Diabetes and Hypertension Project ECHO* Clinic

*ECHO: Extension of Community Healthcare Outcomes

January 28, 2020

If you have already created your VCU Health CE account, scan this QR code to claim CE:

Or text

19146-18817

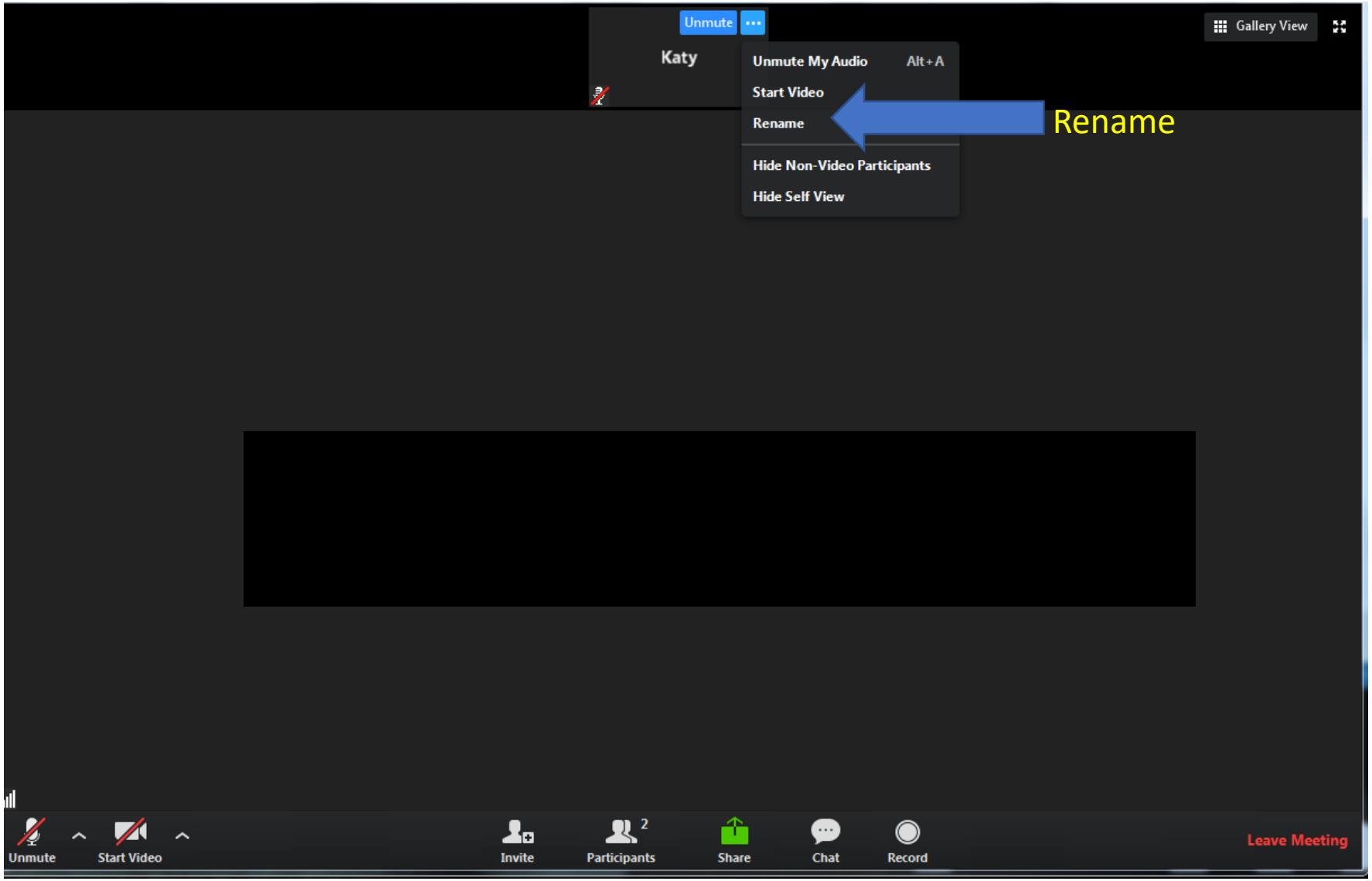
to

804-625-4041

https://VCU.cloud-cme.com/WebService/SelfAttendScan.aspx?EventID=19146

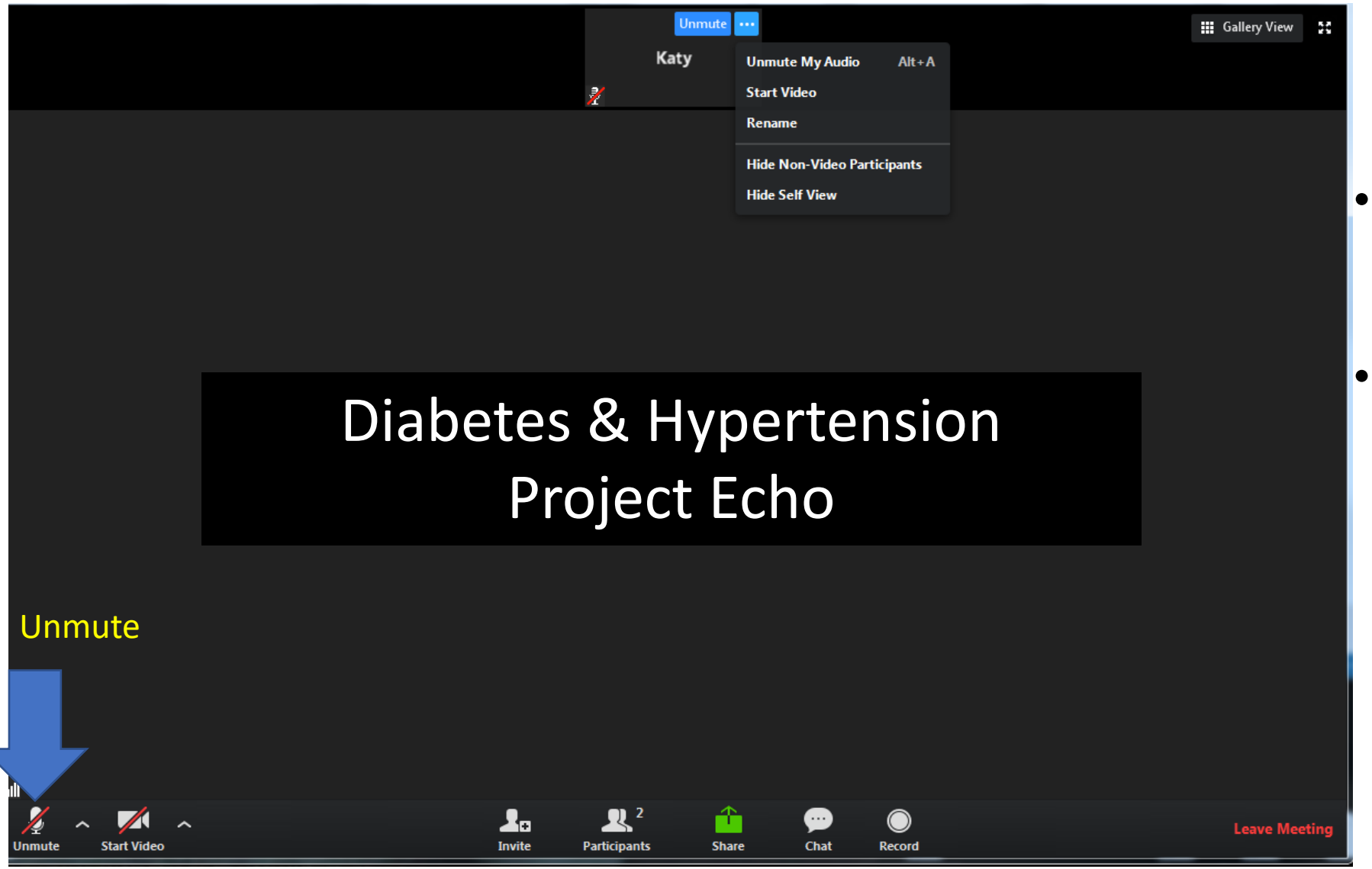
Be thinking of a favorite winter pastime to share during introductions!

