S84

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PHARMACOLOGIC APPROACHES TO GLYCEMIC TREATMENT

Pharmacologic Therapy for Type 2 Diabetes

9.4 Metformin is the preferred initial pharmacologic agent for the treatment of type 2 diabetes. A

9.5 Once initiated, metformin should be continued as long as it is tolerated and not contraindicated; other agents, including insulin, should be added to metformin. A

9.6 Early combination therapy can be considered in some patients at treatment initiation to extend the time to treatment failure. A

9.7 The early introduction of insulin should be considered if there is evidence of ongoing catabolism (weight loss), if symptoms of hyperglycemia are present, or when A1C levels (>10% [86 mmol/mol]) or blood glucose levels (≥300 mg/dL [16.7 mmol/L]) are very high. E

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PHARMACOLOGIC APPROACHES TO GLYCEMIC TREATMENT

Pharmacologic Therapy for Type 2 Diabetes (continued)

9.8 A patient-centered approach should be used to guide the choice of pharmacologic agents. Considerations include effect on cardiovascular and renal comorbidities, efficacy, hypoglycemia risk, impact on weight, cost, risk for side effects, and patient preferences (Table 9.1 and Figure 9.1). E

9.9 Among patients with type 2 diabetes who have established atherosclerotic cardiovascular disease or indicators of high risk, established kidney disease, or heart failure, a sodium–glucose cotransporter 2 inhibitor or glucagon-like peptide 1 receptor agonist with demonstrated cardiovascular disease benefit (Table 9.1, Table 10.3B, Table 10.3C) is recommended as part of the glucose-lowering regimen independent of A1C and in consideration of patient-specific factors (Fig. 9.1 and Section 10).A

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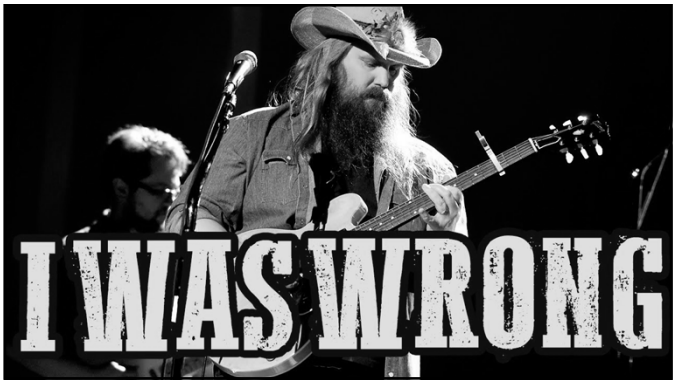

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CARDIOVASCULAR DISEASE AND RISK MANAGEMENT

Cardiovascular Disease—Treatment

10.42a In patients with type 2 diabetes and established atherosclerotic cardiovascular disease, multiple atherosclerotic cardiovascular disease risk factors, or diabetic kidney disease, a sodium–glucose cotransporter 2 inhibitor with demonstrated cardiovascular benefit is recommended to reduce the risk of major adverse cardiovascular events and/or heart failure hospitalization. A

10.42b In patients with type 2 diabetes and established atherosclerotic cardiovascular disease or multiple risk factors for atherosclerotic cardiovascular disease, a glucagon-like peptide 1 receptor agonist with demonstrated cardiovascular benefit is recommended to reduce the risk of major adverse cardiovascular events. A

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Microvascular Complications and Foot Care

Chronic Kidney Disease—Treatment

11.2 Optimize glucose control to reduce the risk or slow the progression of chronic kidney disease. A

11.3a For patients with type 2 diabetes and diabetic kidney disease, consider use of a sodium–glucose cotransporter 2 inhibitor in patients with an estimated glomerular filtration rate ≥30 mL/min/1.73 m^2 and urinary albumin >300 mg/g creatinine. A

11.3b In patients with type 2 diabetes and diabetic kidney disease, consider use of sodium–glucose cotransporter 2 inhibitors additionally for cardiovascular risk reduction when estimated glomerular filtration rate and urinary albumin creatinine are >30 mL/min/1.73 m^2 or.300 mg/g, respectively. A

