

# Diabetes and Hypertension Project ECHO\* Clinic

\*ECHO: Extension of Community Healthcare Outcomes

**April 13, 2023**

## Before we begin:

- Rename your Zoom screen with your name and organization
- Claim CE:
- Go to [vcuhealth.org/echodmhtn](https://vcuhealth.org/echodmhtn) for instructions on creating your account

*The Diabetes and Hypertension ECHO is made possible by  
funding through CDC Cooperative Agreement  
NU58DP006620-InnoVAte.*

# Zoom Reminders



## Diabetes & Hypertension Project Echo

- You are all on **mute**. Please **unmute** to talk.
- If joining by telephone audio only, press **\*6** to mute and unmute.
- Use the chat function to speak with our team or ask questions.

Unmute

Chat Box



Leave Meeting

# ECHO is all teach, all learn

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Interactive



Co-management  
of cases



Peer-to-peer  
learning



Collaborative  
problem solving

## Helpful Reminders

- Please feel free to eat your lunch or step away briefly if needed
- We are recording and can share sessions upon request
  - Each session's slides are available on [www.vcuhealth.org/echodmhtn](http://www.vcuhealth.org/echodmhtn)
- Please **do not share any protected health information** in your discussion or the chat box
- Project ECHO operates on the “All Teach, All Learn” model
  - Feel free to ask questions in the chat or unmute to ask questions at designated times
  - We're all here to learn from each other and value each person's input and expertise!



# VCU Health Diabetes & Hypertension ECHO Clinics

VCU Hub Team	
Principal Investigator	Dave Dixon, PharmD
Clinical Experts	Niraj Kothari, MD Trang Le, MD
Program Coordinator	Sydney Weber

- One-hour ECHO clinics on 2nd Thursdays
- Every ECHO clinic includes a didactic presentation followed by case discussions
- Website: [www.vcuhealth.org/echodmhtn](http://www.vcuhealth.org/echodmhtn)
  - Directions for claiming CE :
  - You have up to six days after our session to claim CE by texting 29387-28189 to 804-625-4041



