Diabetes and Hypertension Project ECHO* Clinic

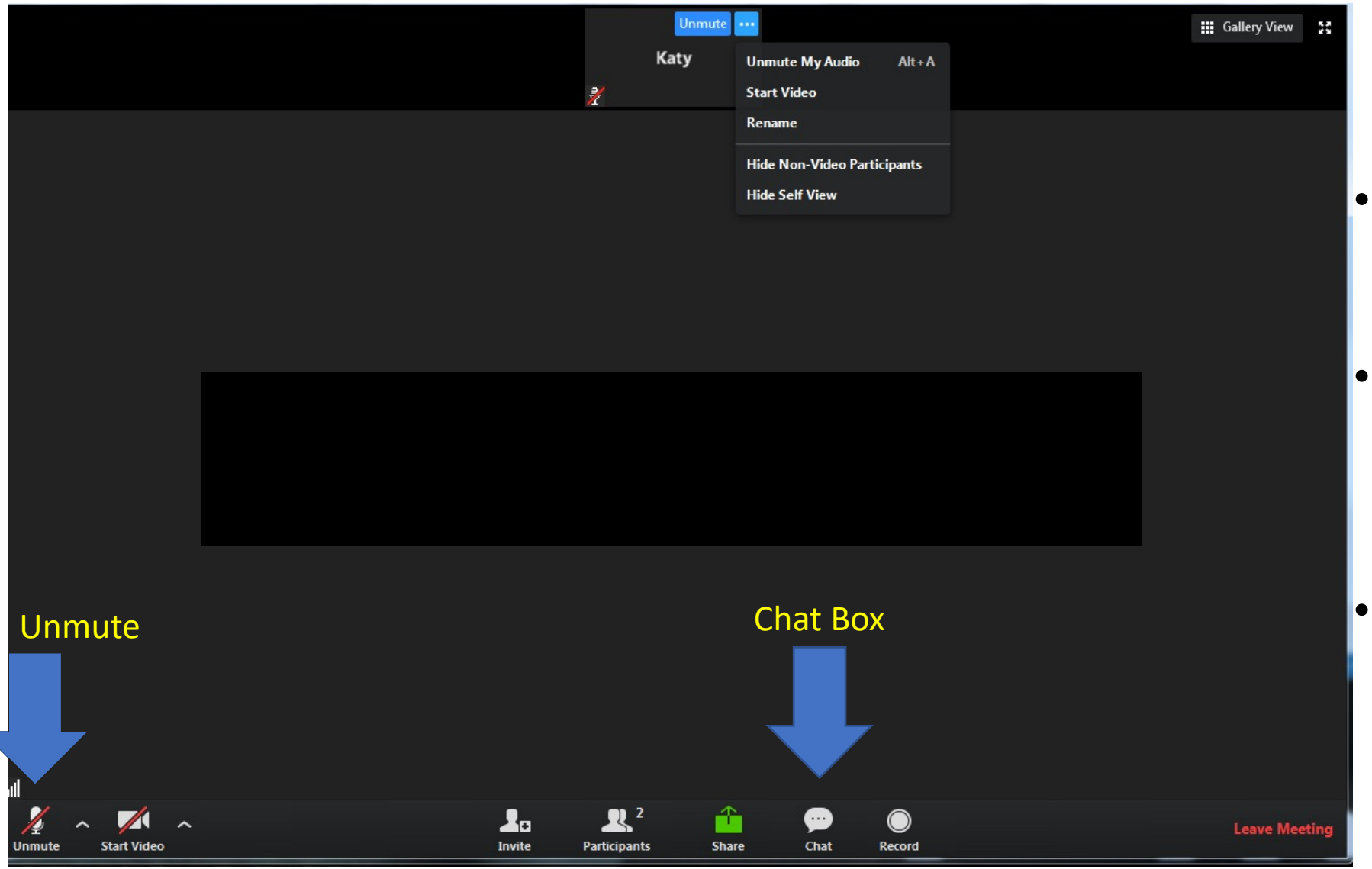
*ECHO: Extension of Community Healthcare Outcomes

April 8, 2021

Before we begin:

- Rename your Zoom screen with your name and organization
- Claim CE: text 19157-18817 to 804-625-4041
  - Go to **vcuhealth.org/echodmhtn** for instructions on creating your account

Helpful Reminders



- 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

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
  - 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!