Helpful Reminders



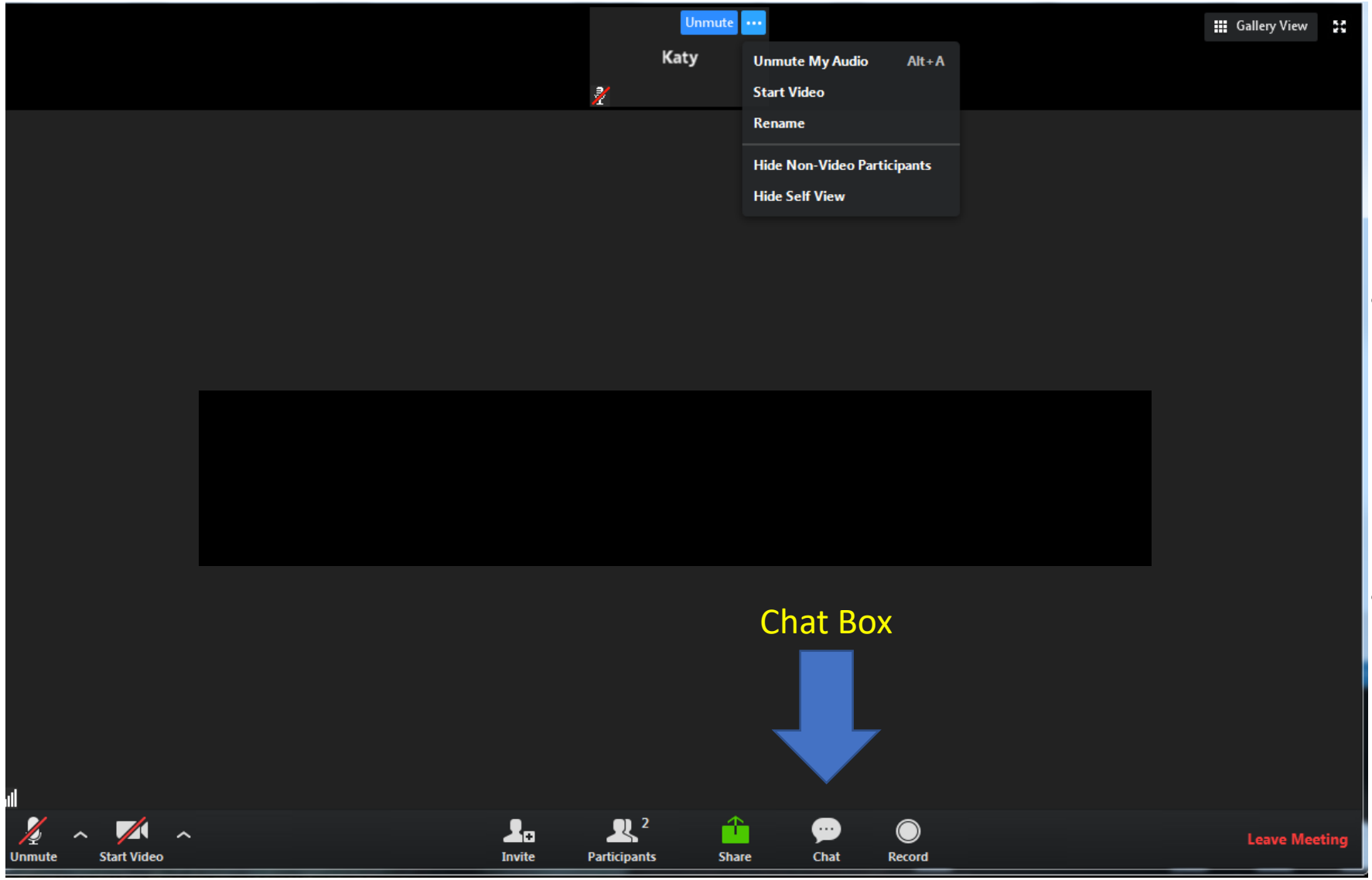
*Rename your Zoom screen with your name and organization