<https://VCU.cloud-cme.com/WebService/SelfAttendScan.aspx?EventID=29387>

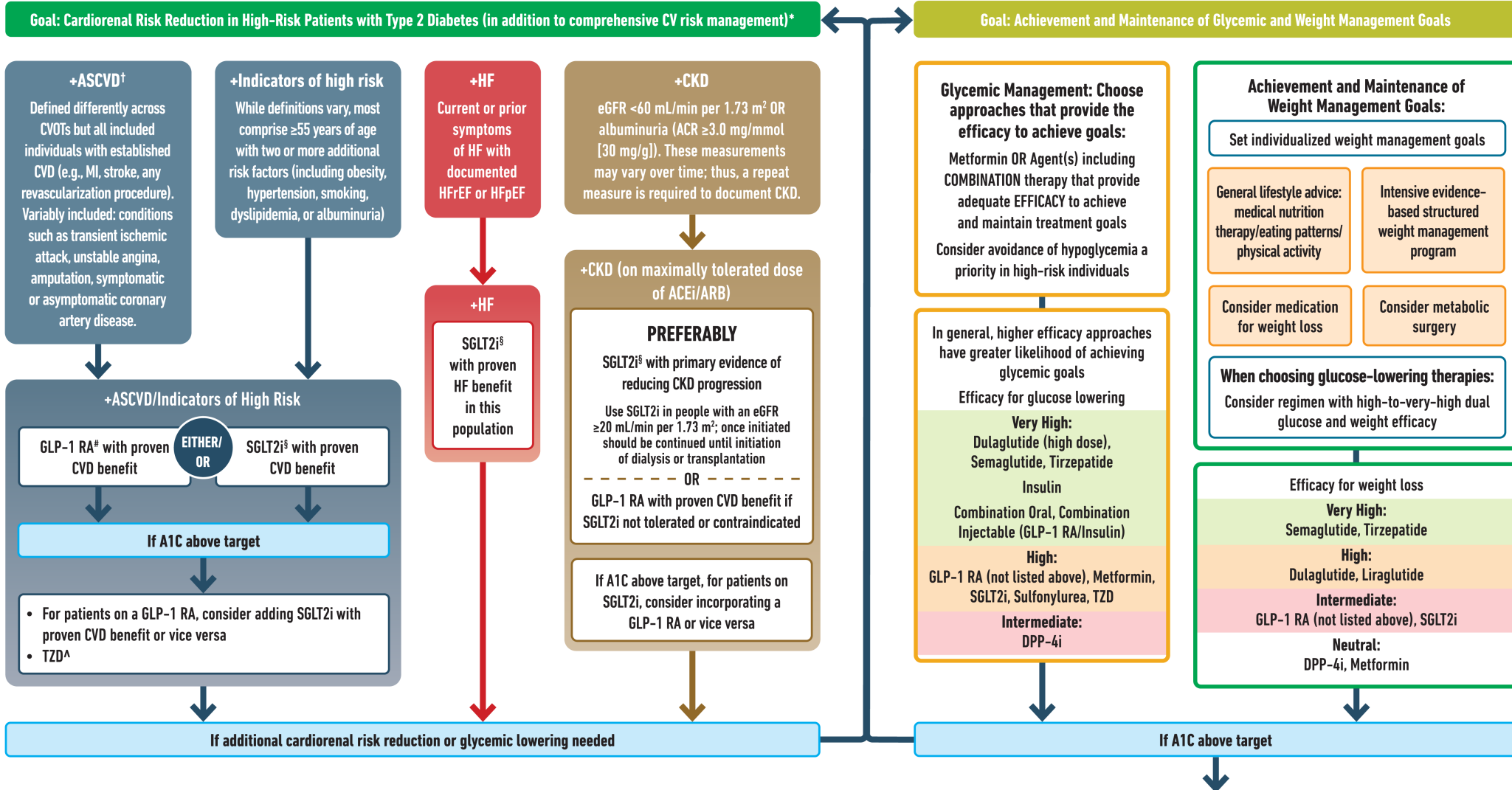
# Disclosures

Trang Le, M.D., has no financial conflicts of interest to disclose.  
There is no commercial or in-kind support for this activity.

# Bolus Insulin: When and How

# Learning objectives

- Discuss indications for bolus insulin
- Review patient preparation for success with bolus insulin
- List alternatives to typical bolus insulin



\* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin;† A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; ^ Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HFrEF, and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CVD.



# The insulin discussion

- The need for the greater potency of injectable medications is common, particularly in people with a longer duration of diabetes.
- The addition of basal insulin, either human NPH or one of the long-acting insulin analogs, to oral regimens is well-established and effective for many individuals.

# The insulin discussion

- Many adults with type 2 diabetes eventually require and benefit from insulin therapy
- The progressive nature of type 2 diabetes should be regularly and objectively explained to patients, and clinicians should avoid using insulin as a threat or describing it as a sign of personal failure or punishment
- Instruction of individuals with type 2 diabetes initiating insulin in self-titration of insulin doses based on glucose monitoring improves glycemic control

# Before Bolus.... We need basal insulin

- When A1C is  $\geq 1.5\%$  above the glycemic target many individuals will require dual-combination therapy or a more potent glucose-lowering agent to achieve and maintain their target A1C level
- Insulin should be considered as part of any combination regimen if:
  - Severe hyperglycemia
  - Presence of catabolic features (weight loss, hypertriglyceridemia, ketosis)
- It is common practice to initiate insulin therapy for people who present with blood glucose levels  $\geq 300$  mg/dL or A1C  $> 10\%$

# Patient preparation

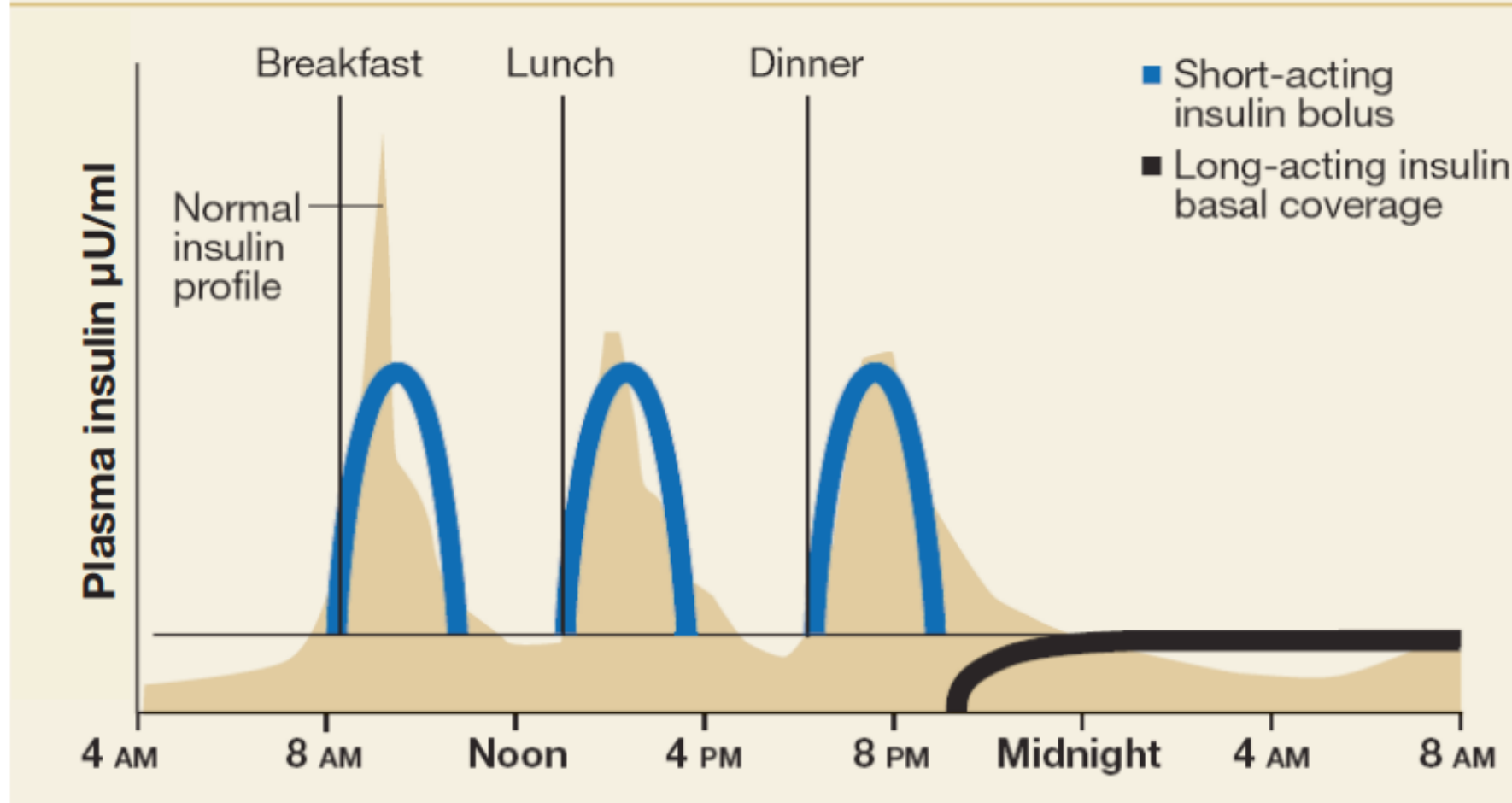
- What are the patient's goals?
- How frequently will the patient check blood glucose values?
- How many injections is the patient willing to start with?