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GLP-1 Receptor Agonists

- Short Acting
- Long Acting

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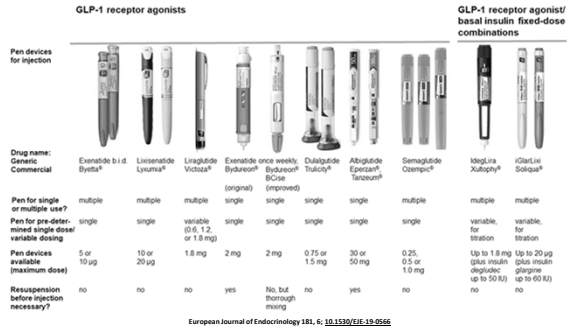

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Administration:	subcutaneous						oral
Compound:	Exenatide	Lixisenatide	Liraglutide	Exenatide	Dulaglutide	Semaglutide	Semaglutide
Frequency:	b.i.d.	q.w.	q.d.	q.w.	q.w.	q.w.	q.d.
Effects:							
HbA_{1c} reduction:	+	+	++	+	++	+++	++(+)
Post-prandial glucose	++[a]	++[a]	+	+	+	+	+
Body weight reduction:	+(+)	+	++	+	+(+)	+++	++(+)
Injection device:	+	+	++	(+)	+++	++	n.a.
Convenience/adherence:	(+)	+	++	+	+++	+++	+++?[b]
CV benefit („MACE"):	not known	±	++	(+)	++	++	(+)
Mortality benefit:	not known	±	++	(+)	±	±	±
Renal benefit:	±	(+)	+	±	+	+	+
Nausea/vomiting:	- -	-	- (-)	-	- (-)	- (-)	- (-)
Immunogenicity[c]:	++	++	(+)	++	(+)	(+)	? (not known)

European Journal of Endocrinology 181, 6; 10.1530/EJE-19-0566

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RYBELSUS®
semaglutide tablets 7mg | 14mg

Oral Semaglutide

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Oral Semaglutide

- Needs to be taken 30 minutes before meals
- Blister pack (sometimes)
- Better covered in 2022
- Lots of unknowns

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GLP-1 RA Precautions

- Pancreatitis
- ***Medullary*** thyroid cancer
- Severe renal impairment
- Type 1???

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TLDR: GLP-1 RA Key Differences

- CV Benefit: liraglutide, semaglutide, dulaglutide
- Biggest A1c reduction: semagutide, liraglutide
- Most weight loss: semaglutide, liraglutide
- Easiest: dulaglutide (easy single use pen)
- Best studied: liraglutide

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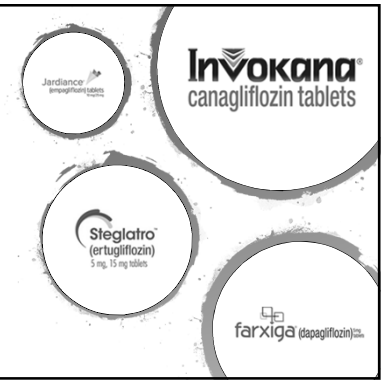
SGLT-2 Inhibitors in the US

- Canagliflozin (Invokana®) - 2013
- Dapagliflozin (Farxiga®) - 2014
- Empagliflozin (Jardiance®) - 2014
- Ertugliflozin (Steglatro®) - 2017



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SGLT-2 Inhibitors Benefits

- A1c reductions compared to placebo **0.4-1.1%.**
- Weight loss
- Low risk for hypoglycemia
- Decreases Blood Pressure
- May be used at any stage of type 2 diabetes?

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SGLT2i Concerns

- 2-4 fold increase in vulvovaginal candidiasis (10-15% of women)
- Increased rate of UTI (8.8% vs. 6.1%)
- Reports: Pyelonephritis, Urosepsis, Nec. fascitis
- Acute Kidney Injury
- Bladder Cancer
- Hypotension
- Bone Fractures - Canagliflozin
- Amputations (toes and foot)
- FDA: post-marketing surveillance studies
- ***No very long term data***

Adreianasis et al. Ther Adv Endocrinolo Metab. 2016

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Combo pills are just as expensive

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TLDR: SGLT 2 inhibitors

- Use in patients with CV disease or renal disease
- Use if for some reason insulin and GLP-1 RA cannot be used
- Don't use in Type 1
- Be aware of urinary tract complications