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 **19155-18817** 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

- 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 your favorite part about spring!

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.

Combination Therapy in Hypertension

Learning Objectives

- Understand the rationale for combination HTN therapy
- Describe a typical approach to management of HTN with combination drug therapy
- Describe comorbidities which may necessitate modification of combination drug therapy for HTN

Considerations

- Magnitude of BP reduction (more important than specific agent used)
- Adverse events
- Comorbidities (CKD, heart failure, edema, MI)
- Risk of hypotension
- Adherence
- Chronotherapy
- Therapeutic inertia

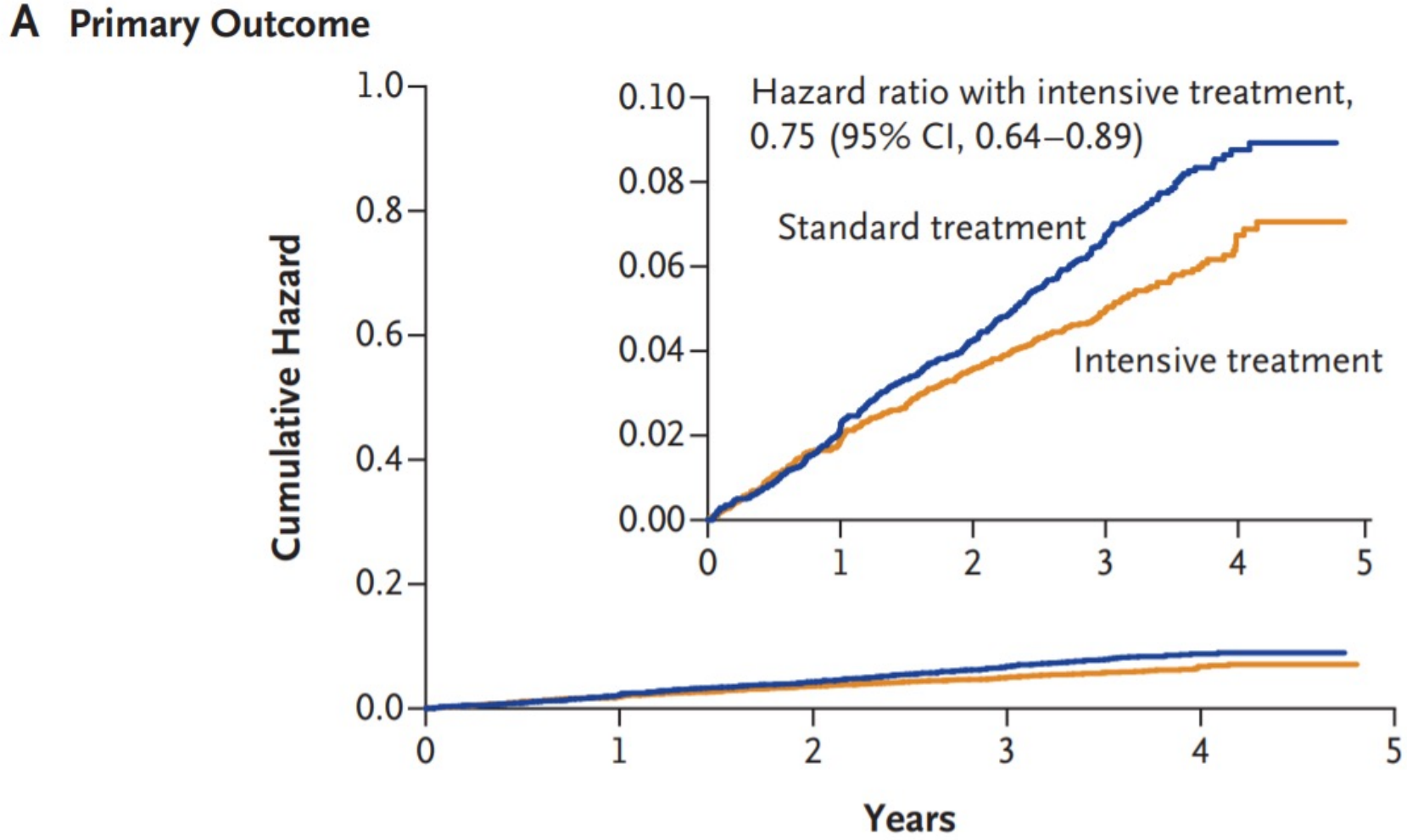
Initial therapy

- Lifestyle changes good for everyone: low sodium/DASH, wt loss, exercise
- 120-129/<80 or stage 1 with 10 year CV risk < 10%: nonpharmacologic
- Nonpharm ± drugs: BP > 130/80 and CV disease, 10 year CV risk > 10%, BP > 140/90: goal <130/80
- **Stage 2 HTN or BP average 20/10mmHg above target: two first-line drugs in different classes**