# Bolus (Prandial) Insulin

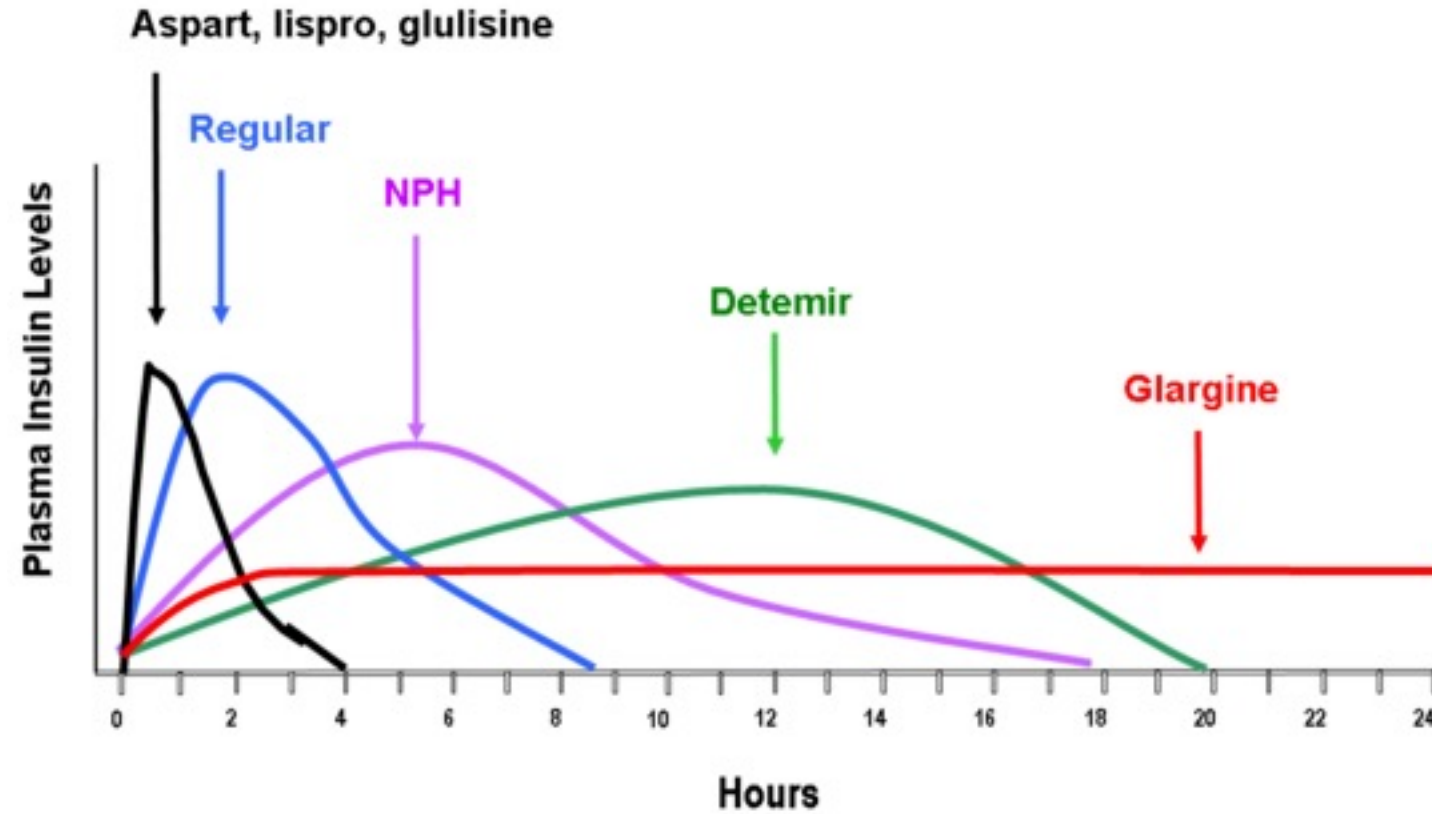
- Many individuals with type 2 diabetes require doses of insulin before meals, in addition to basal insulin, to reach glycemic targets.
- If the individual is not already being treated with a GLP-1 RA, a GLP-1 RA (either in free combination or fixed-ratio combination) should be considered prior to prandial insulin to further address prandial control, and minimize hypoglycemia and weight gain