Helpful Reminders



- You are all on mute. Please unmute to talk
- If joining by telephone audio only, press *6 to mute and unmute

Helpful Reminders



- Please type your full name and organization in the chat box
- Use the chat function to speak with our team or ask questions

VCU Health Diabetes & Hypertension ECHO Clinics

- Bimonthly, 1.5-hour tele-ECHO clinics on 2nd and 4th Thursdays
- Every tele-ECHO clinic includes a 30-minute didactic presentation followed by case discussions
- Didactic presentations are developed and delivered by interprofessional experts
- Website: www.vcuhealth.org/echodmhtn
  - Directions for creating an account and claiming CE can be found here also
  - You have up to six days after our session to claim CE by texting **19146-18817** to **804-625-4041**

Hub and Participant Introductions

VCU Team	
Principal Investigator	Dave Dixon, PharmD
Administrative Medical Director ECHO Hub	Vimal Mishra, MD, MMCi
Clinical Experts	Niraj Kothari, MD Trang Le, MD
Project Coordinator/IT Support	Madeleine Wagner, BA
Program Manager	Bhakti Dave, MPH

- Use chat function for introduction
  - Name
  - Organization

Reminder: Mute and unmute screen to talk or press *6 for phone audio

Share your name, organization, and a favorite winter pastime!

Housekeeping items

- 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
  - We encourage you to keep your camera on, but if you are uncomfortable being recorded, feel free to turn it off
- Please **do not share any protected health information** in your discussion or the chat
- 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!

What to Expect

I. Didactic Presentations
    I. Teaching Patients Diabetes Self-Management Skills
II. Case presentations
    I. Case 1
        I. Case summary
        II. Clarifying questions
        III. Recommendations
    II. Case 2
        I. Case summary
        II. Clarifying questions
        III. Recommendations
III. Closing and questions

Let's get started!

Didactic Presentation

Disclosures

Trang Le, MD has no financial conflicts of interest to disclose.

Niraj Kothari, MD has no financial conflicts of interest to disclose.

There is no commercial or in-kind support for this activity.

Learning Objectives

- Apply current best practices for comprehensive diabetes and hypertension care to patient case scenarios.
- Recognize best practices for implementing team-based diabetes and hypertension care.
- Demonstrate awareness of opportunities to improve care provided to patients with diabetes and hypertension.

Chronic Kidney Disease

Learning Objectives

- Review mechanisms of treatments for HTN
- Identify CKD/ESKD related risk factors that may influence selection of antihypertensive agents

Considerations

- Efficacy, particularly as GFR declines
- Cost
- Electrolyte issues (particularly hyperkalemia)
- Contributing factors (dialysis, salt intake)
- Control of HTN is more important than the choice of drug

Category	Office reading (mmHg)	24-hour ambulatory (mmHg)	Self-recorded (mmHg)
Normal	SBP < 120 and DBP < 80		
Elevated BP	SBP 120-129 and DBP < 80		
HTN Stage 1	SBP 130-139 or DBP 80-89		
HTN Stage 2	SBP ≥ 140 or DBP ≥ 90	>130/80	135/85

Initial therapy

- Lifestyle changes good for everyone: **low sodium**/DASH, wt loss, exercise

- Nonpharmacologic therapy: 120-129/<80 or stage 1 with 10 year ASCVD risk < 10%
- Nonpharm ± drugs: BP > 130/80 and CV disease, 10 year ASCVD risk > 10%, BP > 140/90: goal <130/80
- Two first-line drugs in different classes: Stage 2 HTN or BP average 20/10mmHg above target