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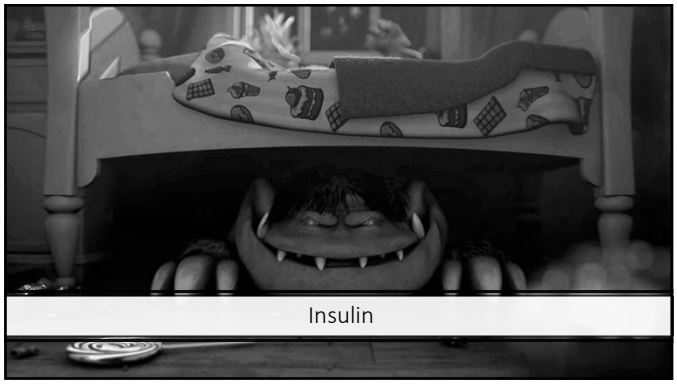

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Sad state of obtaining insulin in United States

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Previous Situation

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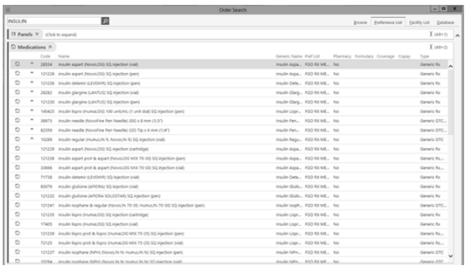

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Previous Situation

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Innovation

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New Situation

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When To Start Insulin in T2DM

- Patients with
  - hyperglycemic emergencies
  - symptomatic hyperglycemia and/or markedly high HbA1c
  - hepatic or renal disease
  - coronary artery disease, ↑ triglyceride level
- When combination oral/injectable agents become inadequate
- Unacceptable side effects of oral/injectable agents
- Patient wants more flexibility
- Special circumstances (ie, steroid use, infection, pregnancy)

Holman RR, et al. *NEJM*. 2009; 361(18):1736-1747.
Lebovitz HE. *Diabetes Rev*. 1999;7(3):139-153.

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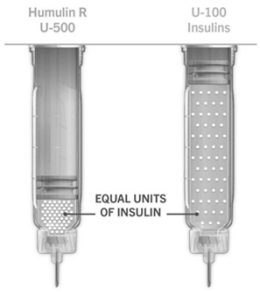
U100 vs U200 vs U300 vs U500

- U100 is "normal" or "standard"
- Higher numbers are concentrated
- Concentrated insulin works well in insulin resistance patients
  - Can give higher doses with less volume of insulin



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Basal Insulins Currently Available

	NPH Insulin	Insulin Glargine U-100	Insulin Detemir	Follow-on Insulin Glargine	Insulin Glargine U-300	Insulin Degludec
Insulin type	Human; intermediate-acting	Analog; long-acting	Analog; long-acting	Analog; long-acting	Analog; long-acting	Analog; long-acting
Onset	2-4 hours	1.3 hours	1.3 hours		6 hours	1 hour
Peak	4-10 hours	No pronounced peak	Relatively flat	No pronounced peak	Flat	Flat
Effective duration	10-16 hours	Up to 24 hours	Up to 24 hours	Up to 24 hours	≤36 hours	≤42 hours
Half-life	Unknown*	14 hours	5-7 hours		~23 hours	~25 hours
Time to steady-state	Unknown	2 days	2 days		4 days	2-3 days

Porcellati F, et al. *Diabetes Care*. 2007;30(10):2447-2452. Lucidi P, et al. *Diabetes Care*. 2011;34(6):1312-1314. Niswender K. *Clin Diabetes*. 2009;27:60-68. Novolin N [package insert]. Indianapolis, IN: Eli Lilly & Co.; January 2017. Lantus [package insert] Bridgewater, NJ: sanofi-aventis US LLC; August 2015. Basaglar [package insert]. Indianapolis, IN: Eli Lilly & Co.; April 2017. Levemir [package insert]. Princeton, NJ: Novo Nordisk US; February 2015. Toujeo [package insert]. Bridgewater, NJ: sanofi-aventis US LLC; October 2015. Becker RH, et al. *Diabetes Care*. 2015;38:637-643. Tresiba [package insert]. Plainsboro, NJ: Novo Nordisk Inc.; December 2016. Heise T, et al. *Diabetes Obes Metab*. 2012;14(10):944-950.