# Basal-Bolus Insulin Treatment

## Basal/bolus regimen mimics normal insulin profile



# Basal-Bolus Insulin Treatment



# Question

- You have a 70kg patient with T2DM who is currently on glargine, 30 units nightly and semaglutide 2mg weekly. A1c is 9%. Her largest meal of the day is dinner but her sugars increase the most after breakfast. She is only agreeable to adding 1 additional injection per day. You recommend:
  - A. 2 units with dinner
  - B. 4 units at breakfast
  - C. 4 units with all three meals
  - D. 10 units with dinner



# Bolus insulin

- For individuals who advance to prandial insulin, a **prandial insulin dose of 4 units or 10% of the amount of basal insulin at the largest meal** or the meal with the greatest postprandial excursion is a safe estimate for initiating therapy.
- The prandial insulin regimen can then be intensified based on individual needs
- With significant additions to the prandial insulin dose, particularly with the evening meal, consideration should be given to pre-emptively decreasing basal insulin

# Question

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  - A. 2 units with dinner
  - B. 4 units at breakfast
  - C. 4 units with all three meals
  - D. 10 units with dinner

# Bolus insulin – other considerations

- What types of insulin?
- How to adjust basal, when starting bolus insulin?
  - Reassess weight based basal insulin dosing/ renal function
- Add correction for hyperglycemia?
  - Example: 4 units premeal to start, 8 units if premeal glucose above 300

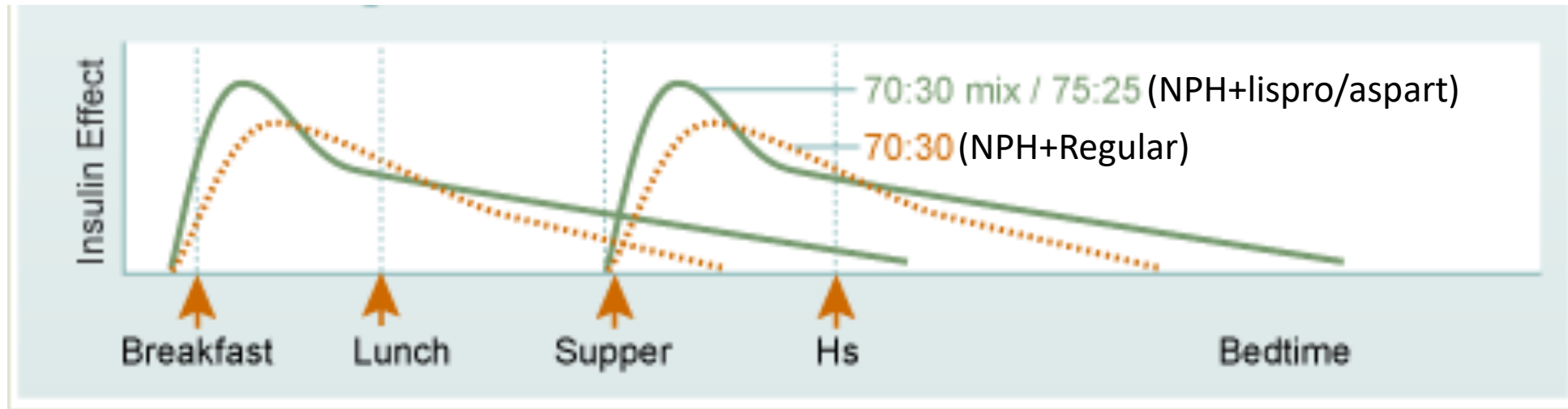
# Question

- Premixed insulin is inferior to basal bolus insulin due to
  - A. higher risk of hypoglycemia
  - B. more weight gain
  - C. both A and B
  - D. it depends on the patient

# Alternative mealtime insulins – premixed insulin

- combinations of NPH and regular, aspart, or lispro
- basal-prandial regimens offer greater flexibility for individuals who eat on irregular schedules or have very variable carb intake with meals / snacks
- However, two doses of premixed insulin is a simple, convenient means of spreading insulin across the day.
- Moreover, human insulins, separately, self-mixed, or as premixed NPH/regular (70/30) formulations, are less costly alternatives to insulin analogs.