SPRINT

- Enrolled patients >50 years old with SBP > 130mmHg and increased CV risk (age > 75, CKD, CAD, Framingham 10 year risk score > 15%)
  - Excluded DM, proteinuria > 1g, stroke, symptomatic HF
- Compared goal SBP < 120mmHg to goal SBP < 140mmHg
- Primary endpoint: composite outcome (MI/ACS, stroke, decompensated HF, death from CV causes)
- Diuretics (particularly thiazides) encouraged as first line

SPRINT



NEJM 2015

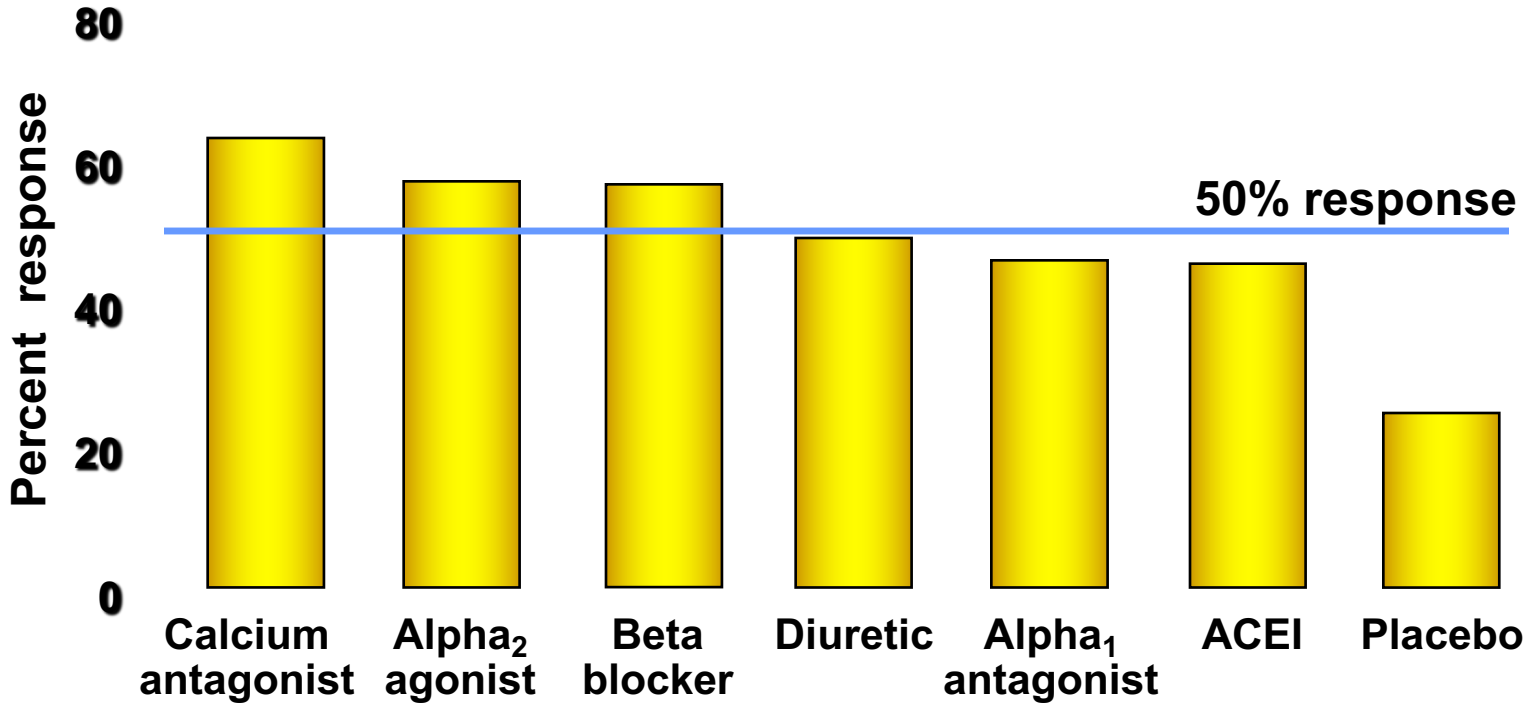
SPRINT

Table 3. Serious Adverse Events, Conditions of Interest, and Monitored Clinical Events.