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Regular Human Insulin U-500

- Limitations of use
  - Use in adults/children requiring >200 units insulin/day
  - Safety/efficacy in combination with other insulins has not been determined
- ***If using vial/syringe, use only U-500 syringe***
- Hypokalemia- monitor at-risk persons
- Fluid retention/Heart failure with concomitant TZD
- Most common adverse events
  - Hypoglycemia, allergic reactions, injection site reactions, lipodystrophy, pruritus, rash

Humulin R U-500 [package insert]. Indianapolis, IN: Eli Lilly and Company; March 2017.

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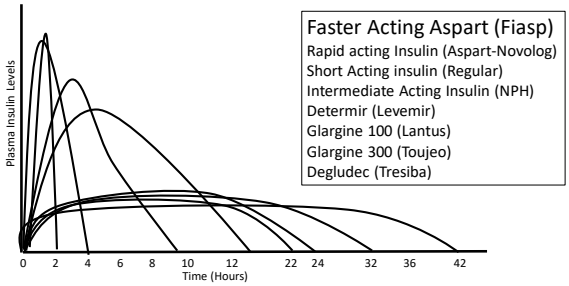
Insulin Duration of Action



Faster Acting Aspart (Fiasp)
Rapid acting Insulin (Aspart-Novolog)
Short Acting insulin (Regular)
Intermediate Acting Insulin (NPH)
Determir (Levemir)
Glargine 100 (Lantus)
Glargine 300 (Toujeo)
Degludec (Tresiba)

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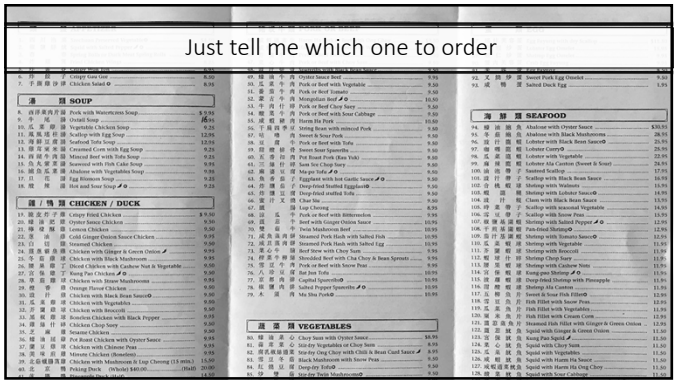
Just tell me which one to order



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Annals of Internal Medicine

REVIEW

Comparative Benefits and Harms of Basal Insulin Analogues for Type 2 Diabetes

A Systematic Review and Network Meta-analysis

Anastasia-Vasiliki Madenidou, MD, MSc; Paschalis Paschos, MD, MSc; Thomas Karagiannis, MD, MSc; Anastasia Katsoula, MD, MSc; Eleni Athanasiadou, MSc; Konstantinos Kitsios, MD, PhD; Eleni Bekiari, MD, PhD, MSc; David R. Matthews, MD, DPhil; and Apostolos Tsapas, MD, PhD, MSc

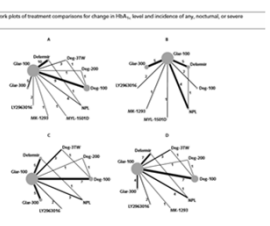

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Figure 3. Network meta-analysis estimates for change in HbA_{1c} level and incidence of nocturnal hypoglycemia for each comparison of basal insulin analogues.

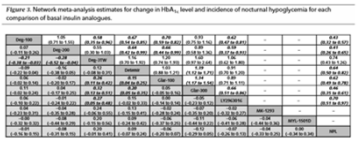

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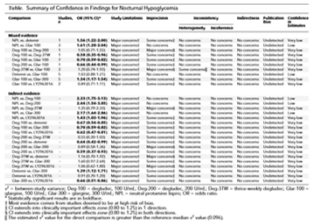
Table. Summary of Confidence in Findings for Nocturnal Hypoglycemia



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Discussion

On the basis of our findings, differences in glycemic efficacy among basal insulin analogues were minimal and probably lacked clinical significance (58). Detemir caused less weight gain than any other regimen, whereas Glar-300 had a favorable weight profile compared with Deg-100, Deg-200, Deg-3TW, Glar-100, and LY2963016. Fewer patients treated with Deg-100, Deg-200, and Glar-300 had nocturnal hypoglycemia than those treated with other basal insulin analogues. Incidence of severe hypoglycemia did not differ among interventions, except NPL, which was associated with higher hypoglycemic risk than any other insulin regimen. We observed no differences between glargine and glargine biosimilars (LY2963016, MK-1293, and MYL-1501D) in terms of reduction in HbA_{1c} level, effect on body weight, or incidence of hypoglycemia.

