



Hypertension Applying Guidelines

ASCVD Secondary Prevention

The Standard of Care

Global Cardiovascular Risk

In one Generation

- Global CVD mortality has fallen >50%
- Myocardial Infarction Mortality declined from 30% to 4%
- > 80% decline in cardiovascular risk factors

55% of the outcome improvement
Due to medical secondary prevention therapies

Why Does Secondary Prevention Matter?

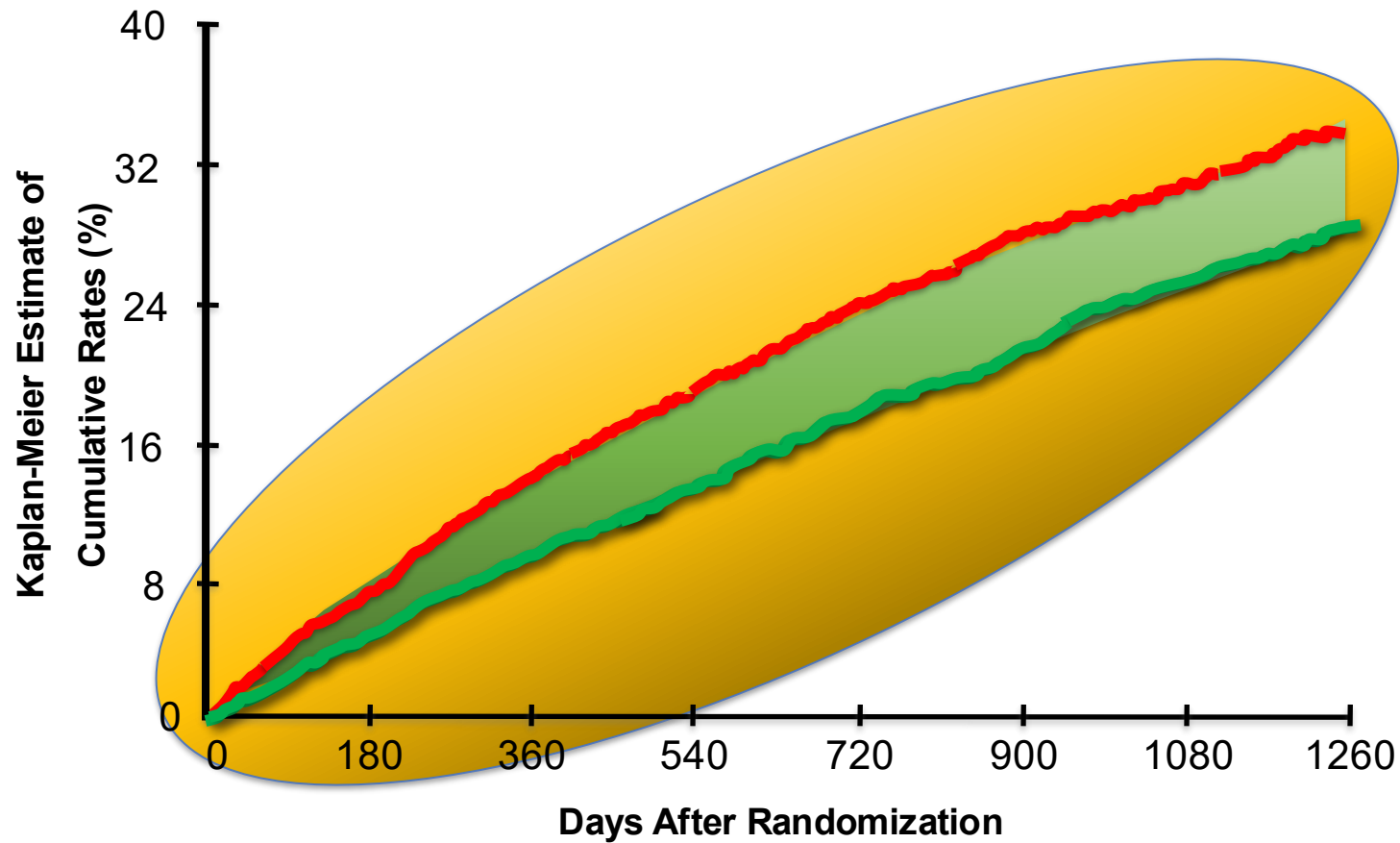
- Vascular Event
- Symptoms
- Imaging evidence
- Risk Score

Symptoms and Events

Cardiac	MI, CHF,
Neurologic	Stroke, TIA
Renal	CKD
Vascular	Claudication, gangrene