Variable	Intensive Treatment (N=4678)	Standard Treatment (N=4683)	Hazard Ratio	P Value
	no. of patients (%)			
Serious adverse event*	1793 (38.3)	1736 (37.1)	1.04	0.25
Conditions of interest				
Serious adverse event only				
Hypotension	110 (2.4)	66 (1.4)	1.67	0.001
Syncope	107 (2.3)	80 (1.7)	1.33	0.05
Bradycardia	87 (1.9)	73 (1.6)	1.19	0.28
Electrolyte abnormality	144 (3.1)	107 (2.3)	1.35	0.02
Injurious fall†	105 (2.2)	110 (2.3)	0.95	0.71
Acute kidney injury or acute renal failure‡	193 (4.1)	117 (2.5)	1.66	<0.001
Emergency department visit or serious adverse event				
Hypotension	158 (3.4)	93 (2.0)	1.70	<0.001
Syncope	163 (3.5)	113 (2.4)	1.44	0.003
Bradycardia	104 (2.2)	83 (1.8)	1.25	0.13
Electrolyte abnormality	177 (3.8)	129 (2.8)	1.38	0.006
Injurious fall†	334 (7.1)	332 (7.1)	1.00	0.97
Acute kidney injury or acute renal failure‡	204 (4.4)	120 (2.6)	1.71	<0.001
Monitored clinical events				
Adverse laboratory measure§				
Serum sodium <130 mmol/liter	180 (3.8)	100 (2.1)	1.76	<0.001
Serum sodium >150 mmol/liter	6 (0.1)	0		0.02
Serum potassium <3.0 mmol/liter	114 (2.4)	74 (1.6)	1.50	0.006
Serum potassium >5.5 mmol/liter	176 (3.8)	171 (3.7)	1.00	0.97
Orthostatic hypotension¶				
Alone	777 (16.6)	857 (18.3)	0.88	0.01
With dizziness	62 (1.3)	71 (1.5)	0.85	0.35

NEJM 2015

Monotherapy Is Inadequate in 40%–60% of Hypertensive Patients

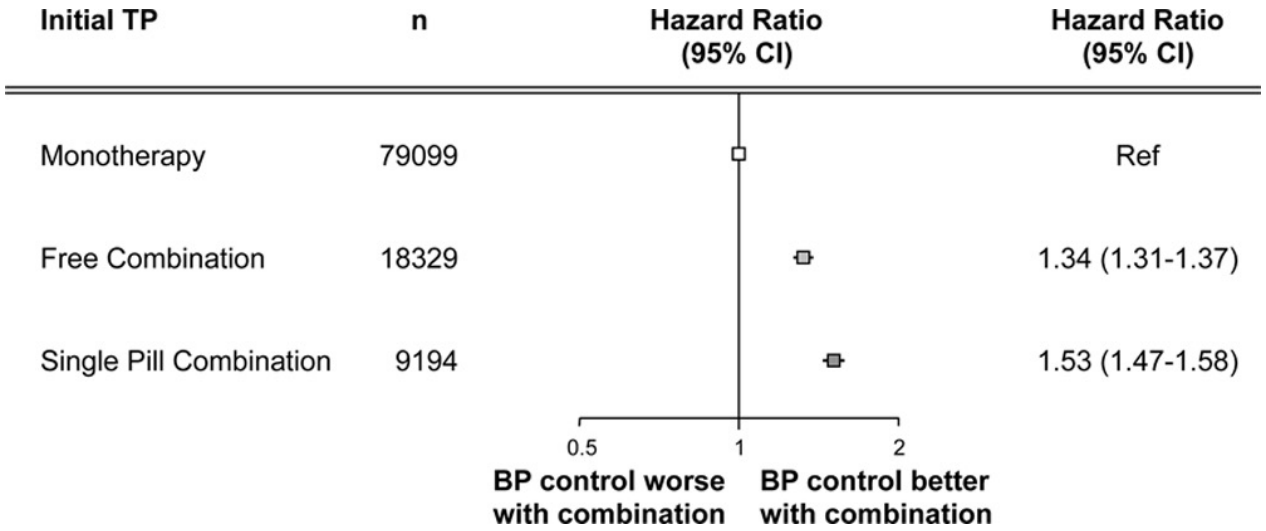


Response defined as DBP <95 mm Hg after one year of treatment

Adapted from Materson BJ, Reda DJ, Cushman WC. *Am J Hypertens*. 1993;8(2):189-192.