# Premixed insulins



<https://dtc.ucsf.edu/types-of-diabetes/type2/treatment-of-type-2-diabetes/medications-and-therapies/type-2-insulin-rx/types-of-insulin/pre-mixed-insulin/>

# Question

- Which of the following is correct regarding inhaled insulin?
- A. inhaled insulin has been discontinued in the United States
- B. inhaled insulin has a delayed onset of action compared with injected insulin
- C. inhaled insulin is available as both rapid-acting insulin and basal insulin
- D. inhaled insulin requires pulmonary function testing prior to initiation

# Alternative mealtime insulins - inhaled

- Inhaled insulin is available as a rapid-acting insulin
- *faster onset* and *shorter duration* compared with rapid acting insulin lispro
- clinically meaningful A1C reduction compared with insulin aspart over 24 weeks
- Use of inhaled insulin may result in a decline in lung function (reduced forced expiratory volume in 1s [FEV1])
- Inhaled insulin is **contraindicated** in individuals with chronic lung disease, (asthma and chronic obstructive pulmonary disease)
- Not recommended in individuals who smoke /recently stopped smoking
- All individuals require spirometry (FEV1) testing to identify potential lung disease prior to and after starting inhaled insulin therapy.



# Inhaled Insulin



4-units

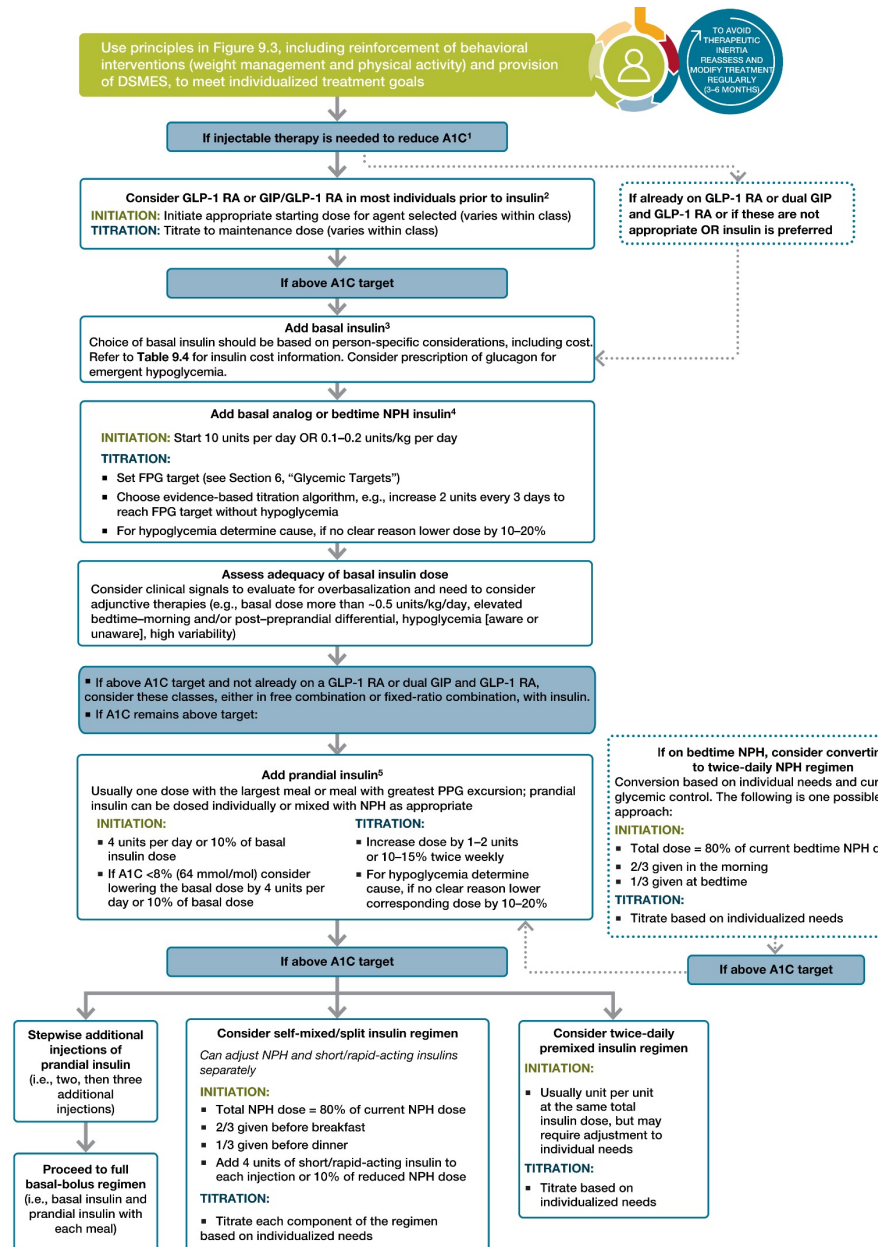


8-units

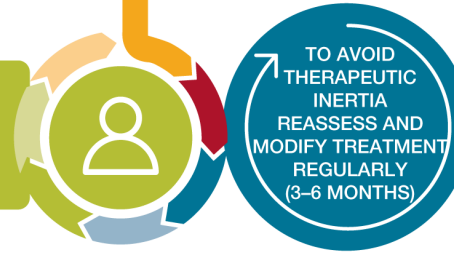


12-units





Use principles in Figure 9.3, including reinforcement of behavioral interventions (weight management and physical activity) and provision of DSMES, to meet individualized treatment goals