↓ Quality of Life
↓ Survival

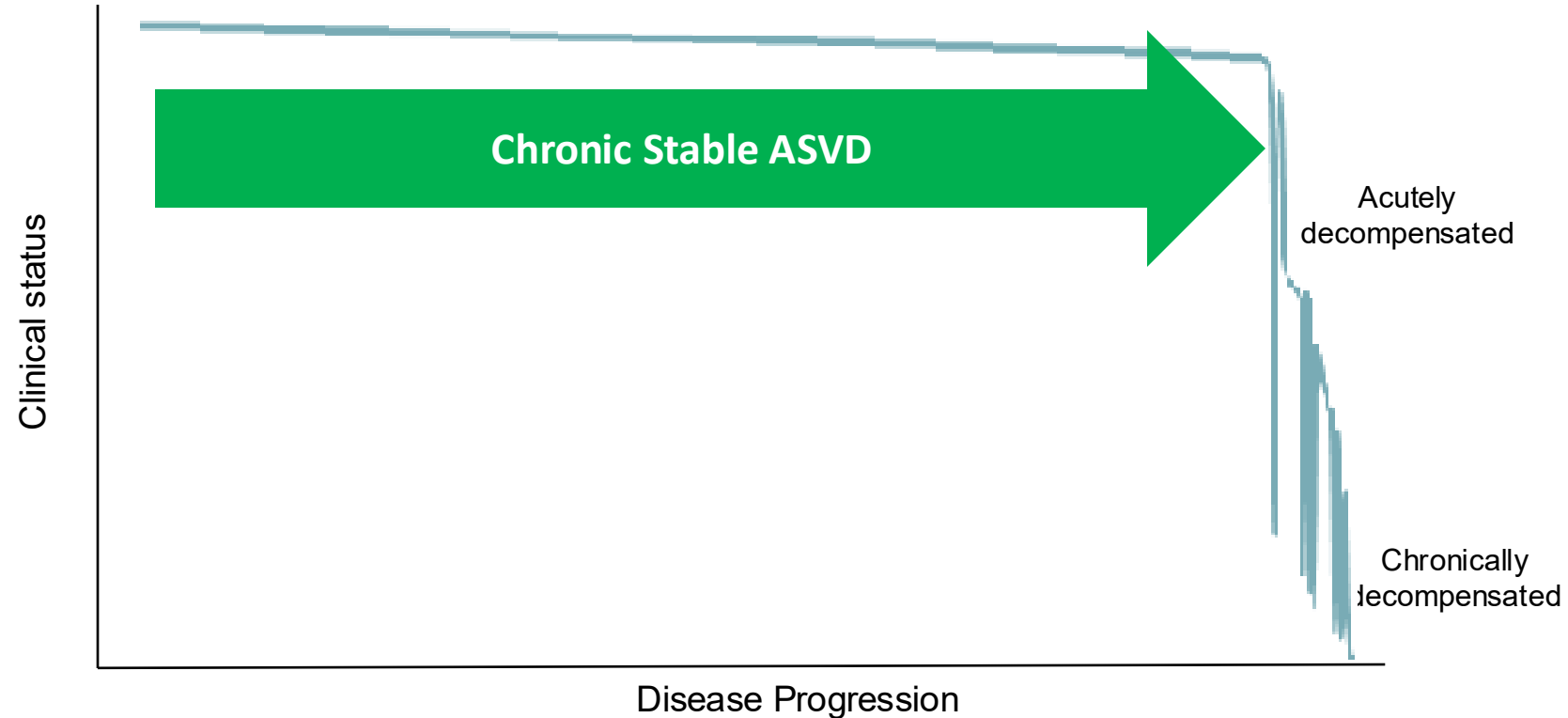
Time Under Treatment Matters



Benefits start early

& increase over time

Reframe the Perspective as Lifelong!