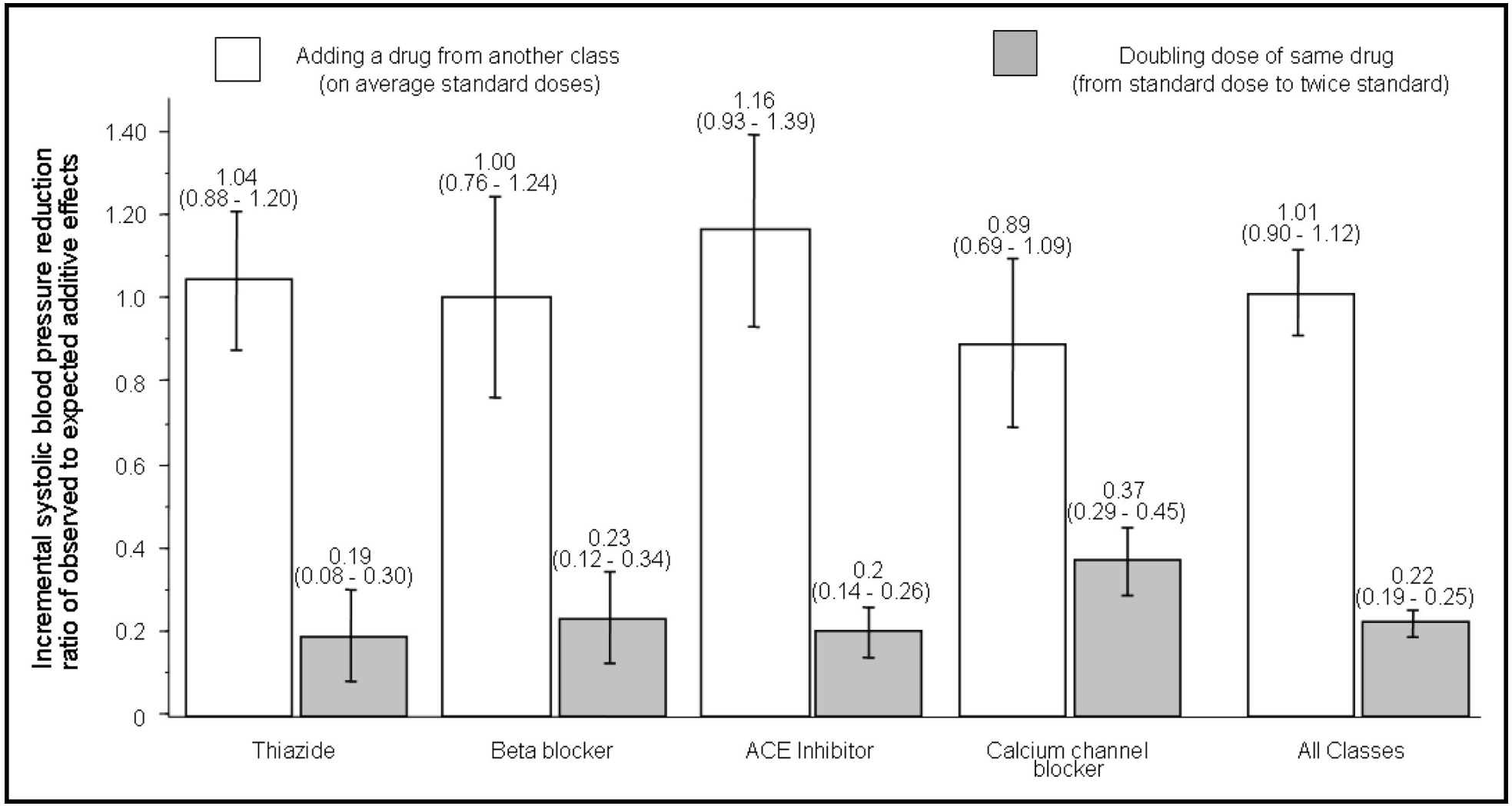
Patients respond better to multidrug therapy