If injectable therapy is needed to reduce A1C<sup>1</sup>

Consider GLP-1 RA or GIP/GLP-1 RA in most individuals prior to insulin<sup>2</sup>

**INITIATION:** Initiate appropriate starting dose for agent selected (varies within class)

**TITRATION:** Titrate to maintenance dose (varies within class)

If already on GLP-1 RA or dual GIP and GLP-1 RA or if these are not appropriate OR insulin is preferred

If above A1C target

Add basal insulin<sup>3</sup>

Choice of basal insulin should be based on person-specific considerations, including cost. Refer to **Table 9.4** for insulin cost information. Consider prescription of glucagon for emergent hypoglycemia.

Add basal analog or bedtime NPH insulin<sup>4</sup>

**INITIATION:** Start 10 units per day OR 0.1–0.2 units/kg per day

**TITRATION:**

- Set FPG target (see Section 6, “Glycemic Targets”)
- Choose evidence-based titration algorithm, e.g., increase 2 units every 3 days to reach FPG target without hypoglycemia
- For hypoglycemia determine cause, if no clear reason lower dose by 10–20%

Assess adequacy of basal insulin dose

Consider clinical signals to evaluate for overbasalization and need to consider adjunctive therapies (e.g., basal dose more than 0.5 units/kg/day, elevated

### Assess adequacy of basal insulin dose

Consider clinical signals to evaluate for overbasalization and need to consider adjunctive therapies (e.g., basal dose more than ~0.5 units/kg/day, elevated bedtime–morning and/or post–preprandial differential, hypoglycemia [aware or unaware], high variability)

- If above A1C target and not already on a GLP-1 RA or dual GIP and GLP-1 RA, consider these classes, either in free combination or fixed-ratio combination, with insulin.
- If A1C remains above target:

### Add prandial insulin<sup>5</sup>

Usually one dose with the largest meal or meal with greatest PPG excursion; prandial insulin can be dosed individually or mixed with NPH as appropriate

#### INITIATION:

- 4 units per day or 10% of basal insulin dose
- If A1C <8% (64 mmol/mol) consider lowering the basal dose by 4 units per day or 10% of basal dose

#### TITRATION:

- Increase dose by 1–2 units or 10–15% twice weekly
- For hypoglycemia determine cause, if no clear reason lower corresponding dose by 10–20%

### If on bedtime NPH, consider converting to twice-daily NPH regimen

Conversion based on individual needs and current glycemic control. The following is one possible approach:

#### INITIATION:

- Total dose = 80% of current bedtime NPH dose
- 2/3 given in the morning
- 1/3 given at bedtime

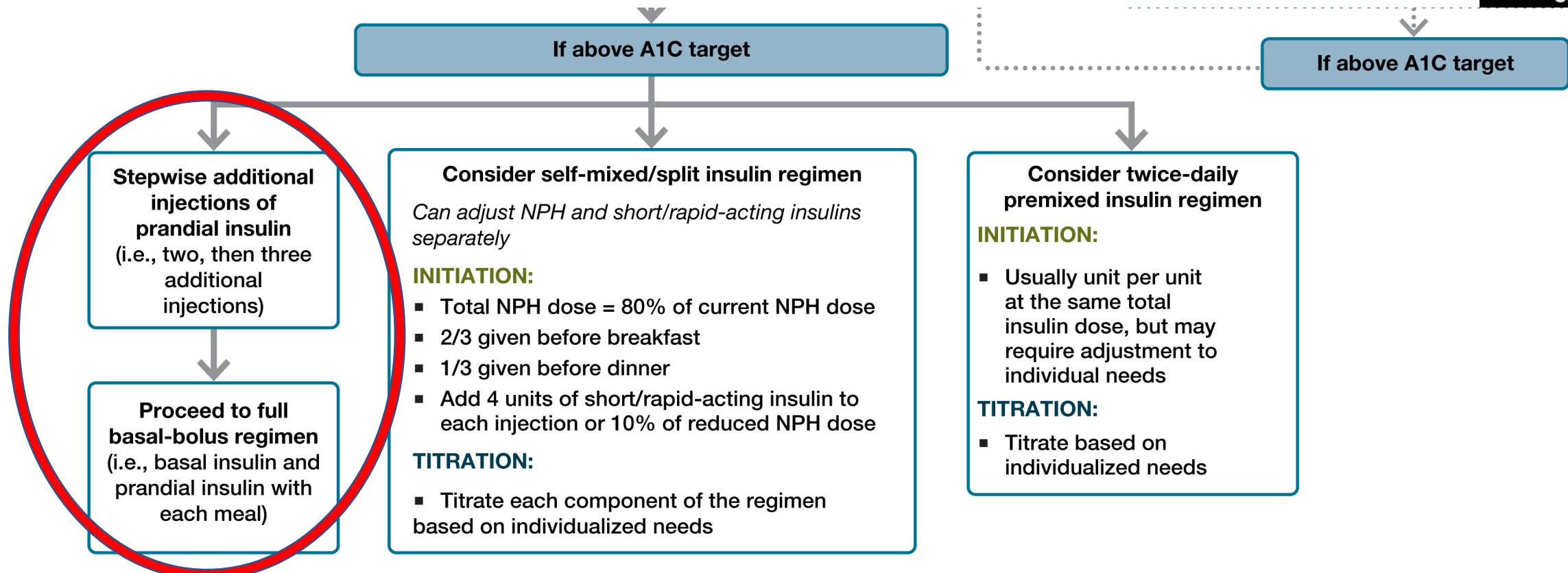
#### TITRATION:

- Titrate based on individualized needs

If above A1C target

If above A1C target





If above A1C target

1. Consider insulin as the first injectable if evidence of ongoing catabolism, symptoms of hyperglycemia are present, when A1C levels (>10% [86 mmol/mol]) or blood glucose levels (300 mg/dL [16.7 mmol/L]) are very high, or a diagnosis of type 1 diabetes is a possibility.
2. When selecting GLP-1 RA, consider individual preference, A1C lowering, weight-lowering effect, or frequency of injection. If CVD is present, consider GLP-1 RA with proven CVD benefit. Oral or injectable GLP-1 RA are appropriate.
3. For people on GLP-1 RA and basal insulin combination, consider use of a fixed-ratio combination product (IDegLira or iGlarLixi).
4. Consider switching from evening NPH to a basal analog if the individual develops hypoglycemia and/or frequently forgets to administer NPH in the evening and would be better managed with an A.M. dose of a long-acting basal insulin.
5. If adding prandial insulin to NPH, consider initiation of a self-mixed or premixed insulin regimen to decrease the number of injections required.

# Average Wholesale Price and Median National Drug Acquisition Cost

Insulins	Compounds	Dosage form/product	Median AWP (min, max)*	Median NADAC*
Rapid-acting	• Lispro follow-on product	U-100 vial	\$118 (\$118, \$157)	\$94
		U-100 prefilled pen	\$151	\$121
	• Lispro	U-100 vial	\$99†	\$79†
		U-100 cartridge	\$408	\$326
		U-100 prefilled pen	\$127†	\$102†
		U-200 prefilled pen	\$424	\$339
	• Lispro-aabc	U-100 vial	\$330	\$261
		U-100 prefilled pen	\$424	\$339
		U-200 prefilled pen	\$424	NA
	• Glulisine	U-100 vial	\$341	\$272
		U-100 prefilled pen	\$439	\$351
	• Aspart	U-100 vial	\$174†	\$140†
		U-100 cartridge	\$215†	\$172†
		U-100 prefilled pen	\$224†	\$180†
	• Aspart ("faster acting product")	U-100 vial	\$347	\$277
		U-100 cartridge	\$430	\$344
		U-100 prefilled pen	\$447	\$357
	• Inhaled insulin	Inhalation cartridges	\$1,418	NA
Short-acting	• Human regular	U-100 vial	\$165††	\$132††
		U-100 prefilled pen	\$208	\$166

# Average Wholesale Price and Median National Drug Acquisition Cost

Insulins	Compounds	Dosage form/product	Median AWP (min, max)*	Median NADAC*
Premixed insulin products	• NPH/regular 70/30	U-100 vial	\$165††	\$133††
		U-100 prefilled pen	\$208	\$167
	• Lispro 50/50	U-100 vial	\$342	\$274
		U-100 prefilled pen	\$424	\$339
	• Lispro 75/25	U-100 vial	\$342	\$273
		U-100 prefilled pen	\$127†	\$103†
	• Aspart 70/30	U-100 vial	\$180†	\$146†
		U-100 prefilled pen	\$224†	\$178†

# Summary

- The best insulin regimen for a patient depends on
  - Frequency of glucose monitoring
  - Typical meal schedule
- Prepare early for the possibility of needing to start prandial/bolus insulin
- Maximize other therapies associated with weight loss / neutrality first, before adding bolus insulin, if the severity of hyperglycemia permits



# Case Studies

**Case 1:** 72 year old lady with T2DM diagnosed in her 40s who presents to establish care due to prior endocrinologist retiring

- Medical history: T2DM, hyperlipemia, hypertension, class 1 obesity
- A1c 8.3%, normal renal function
- Medications:
  - NPH/Aspart 70/30, 32 units in AM only
  - Glargine 24 units nightly
  - Aspart, pre-meal, 2 units per 50 above 200
  - Metformin 100mg BID
  - Sitagliptin 100mg daily
- Frequently forgets lunch dose of aspart
- Diet: Uses carb exchanges, she is most comfortable with 4-5 exchanges for meals and reports that while this keeps her weight is stable, she is not able to lose weight

**Case 1:** 72 year old lady with T2DM diagnosed in her 40s who presents to establish care due to prior endocrinologist retiring

- Review of BGs: Number of daily checks: 3,
  - Fasting a.m. = 123-213, generally less than 180
  - Pre-dinner: 83-221
  - Bedtime, 64-218
- patient is agreeable to simplify her insulin regimen, again:
  - NPH/Aspart 70/30, 32 units in AM only
  - Glargine 24 units nightly
  - Aspart, pre-meal, 2 units per 50 above 200
  - Metformin 1000mg BID
  - Sitagliptin 100mg daily
- Questions / suggestions?