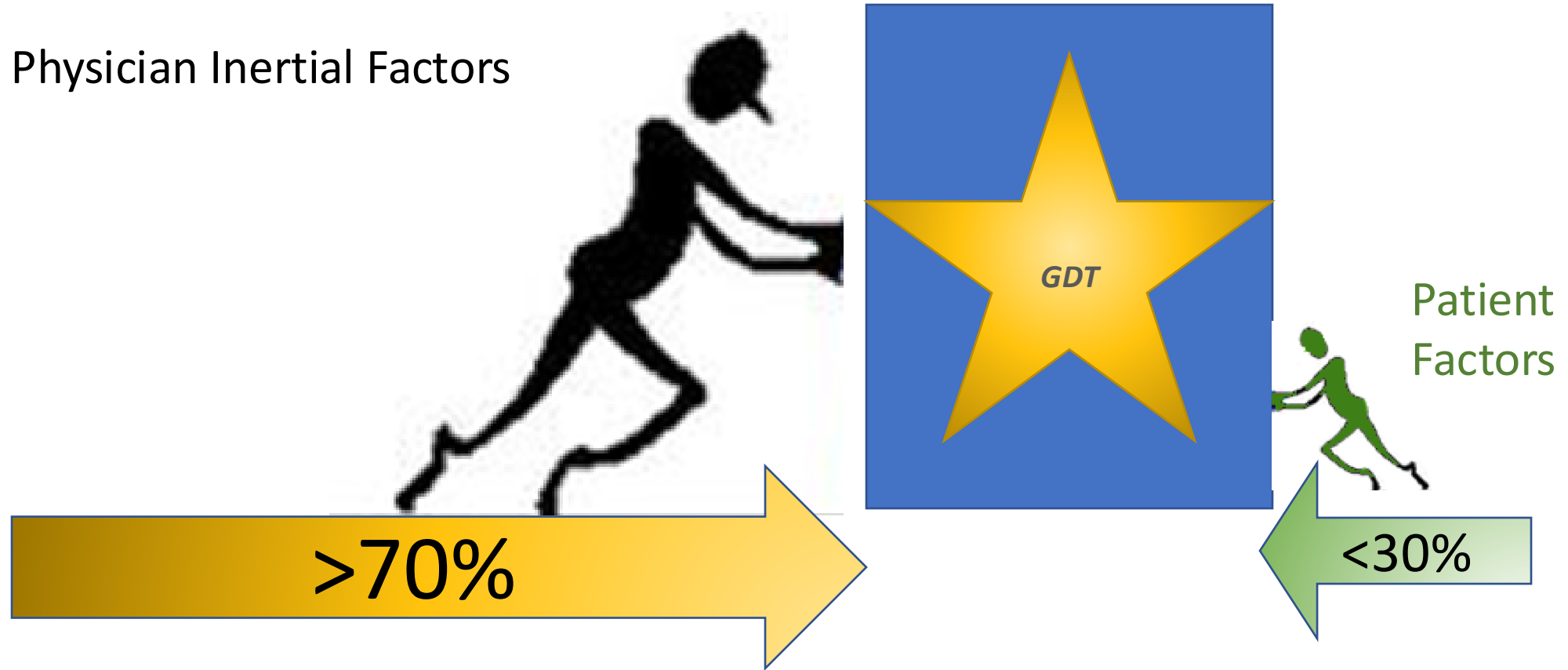


ASCVD as a Chronic Condition

Providers Drive Good Patient Outcomes!

Focus on Positives not the negative (Inertia)