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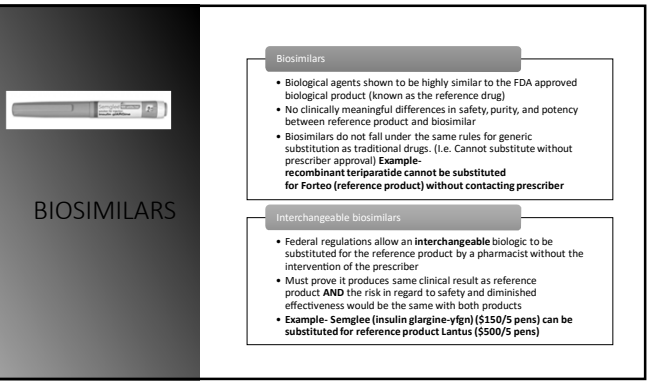

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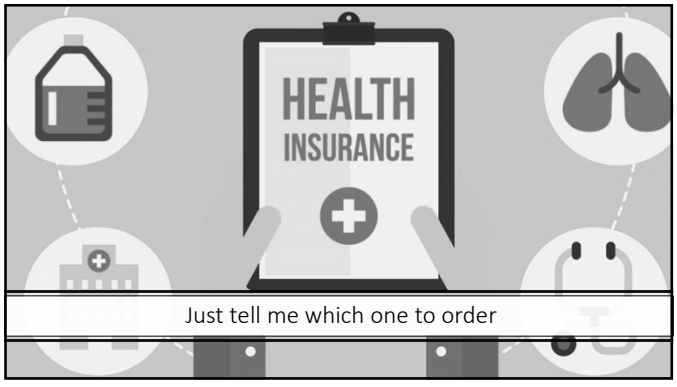

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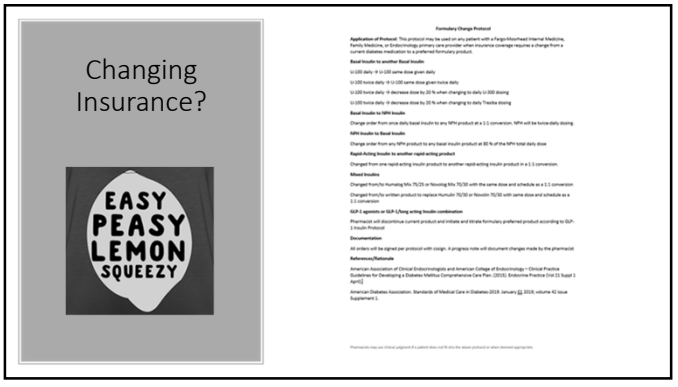

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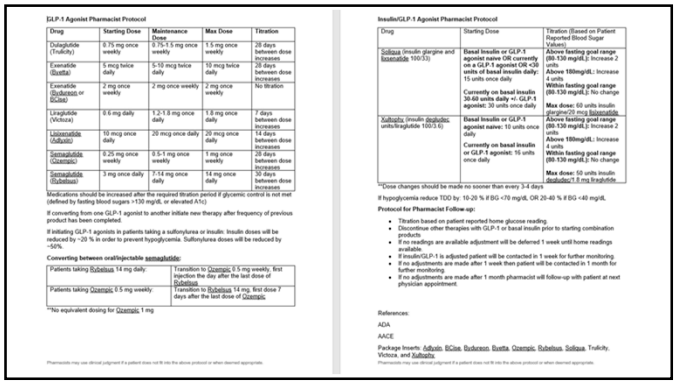