Considerations in kidney patients

- eGFR < 30mL/min/1.73m2: thiazides ineffective, use loop diuretics
- CKD patients tend to be particularly volume sensitive—diuretic therapy should remain a mainstay of HTN treatment
- Proteinuric and diabetic patients would benefit from RAAS blockade
- Hyperkalemia may limit use of RAASi/MRA
- Chronotherapy

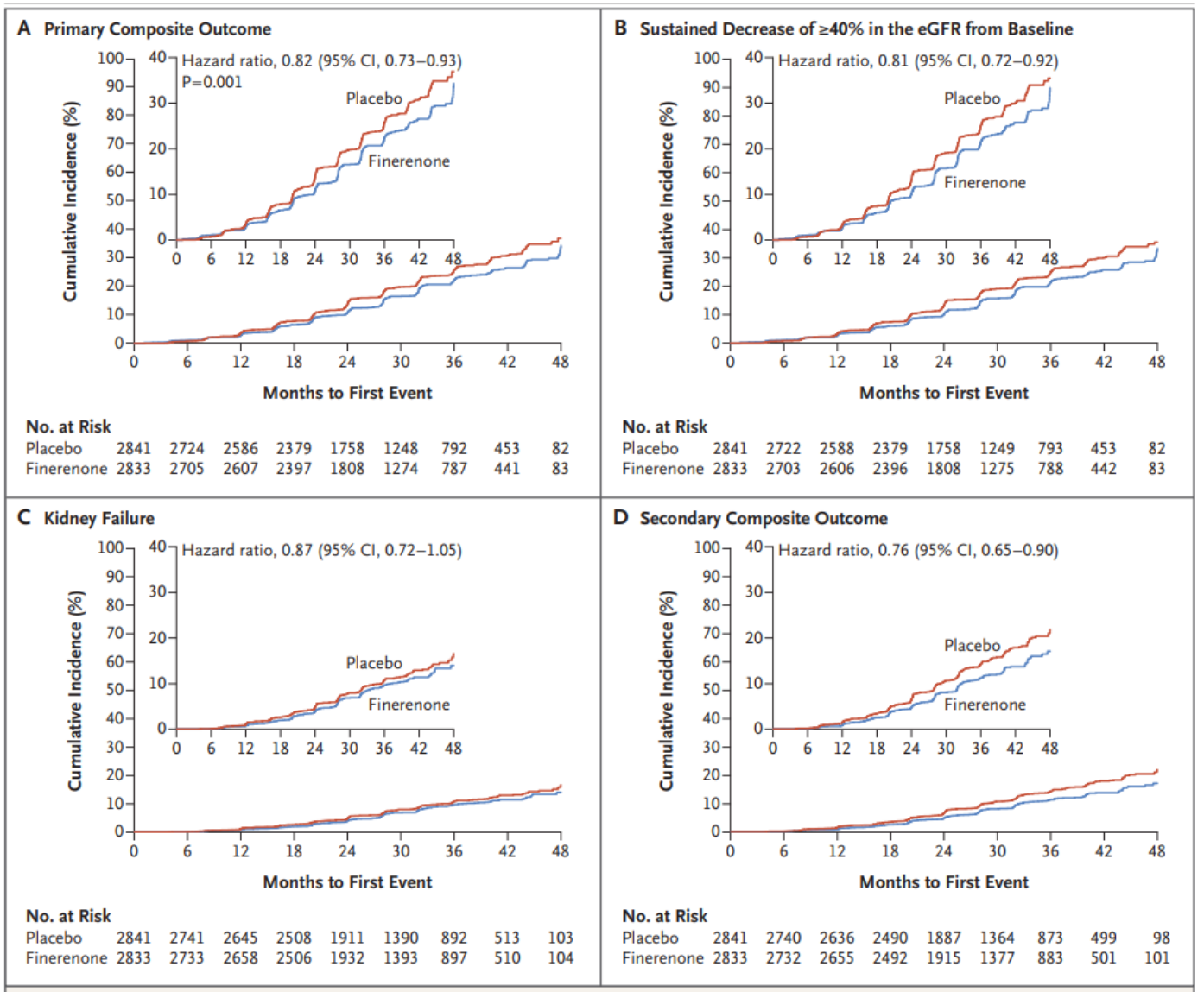
Kidney disease and HTN

- Acute glomerular disease tends to cause sodium retention
  - RAAS suppression
- HTN is very common, present in ~85% of CKD patients
  - Worsens as GFR falls
  - Sodium retention (even in nonedematous patients)
  - Increased RAAS activity
  - Renovascular disease-renal ischemia stimulates renin secretion
  - Possible increased sympathetic activity
  - Secondary hyperparathyroidism
  - EPO

Drug class	Example	Site of action	Effect	Adverse events
Carbonic anhydrase inhibitors	Acetazolamide	Carbonic anhydrase in the proximal convoluted tubule	Prevents dehydration of H_2CO_3 and hydration of CO_2, leading to reduced reabsorption of HCO_3- and subsequent diuresis	Metabolic acidosis Hypokalemia GI upset Tinnitus
Loop diuretics	**Furosemide** **Torsemide**	NKCC transporter in the thick ascending loop of Henle	Prevents reabsorption of Na-K-2Cl, leading to diuresis	Hyponatremia Hypokalemia Hypomagnesemia Hypocalcemia
Thiazides	**Chlorthalidone** **HCTZ** Metolazone	NCC transporter in the distal convoluted tubule	Prevents reabsorption of Na-Cl, leading to diuresis	Hyponatremia Hypokalemia HyperGLUC (glucose/lipids/uric acid/Ca)
Mineralocorticoid receptor antagonists (K sparing)	Spironolactone Eplerenone **Finerenone**	Aldosterone receptor in the collecting tubule	Inhibits function of ENaC and basolateral Na-K ATPase, leading to diuresis	Hyperkalemia Gynecomastia (spironolactone)

What is finerenone?

- Selective mineralocorticoid receptor antagonist
- Less hyperkalemia than spironolactone or eplerenone
- Reduction of albuminuria
- Improved outcomes for patients with diabetic kidney disease but not yet studied in patients with DKD on SGLT2 inhibition