Physician Inertial Factors

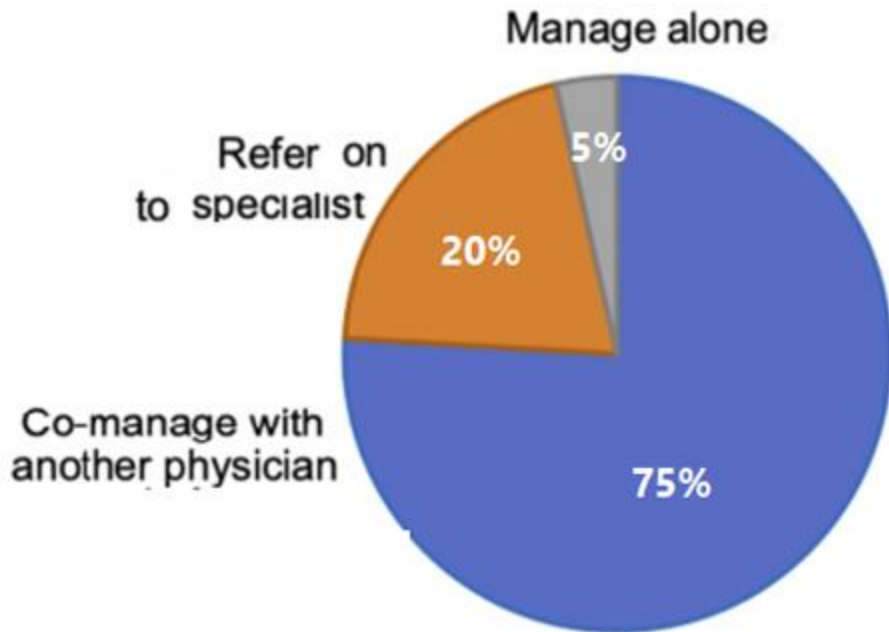


Secondary Prevention

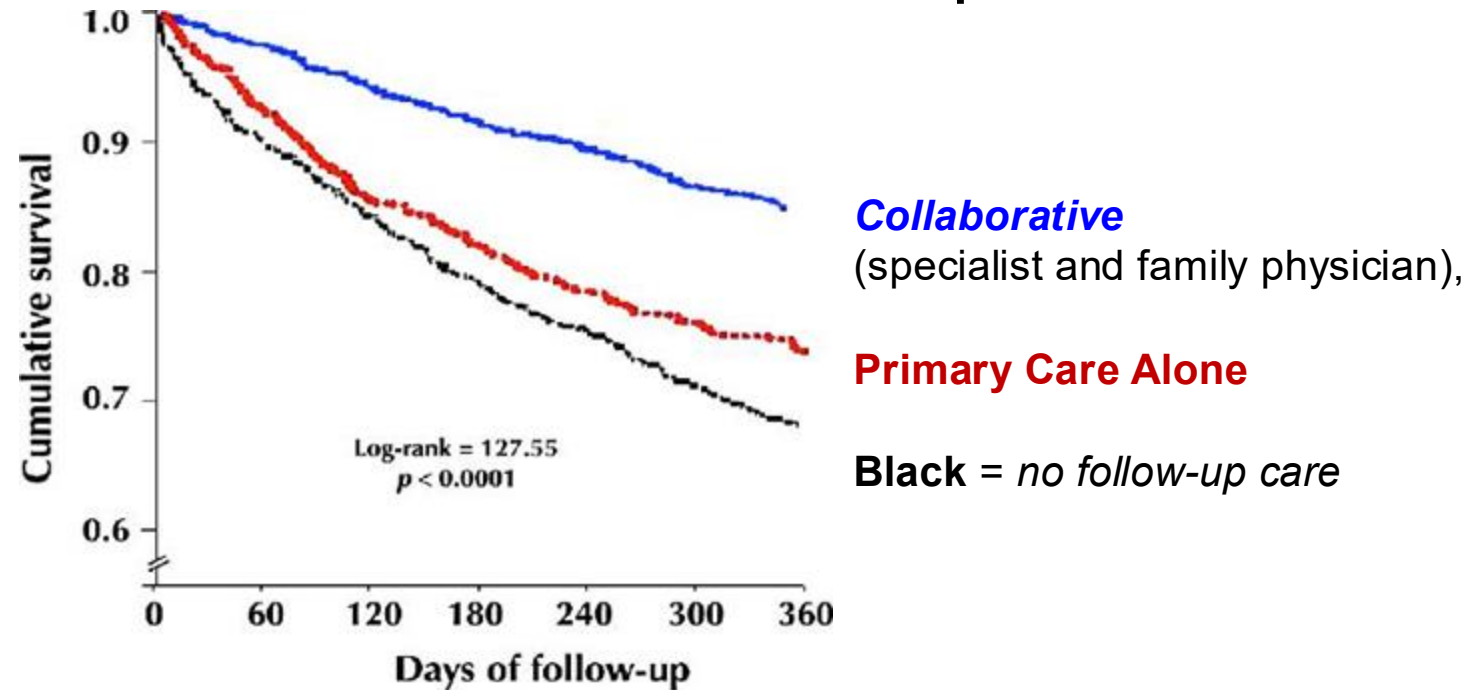


Expect Primary Care & Specialist Alignment

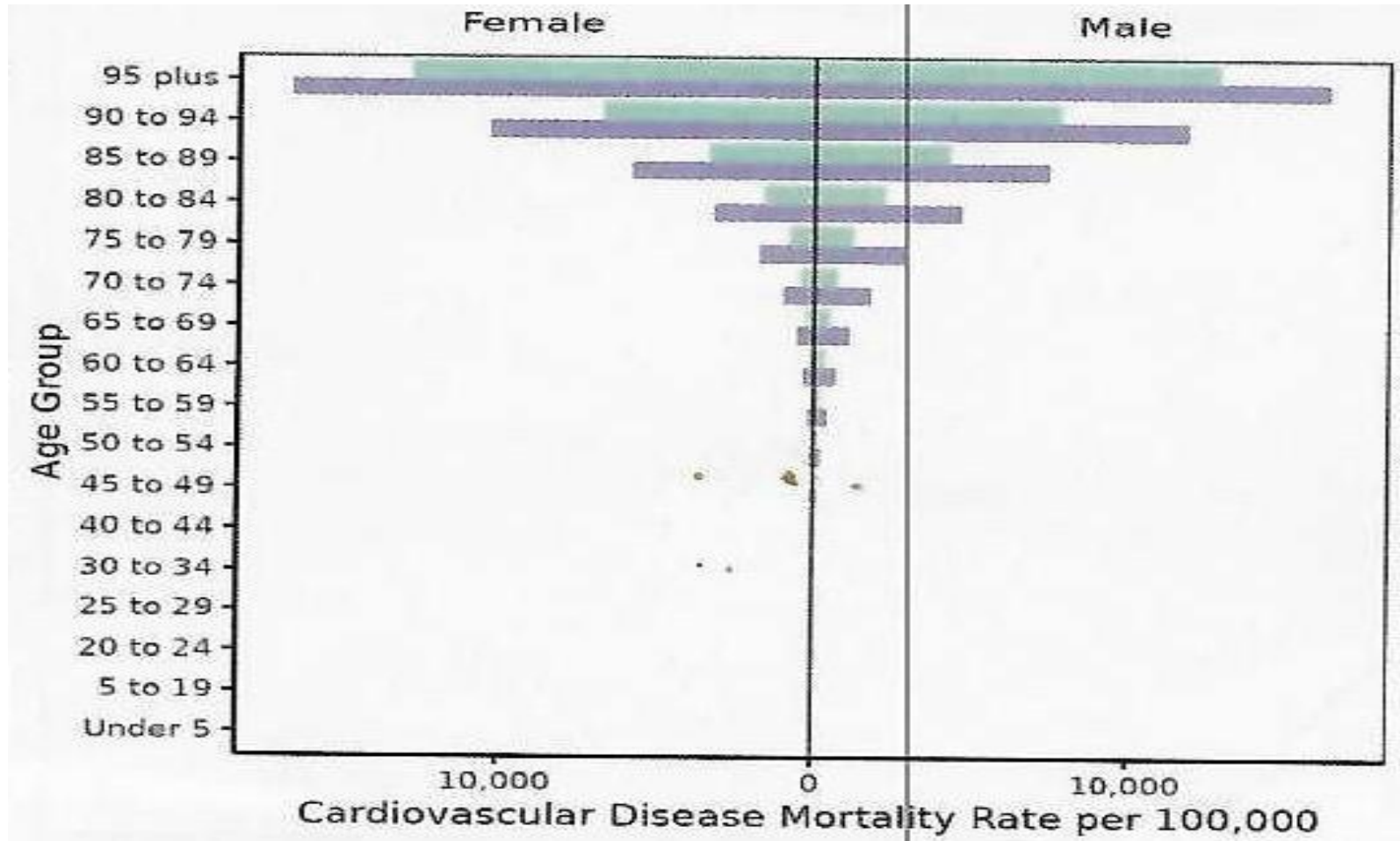
Co-Management



- Provide Collaboration Improves

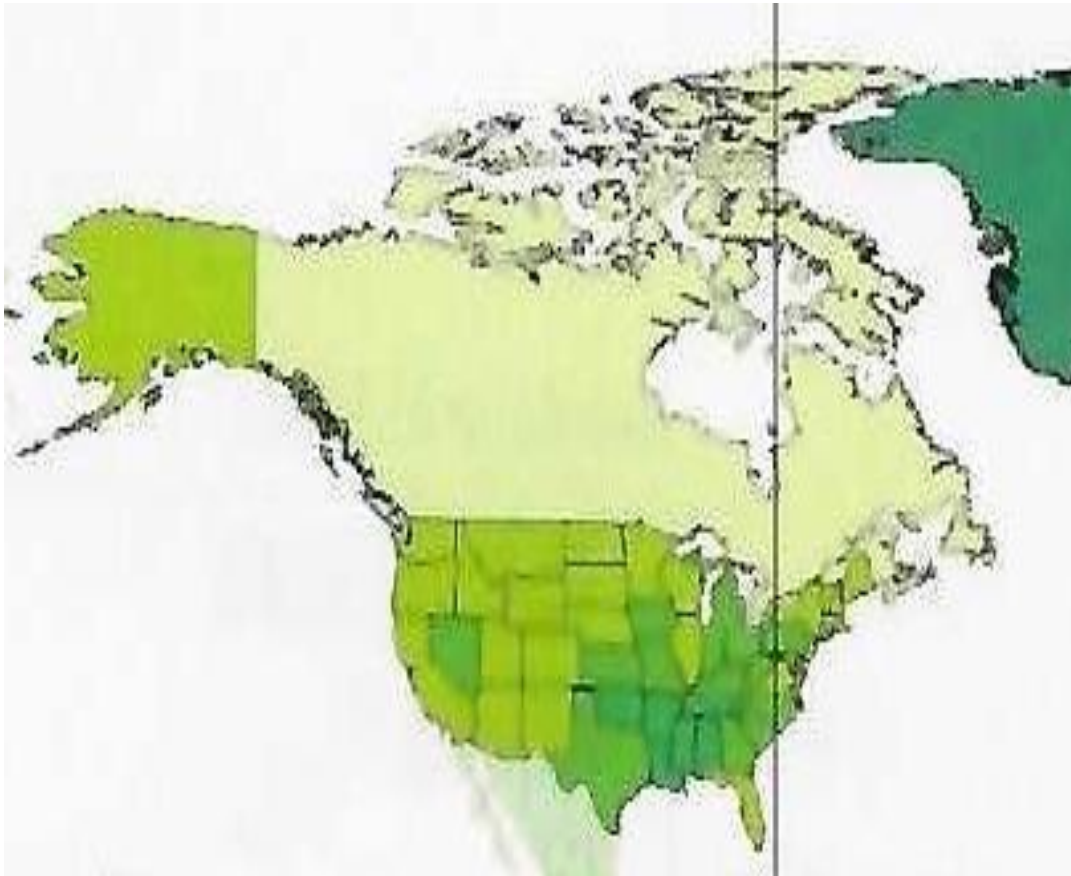


Cardiovascular Risk is Falling

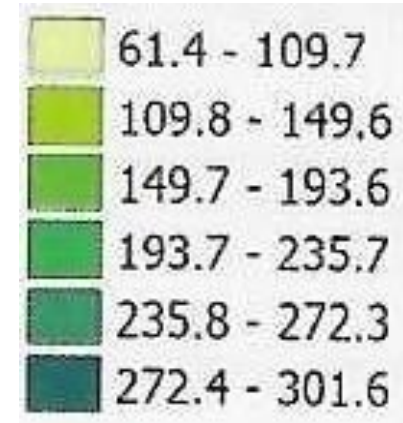


● 2001
● 1991

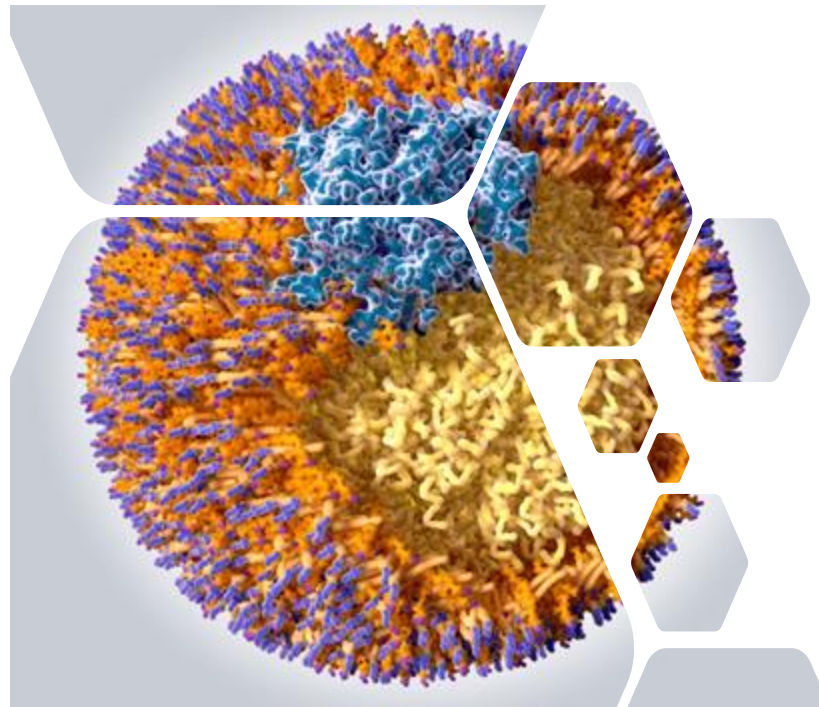
Canada As A Leader



Age Standardized Cardiovascular Mortality
Per 100,000 population > 40 years of age



Title Page and Image



Every Day Counts

INITIATE Secondary Prevention Strategies

From the **FIRST DAY** the Diagnosis of ASCVD is made

and at **EVERY VISIT**

For the **REST OF YOUR PATIENTS' LIFE**

Learning Objectives

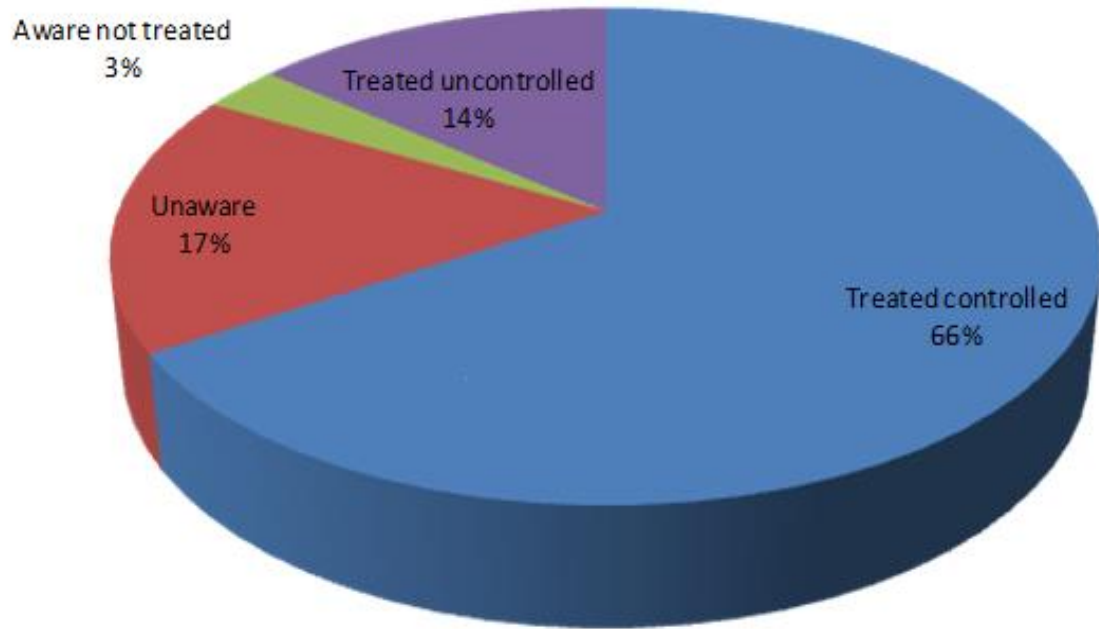