GLP-1 Agonist Pharmacist Protocol

Drug	Starting Dose	Maintenance Dose	Max Dose	Titration
Dulaglutide (Trulicity)	0.75 mg once weekly	0.75-1.5 mg once weekly	1.5 mg once weekly	28 days between dose increases
Exenatide (Byetta)	5 mcg twice daily	5-10 mcg twice daily	10 mcg twice daily	28 days between dose increases
Exenatide (Bydureon or BCise)	2 mg once weekly	2 mg once weekly	2 mg once weekly	No titration
Liraglutide (Victoza)	0.6 mg daily	1.2-1.8 mg once daily	1.8 mg once daily	7 days between dose increases
Lixisenatide (Adlyxin)	10 mcg once daily	20 mcg once daily	20 mcg once daily	14 days between dose increases
Semaglutide (Ozempic)	0.25 mg once weekly	0.5-1 mg once weekly	1 mg once weekly	28 days between dose increases
Semaglutide (Rybelsus)	3 mg once daily	7-14 mg once daily	14 mg once daily	30 days between dose increases

Medications should be increased after the required titration period if glycemic control is not met (defined by fasting blood sugars >130 mg/dL or elevated A1c)

If converting from one GLP-1 agonist to another initiate new therapy after frequency of previous product has been completed.

If initiating GLP-1 agonists in patients taking a sulfonylurea or insulin: Insulin doses will be reduced by ~20 % in order to prevent hypoglycemia. Sulfonylurea doses will be reduced by ~50%.

Converting between oral/injectable semaglutide:

Patients taking Rybelsus 14 mg daily:	Transition to Ozempic 0.5 mg weekly, first injection the day after the last dose of Rybelsus
Patients taking Ozempic 0.5 mg weekly:	Transition to Rybelsus 14 mg, first dose 7 days after the last dose of Ozempic

**No equivalent dosing for Ozempic 1 mg

Pharmacists may use clinical judgment if a patient does not fit into the above protocol or when deemed appropriate.

Insulin/GLP-1 Agonist Pharmacist Protocol

Drug	Starting Dose	Titration (Based on Patient Reported Blood Sugar Values)
Soliqua (insulin glargine and lixisenatide 100/33)	**Basal insulin or GLP-1 agonist naive OR currently on a GLP-1 agonist OR <30 units of basal insulin daily:** 15 units once daily **Currently on basal insulin 30-60 units daily +/- GLP-1 agonist:** 30 units once daily	**Above fasting goal range (80-130 mg/dL):** Increase 2 units **Above 180mg/dL:** Increase 4 units **Within fasting goal range (80-130 mg/dL):** No change **Max dose:** 60 units insulin glargine/20 mcg lixisenatide
Xultophy (insulin degludec/ units/liraglutide 100/3.6)	**Basal insulin or GLP-1 agonist naive:** 10 units once daily **Currently on basal insulin or GLP-1 agonist:** 16 units once daily	**Above fasting goal range (80-130 mg/dL):** Increase 2 units **Above 180mg/dL:** Increase 4 units **Within fasting goal range (80-130 mg/dL):** No change **Max dose:** 50 units insulin degludec/1.8 mg liraglutide

**Dose changes should be made no sooner than every 3-4 days

If hypoglycemia reduce TDD by: 10-20 % if BG <70 mg/dL OR 20-40 % if BG <40 mg/dL

Protocol for Pharmacist Follow up:

- Titration based on patient reported home glucose reading
- Discontinue other therapies with GLP-1 or basal insulin prior to starting combination products
- If no readings are available adjustment will be deferred 1 week until home readings available
- If insulin/GLP-1 is adjusted patient will be contacted in 1 week for further monitoring.
- If no adjustments are made after 1 week then patient will be contacted in 1 month for further monitoring.
- If no adjustments are made after 1 month pharmacist will follow-up with patient at next physician appointment

References:

ADA

AACE

Package Inserts: Adlyxin, BCise, Bydureon, Byetta, Ozempic, Rybelsus, Soliqua, Trulicity, Victoza, and Xultophy

Pharmacists may use clinical judgment if a patient does not fit into the above protocol or when deemed appropriate.

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When to Stop Titrating Basal Insulin and Consider Prandial Control Options

The individual is not meeting glycemic targets on basal insulin[1-4] and:

- **HbA1C still not at goal with 0.5 units/kg/d of daily basal insulin[3]**
- **HbA1c elevated despite normal FPG with basal insulin[2,3]**
- **FPG with basal insulin is within targeted range, but PPG is persistently above goal[3,4]**
- **Further increases in basal insulin result in hypoglycemia[3]**

1. Skyler JS. In: Lebovitz HE, ed. *Therapy for Diabetes Mellitus and Related Disorders*. Alexandria, VA: American Diabetes Association, Inc.; 2004:207-223.
2. American Diabetes Association. *Practical Insulin: A Handbook for Prescribing Providers*. 3rd ed. 2011:1-68.
3. Inzucchi S, et al. *Diabetes Care*. 2012;35:1364-1379.
4. Davidson MB, et al. *Endocr Pract*. 2011;17:390-401.