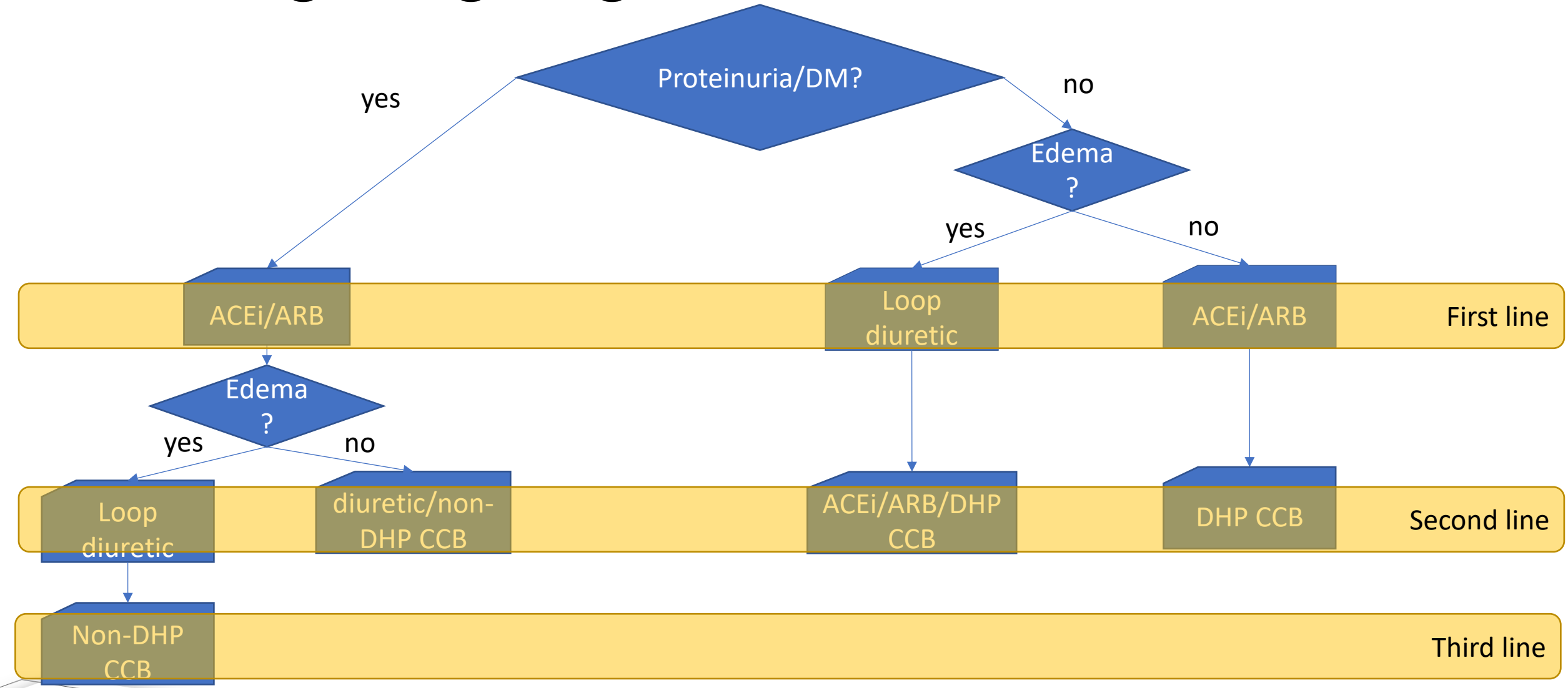


Drug class	Example	Site of action	Effect	Adverse events
Direct renin inhibitor	Aliskiren	Renin	Inhibits renin-catalyzed conversion of angiotensinogen to angiotensin I	Hyperkalemia Teratogenicity AKI
Angiotensin converting enzyme inhibitor	"-prils"	Angiotensin converting enzyme (lungs)	Inhibits conversion of angiotensin I to angiotensin II, as well as degradation of bradykinin	Hyperkalemia Teratogenicity AKI Cough
Angiotensin receptor blocker	"-sartans"	Angiotensin receptor	Inhibits activity of angiotensin receptor	Hyperkalemia Teratogenicity AKI

Drug class	Example	Site of action	Effect	Adverse events
α-1 antagonists	"-azosins" Phenoxybenzamine Phentolamine	Vascular smooth muscle (α-1 receptors) Some α-2 blocking activity (phenoxybenzamine and phentolamine)	Vasodilation	-azosins: postural hypotension, salt/water retention Phenoxybenzamine: postural hypotension, reflex tachycardia Phentolamine: reflex tachycardia
α-2 agonists	Clonidine Methyldopa	Presynaptic α-2 receptors in CNS	Inhibit release of norepinephrine and decrease centrally mediated sympathetic tone	Clonidine: drowsiness, rebound HTN
β-blockers	"-ololS" Carvedilol Labetalol	β-receptors in kidney (juxtaglomerular cells) and heart	Reduce activity of RAAS and cardiac output	Heart block, bradycardia, bronchospasm (esp. in nonselective agents such as propranolol). Don't use in patients who abuse cocaine!