During this session, participants will analyze and interpret the:

- Value of secondary prevention in patients with hypertension
- Individualized treatment strategies to optimize cardiovascular risk in patients with hypertension and ASCVD
- Treatment options that offer cardiovascular protection for patients with hypertension

Canadian Hypertension Guidelines

- Diagnosis of hypertension should be based on out-of-office measurement
- Encourage Patient self management and BP logging
- Thresholds for blood pressures are 120 mmHG if high risk
- Preferred Therapies
 - Single pill combinations
 - Combinations of ARB/ACE with Amlodipine
 - Longer-acting diuretics are preferred vs. shorter-acting thiazides

CANADA: A Proud Legacy



Canada has highest rates of BP control reported world wide

Hypertension Canada is a respected evidence-based hypertension management organization

- annual updates
- validated review process

Poll Question

Why don't Patients Take Rx for BP?

- a) Not clear about value to health
- b) Complexity
- c) Adverse effects
- d) Cost
- e) Other



"In this case, a new high score is not a good thing."

Definition of Treatment Inertia

Lack of treatment intensification in a patient not at evidence-based goals for care.

may contribute to up to 80 percent of heart attacks and strokes”

Combating Inertia

- ✓ Accurate diagnosis of hypertension
- ✓ Communicate Evidence of Risk and Benefit
- ✓ Use Effective therapies
- ✓ Promote Compliance through Self Monitoring

Diagnosis

Poll Question

Diagnosis



57-year-old accountant in your office for annual visit

History: Hypertension (2015)

Home BP readings 140-155 mmHg average

Medications: Perindopril 8 mg. Amlodipine 5 mg.