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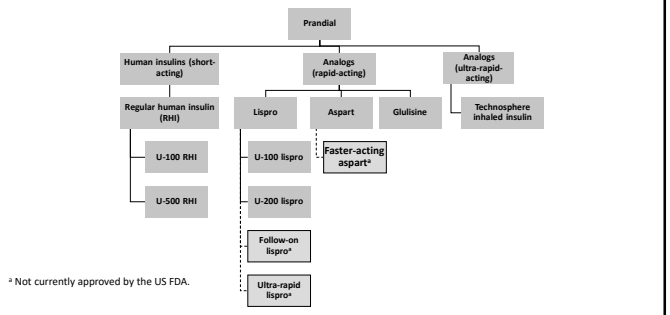
Current and Emerging Prandial Insulins



[a] Not currently approved by the US FDA.

US Food and Drug Administration. http://www.accessdata.fda.gov/Scripts/cder/DrugsatFDA.

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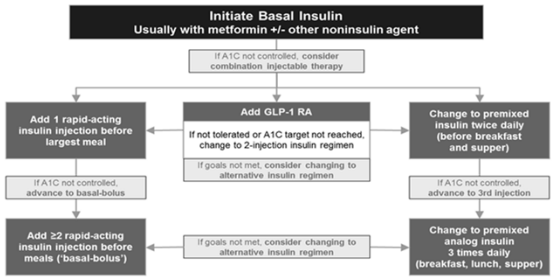
Therapeutic Options in Patients Not Achieving Glycemic Goals with Basal Insulin



American Diabetes Association. *Diabetes Care*. 2017;40(suppl 1):S1-S135.

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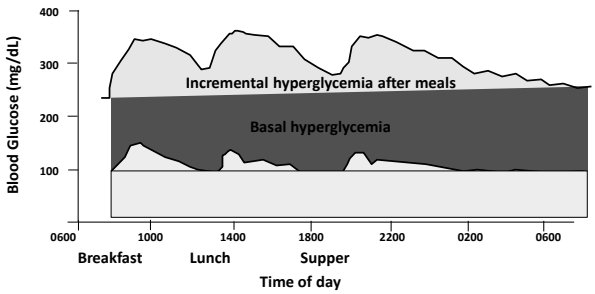
Basal vs Mealtime Hyperglycemia in T2DM



Polonsky KS, et al. *N Engl J Med*. 1988;318(19):1231-1239.

65

Basal-Plus Mealtime Insulin

- Use rapid-acting analogs (Aspart, Lispro, Glulisine), not RHI
  - Easier timing, less postprandial hypoglycemia
- **Start with 1 injection at largest meal:**
  - 4 units and titrate, OR
  - By weight: 0.1 unit/kg
- Titrate to:
  - < 140 mg/dL 2 hours postprandial OR
  - < 110 mg/dL next meal or bedtime

Garber AJ, et al. *Endocr Pract*. 2016;22:84-113.

66

Basal-Plus Mealtime Insulin (cont)

- Consider decreasing dose or stopping oral secretagogues
- Can continue metformin, TZD, AGI, GLP-1RA, DPP-4i, SGLT-2i
- Basal-bolus dosing
  - ~50% basal insulin and ~50% bolus insulin

Garber AJ, et al. *Endocr Pract*. 2016;22:84-113.

67

Quality of Life Improves in T2DM With Intensification of Insulin Therapy

- Multicenter study of 447 patients with insulin-treated T2DM and HbA1c >7%
- Patients were transitioned from baseline insulin regimens to basal-bolus using glargine + rapid-acting insulin
  - HbA1c declined from 8.8% to 7.7% over 6 months (*P* <.001)
  - Nonsevere hypoglycemic episodes decreased
- Small but significant improvements with no significant change in hypoglycemia fear
  - Emotional well-being (*P*<.001)
  - Diabetes symptom distress (*P*<.001)
  - Hypoglycemia fear (*P*=.61)

Hajos TR, et al. *Qual Life Res*. 2012;21:1359-1365.