Drug class	Example	Site of action	Effect	Adverse events
Arterial vasodilators	Hydralazine Minoxidil	Vascular smooth muscle	Vasodilation	Hydralazine: headache, reflex tachycardia, lupus-like syndrome Minoxidil: reflex tachycardia, edema, hypertrichosis
Nondihydropyridine calcium channel blockers	Verapamil Diltiazem	Mostly heart: L-type calcium channels	Reduced HR, myocardial contractility, and cardiac output, reduced BP	Bradycardia
Dihydropyridine calcium channel blockers	**"-dipines"**	Vascular smooth muscle L-type calcium channels	Vasodilation	Edema, gingival hyperplasia, constipation

Putting things together for CKD



Considerations in dialysis patients

- Dialyzability
- Hemodynamic changes during dialysis sessions
- Diuretics ineffective in anuric/oliguric patients

Dialyzability of various meds

- ACEi: most are between 20-50%, fosinopril is not dialyzable
- ARB not dialyzed
- MRA not dialyzed
- BB: atenolol/nadolol 50% dialyzable, carvedilol/labetalol/metoprolol/propranolol not dialyzed
- CCBs not dialyzed
- A-blockers not dialyzed
- Clonidine 5% dialyzable
- Hydralazine 25-40% dialyzable

Sequence of medication use for dialysis patients

- BB first line (remember atenolol/nadolol are dialyzable)
- Dihydropyridine CCBs are second line. Can use verapamil/diltiazem but caution if combining with BB (bradycardia)
- ACEi/ARB third line.
  - May interfere with action of EPO.
  - hyperkalemia

Questions?

Case presentation #1: Patricia Fulco, VCU Health

- **Demographic info:** Patient is a 29yo AAM consulted to this provider for progression of diabetes from pre-diabetes. Patient is married and works as a property manager.
- **Medical history:** HIV (04/22/15) with CD4=1424 (37%) VL 267 copies/mL , progression of pre-diabetes to diabetes A1C=7.1% (prior value 5.7%), obesity (BMI 36), vitamin D deficiency (6.4) with recent transfer of care from Johns Hopkins in Baltimore back to VCU clinic. Patient with pre-diabetes and recent A1c of 7.1%. Strong family history of diabetes (father, mother, brother).

Case presentation #1 (cont.)

- Patient with no physical activity and on diet recall (daily soda/juice, take out foods; states I drink/eat what my husband buys), need for education and suggestions for improvement. At the first visit, referral to clinic registered dietitian, physical activity and dietary discussion, weight loss goals set, and metformin initiation. RTC 6 weeks.
- Prior to the next appointment (a few days prior), patient stopped his metformin (reports for a few weeks) without letting provider know, called and discussed polyuria/polydipsia/nocturia. Patient presented with weight loss/catabolism and thus initiated insulin glargine and insulin lispro. A1C returned at 12.6%. 3 months between values. After insulin titration, then started semaglutide 6 weeks later, but called after the 0.25 mg due to GI distress, but then reported positive COVID test at the same time.
- **Main concern:** Difficult to determine if patient truly understands the significance of the disease, but weekly telephone calls have demonstrated improvement in BG values with pharmacotherapy titration.

Any clarifying questions? Any recommendations?

Case presentation #2

- 45yo M with newly diagnosed HTN, treatment naïve
- PMH: CKD G3b-A3 (eGFR ~35mL/min/1.73m^2 with 500mg proteinuria), poorly controlled DM2 (A1c ~10)
- Only takes insulin
- BP in office and at home high 130s/80s
- What will be first line for him? What other factors need to be considered?
- What would be second line?

Case Studies

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

Provide Feedback

www.vcuhealth.org/echodmhtn

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

Access Your Evaluation

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

For Providers

- Education
  - **Diabetes and Hypertension Project ECHO**
    - Our Team
    - Curriculum
    - Claiming CE Credit
    - Contact Us
  - VCU Nursing Home ECHO
  - VCU Health Palliative Care ECHO
  - 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

2nd and 4th Thursdays — 12-1:30 p.m.

Mark Your Calendars — Upcoming Sessions

Feb. 11: Selection of Basal Insulin Regimens

Feb. 25: Secondary Hypertension

Please register at www.vcuhealth.org/echodmhtn

THANK YOU!

https://VCU.cloud-cme.com/WebService/SelfAttendScan.aspx?EventID=19146

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