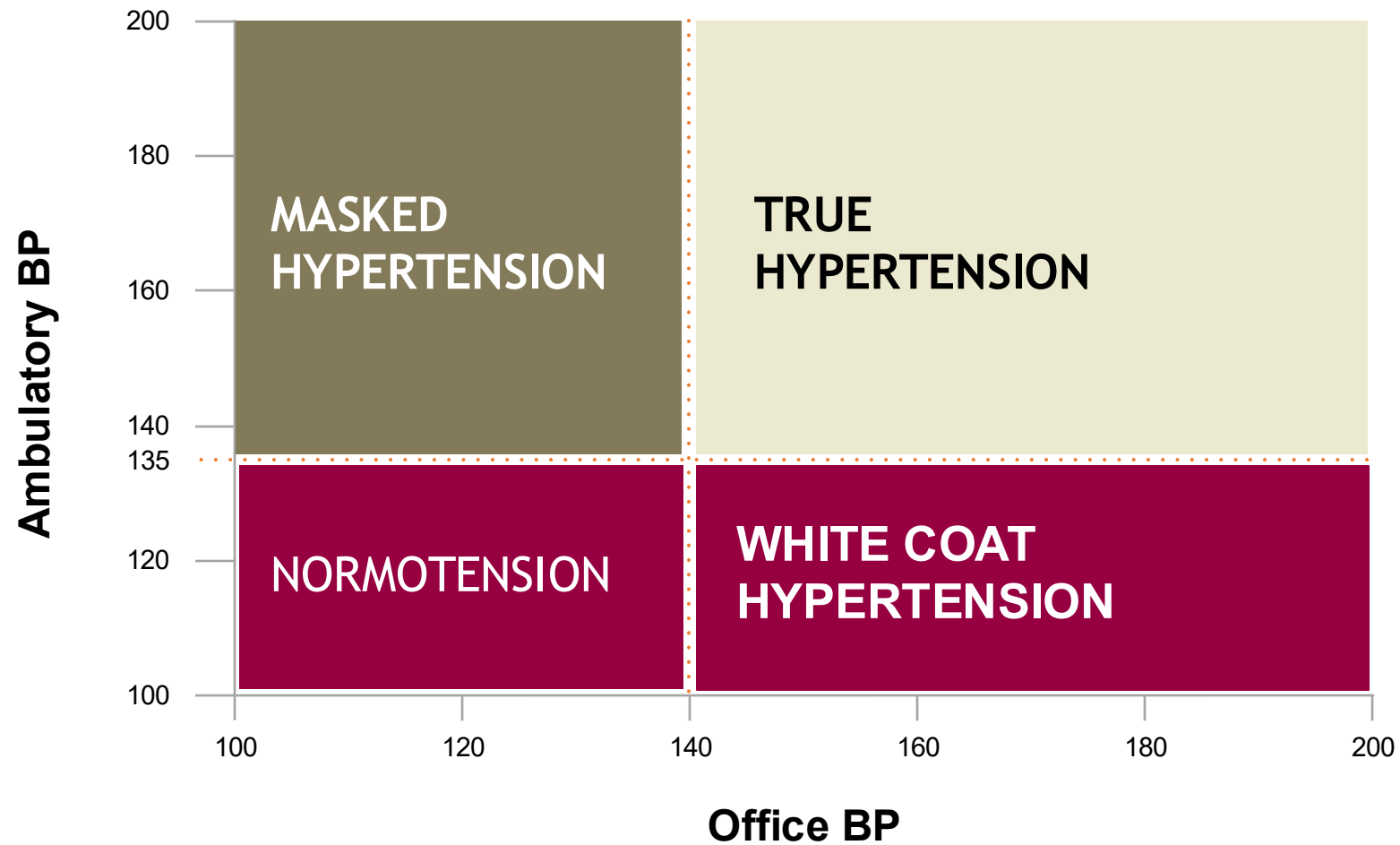
Laboratory: normal CBC, lytes, BUN, Cr, EKG