68

Fiasp® (Faster Acting Aspart)

- Novolog with two additional excipients (Niacinamide and L-arginine)
- FDA Approval Sept. 2017
- Onset of appearance: 2.5 min
- Peak time: 1.5 – 2 hours
- Should be taken with first bite or within 20 minutes within start of a meal
- Unit per unit exchange
- No available evidence of benefit in terms of A1c or hypoglycemia
- Being used on insulin pumps – ONSET Trials 4 & 5 (Currently Off-label)

Bowering K et al. Diabetes Care 2017.
Bode B et al. Diabetes Technol Ther. 2017

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My patient doesn't have insurance

70

My patient doesn't have insurance

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My patient doesn't have insurance

Freestyle lite glucose test strips 50 count

$28.47 $70.00

✓prime FREE Delivery Wed, Dec 11

More Buying Choices
$19.99 (17 new offers)

Bayer Contour Next Blood Glucose 200 Test Strips 4 Boxes of 50 Exp. 4/30/2021

$68.00

Free Shipping
2 Watching

72

73

Home Glucose Testing: How Accurate

5%

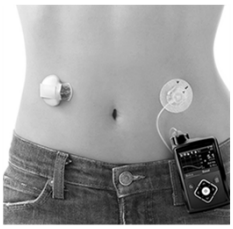
10%

15%

20%

74

Continuous Glucose Sensors



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CGMs: Do they work?

- About 0.5% lower A1c
- Decrease hypoglycemia
- Predictive low technology (combined with pump) decreased hypoglycemia without increasing A1c
- Anecdotally: Patient LOVE them

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FreeStyle Libre

- Covered by Medicare
- Usually $75 or less

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Dexcom g6

- 10 day wear
- No calibrations
- Customizable low and high BG alerts
- Data share automatically with Clarity app
- Transmitter & sensor **separate**
- Links to Tslimx2 insulin pump (closed loop system)

FREESTYLE LIBRE2

- 14 day wear
- No calibrations
- Customizable low and high BG alerts
- Data share automatically with Libreview app
- Transmitter & sensor in one
- Does not link to insulin pumps

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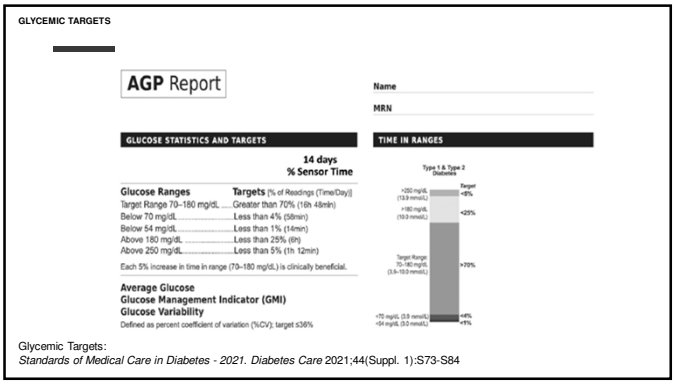
GLYCEMIC TARGETS



Glycemic Targets:
Standards of Medical Care in Diabetes - 2021. Diabetes Care 2021;44(Suppl. 1):S73-S84

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Insurance Coverage by Plan

Product	Medicare Part B *	Sanford Health Plan	BCBS ND	ND Medicaid	MN Medicaid	BCBS MN	IHS	No Coverage
Freestyle Libre2	Yes (medical benefit)	Yes (Pharmacy benefit)	Yes	No	Yes (Pharmacy benefit)	No	Location dependent, check with IHS clinic	Reader $50 Sensors $75/mo
Dexcom G6	Yes (medical benefit)	Yes (Pharmacy benefit)	Yes	Yes (Pharmacy benefit)	Yes (Pharmacy benefit)	Yes	Location dependent, check with IHS clinic	Receiver transmitter & 2-3 sensors $1500

*Medicare Advantage Plans: Some will cover sensors at the pharmacy without requirements
*Medicare criteria for coverage:
- Basal/bolus: At least 3 injections of insulin daily
- Diagnosis of DM (type 1 or 2)

**Libre2 & Dexcom: Are compatible with most iPhone and Android. Patients may use this for the receiver on non Medicare plans

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Insulin Pumps

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Good Night and Good Luck

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