- ~40% of HTN patients respond to monotherapy (only 30% reach BP goal)
- 75-80% respond to 2 drug therapy
- 90-95% respond to 3+ drugs



Circulation Research 2019; 124(7) pgs 1113-1123

Adding meds is better than increasing dose



Am J Medicine Mar 2009: 122(3) pgs 290-300

Common combination HTN meds

- Lotrel: amlodipine + benazepril
- Prinzide/Zestoretic: HCTZ + lisinopril
- Lotensin HCT: HCTZ + benazepril
- Exforge: amlodipine + valsartan
- Exforge HCT: amlodipine + HCTZ + valsartan
- Micardis HCT: HCTZ + telmisartan
- Hyzaar: HCTZ + losartan
- Benicar HCT: HCTZ + olmesartan
- Diovan HCT: HCTZ + valsartan
- Atacand HCT: HCTZ + candesartan
- Lopressor HCT: HCTZ + metoprolol
- BiDil: hydralazine + isosorbide dinitrate
- Tekturna HCT: HCTZ + aliskiren

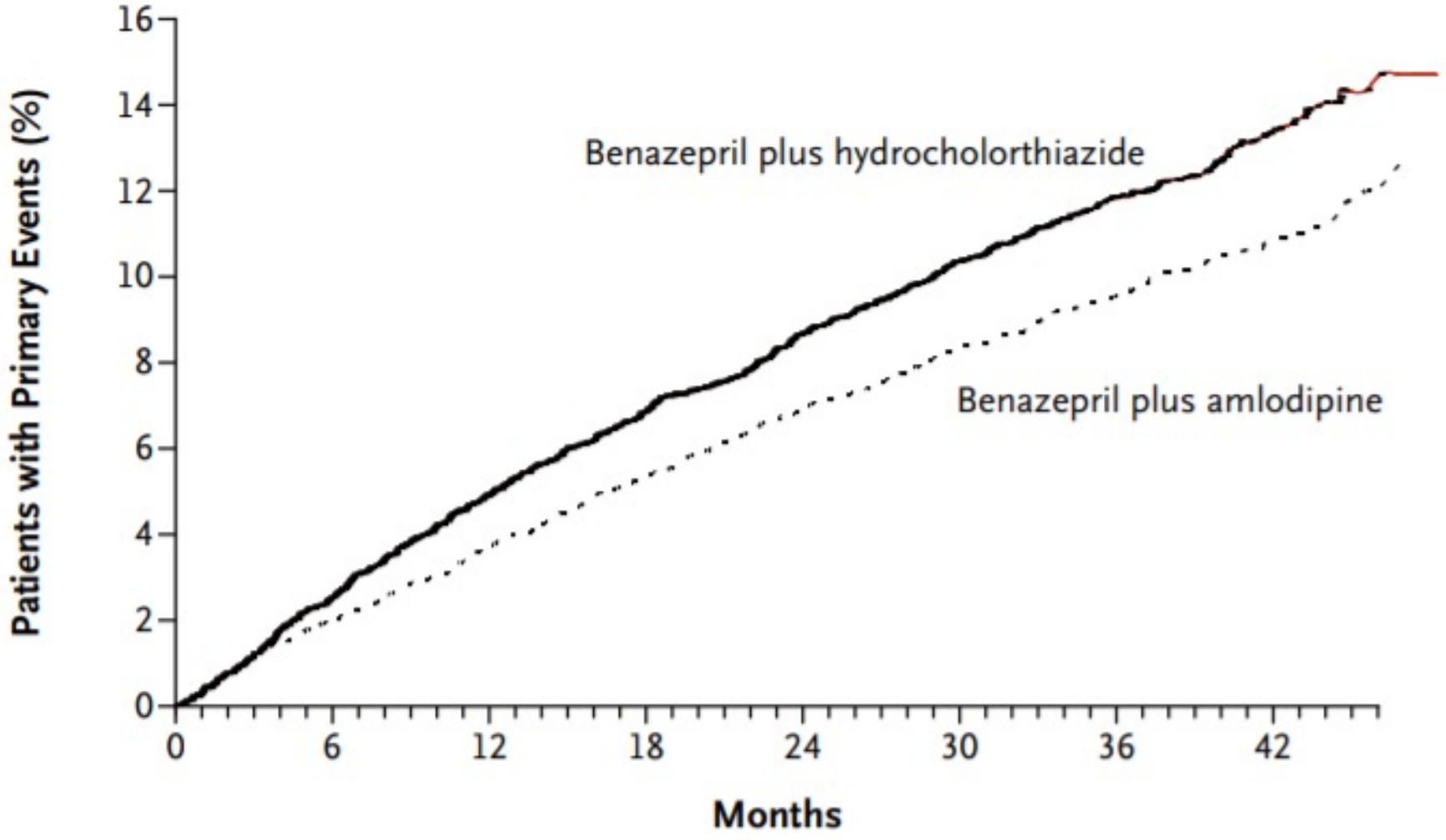
General Principles of Drug Therapy

COR	LOE	Recommendation for General Principle of Drug Therapy
III: Harm	A	Simultaneous use of an ACE inhibitor, ARB, and/or renin inhibitor is potentially harmful and is not recommended to treat adults with hypertension.

ACCOMPLISH

- Enrolled patients with HTN and increased risk of CV disease
- Compared benazepril + HCTZ to benazepril + amlodipine
- Primary outcome: time to first event (composite of cardiovascular events and death from cardiovascular causes)

ACCOMPLISH



NEJM 2008

Other clinical considerations

- Consider using BB + RAAS in pts with recent MI
- Consider Loop + RAAS or MRA in edematous HF patients

In summary

- Combo therapy usually superior
- May be better to use CCB + RAASi combo, perhaps to the point of changing well-controlled pts on other combos to this
- Overall BP control is more important than the choice of agent(s)
- Avoid therapeutic inertia

Case Study #1:

- 24yo F presents for evaluation of severe HTN
- BP in office is 164/100, corroborated by home BP log
- Meds: PNV
- How would we treat this patient?
- Other evaluation needed?

Case Study #2: Dr. Sarah Abdel Massih

42 year old woman is referred to the renal clinic by her OBGYN for high blood pressure. The patient has been in her usual state of health, she has been to her GYN for her annual check up and at that visit she was noticed to have an elevated BP at 154/83. The patient notes that is having no Sxs but is worried because she leads a healthy lifestyle with a low salt and low carbohydrate diet and exercises 3 times a week.