**Case 1:** 72 year old lady with T2DM diagnosed in her 40s who presents to establish care due to prior endocrinologist retiring

- glargine 24 units once nightly, aspart 8 units with all meals, along with correction of 2 units per 50 points above target glucose 150
- discontinue 70/30 insulin
- What to do about her sitagliptin?

*Questions / next steps?*

Component	Latest Ref Rng & Units	1/28/2021	3/5/2021	9/8/2021	4/13/2022	10/17/2022	1/10/2023	4/10/2023
Est Average Glucose	mg/dL	206	183	148	160	140	171	154
HEMOGLOBIN A1C	<5.7 %	8.8 (H)	8.0 (H)	6.8 (H)	7.2 (H)	6.5 (H)	7.6 (H)	7.0 (H)

## Case 2: 72 year old gentleman with T2DM

- Initial visit: 3 year h/o type 2 DM
- Initially on metformin, insulin added 1 year afterwards
- At this new patient visit: **A1c 12%**
  - Lantus 30 units at 7pm
  - Novolog 5-8 units recommended with each meal (often missing doses)
  - Metformin 1000mg BID
- Meal patterns:
  - Nothing for breakfast;
  - Lunch: Sandwich, fruit, pickle,
  - Dinner: usually the largest meal, Protein, salad, bread,
- Blood glucose data:
  - Fasting: 97-153
  - Lunch: 114-147
  - Dinner: 137-287
  - Bedtime: 132-209

*Questions / next steps?*

# Next visit

- A1c 10.8%
  - Lantus 34 units at 7pm
  - Novolog 8 units recommended with each meal (often missing doses)
  - Metformin 1000mg BID
- Review of BGs: checking fasting AM only. mainly in the 100s-200s range.
- “Can I just go back to that mixed insulin?”
- reviewed options with patient, he elects to eat breakfast more regularly and start 70/30 mixed insulin, 30 units in AM and 15 with dinner.

*Questions / next steps?*

# Next visit

- 7.7%
- Regimen:
  - Mixed insulin 70/30, **38 units in the morning \*except on water aerobics days, take only 35 units that morning\*, and 22 units with dinner.**
  - **Metformin 1000mg BID**
- States he cannot remember to do more than 2 injections daily;
- Tends to graze throughout the day but has cut down on the amount of snack items available at home

*Questions / next steps?*

# Follow up

- **A1c now 7.4%**
- Current diabetes regimen is:
  - Mixed insulin 70/30, 24 units with breakfast, 14 units with dinner.
  - Metformin 1000 mg twice daily
  - Trulicity 3.0mg daily,
- Review of BGs: continues to check twice daily before breakfast and before dinner, range= 100-181
- Has lost 20 pounds since starting Trulicity



# Questions?



# Case Studies

- Anyone can submit cases: [www.vcuhealth.org/echodmhtn](http://www.vcuhealth.org/echodmhtn)
- Receive feedback from participants and content experts
- Earn **\$150** for submitting and presenting

# Provide Feedback

[www.vcuhealth.org/echodmhtn](http://www.vcuhealth.org/echodmhtn)

- Feedback
  - Overall feedback related to session content and flow?
  - Ideas for guest speakers?

# Send us your feedback

vcuhealth.org/services/telehealth/for-providers/education/diabetes-and-hypertension-project-echo



## For Providers

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**Diabetes and Hypertension Project ECHO** -

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Curriculum

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Virginia Opioid Addiction ECHO +

Virginia Sickle Cell Disease ECHO +

# Diabetes and Hypertension Project ECHO

Welcome to the Diabetes and Hypertension Extension for Community Health Outcomes or ECHO, a virtual network of multidisciplinary diabetes and hypertension experts. An ECHO model connects professionals with each other in real-time collaborative virtual sessions on Zoom. Participants present de-identified cases to one another, share resources, connect to each other, and grow in their expertise. This ECHO will address practice level issues and solutions related to managing complex patients with difficult to control diabetes and hypertension. [Register now for an ECHO Session!](#)

## Network, Participate and Present

- Engage in a collaborative community with your peers.
- Listen, learn and discuss informational and case presentations in real-time.
- Take the opportunity to [submit your de-identified case study](#) for feedback from a team of specialists for diabetes and hypertension.
- [Provide valuable feedback.](#)
- Claim CE credit by [texting in attendance](#).

## Benefits



# VCU Diabetes & Hypertension Project ECHO Clinics

2<sup>nd</sup> Thursdays — 12 p.m. to 1 p.m.

## **Mark Your Calendars — Next Session**

May 11, 2023 – Management of Hypertriglyceridemia

June 8, 2023 – Lightning Round – submit your topics!

Please register at [www.vcuhealth.org/echodmhtn](http://www.vcuhealth.org/echodmhtn)

Thank you for coming!



Reminder: **Mute** and **Unmute** to talk  
Press \*6 for phone audio  
Use **chat** function for questions