PMHx: GERD, fibromyalgia

PSHx: c-section x2, Rt knee surgery

Social Hx: denies smoking, occasional alcohol intake, no drug use. Works as a cashier at a store

FMHx: father with HTN, mother with diabetes

Allergies: none

Medications: pantoprazole, OCP and Over the counter NSAIDs from the treatment of recurrent pains of fibromyalgia

Physical Exam:

Vitals: t: 36.8C, HR: 72, BP: 153/85, FiO2: 100% on RA, BMI: 24

General: alert, not in distress

HEENT: PEERL, normal conjunctiva

Heart: regular, no murmurs, no JVDs

Lungs: clear to auscultation bilaterally

Abdomen: soft, non-tender, no abdominal bruits

LE: no edema, 2+ pulses bilaterally

Labs:

- Na: 137 (normal)
- K: 4.5 (normal)
- Cl: 105 (normal)
- CO2: 24 (normal)
- BUN: 15 (normal)
- Cr: 0.6 (normal) with eGFR>120 mL/min
- Glucose: 86
- Urinalysis: no protein, no WBCs, no RBCs
- CBC: WBC: 5.3, Hb: 12.8, plts: 267k
- TSH: 1.4 (normal)
- EKG: normal sinus rhythm, no ST or T wave changes, no evidence of LVH

What is the most appropriate next step?

Commonly used medications that can cause HTN:

- OCPs especially those high in estrogen
- NSAIDs especially chronic use
- Antidepressants
- Steroids
- Decongestants
- Erythropoeitin
- Stimulants like amphetamines and methylphenidate
- Illicit drug use like methamphetamines and cocaine
- Atypical antipsychotics like clozapine and olanzapine
- Some drugs used in the treatment of cancer: bevacizumab (angiogenesis inhibitor), TKIs (sunitinib, sorafenib)
- Some immunosuppressive medications like cyclosporine or tacrolimus

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

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  - 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

April 22: Diabetes in pregnancy

May 13: Practical approaches to injectable agents

Please register at www.vcuhealth.org/echodmhtn

Thank you, and see you in two weeks!

Text **19157-18817** to **804-625-4041** for CE credit

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