Office BP: 110-115/65 mmHg via BP-true

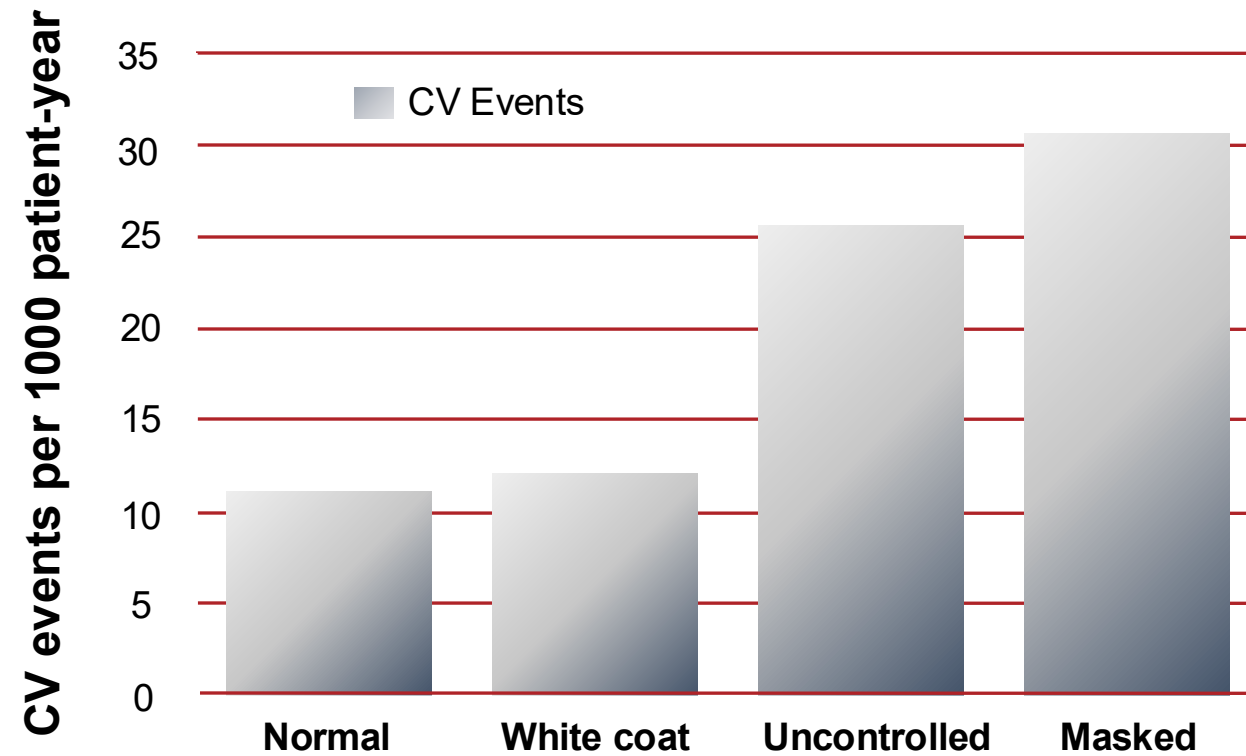
How would you explain this observation?

- a) Essential hypertension
- b) Masked hypertension
- c) White coat syndrome
- d) Not using BP cuff properly

Diagnosis



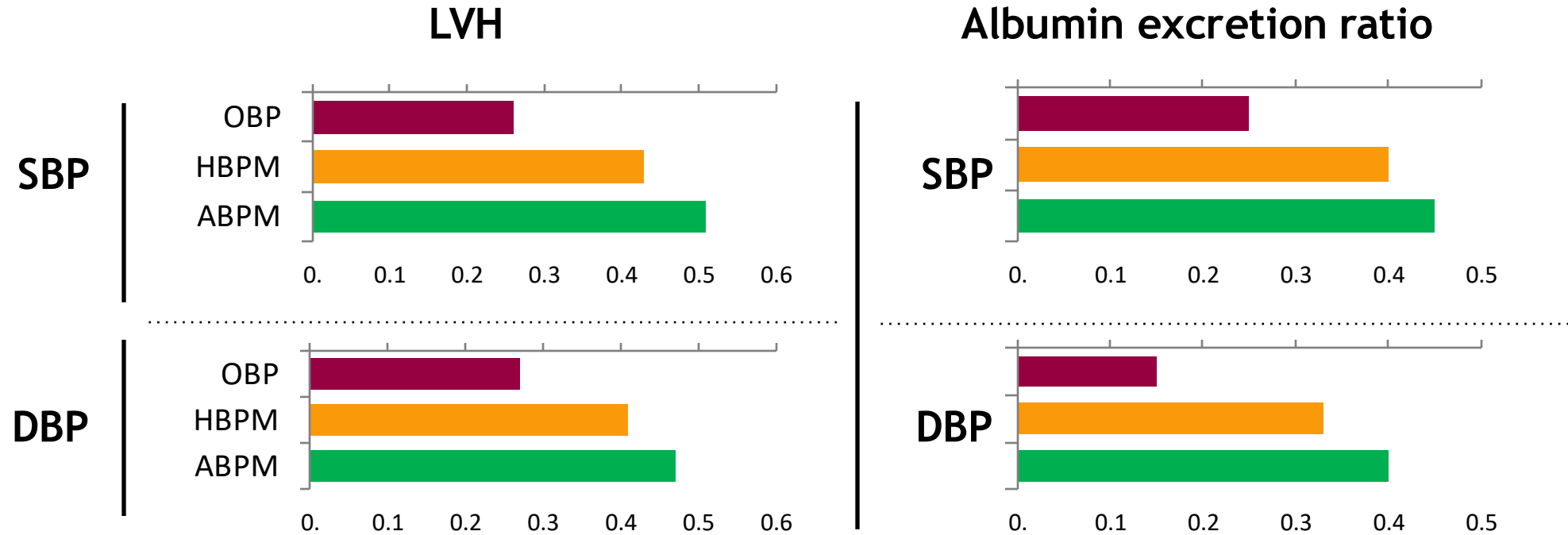
Diagnosis and Prognosis



What is Masked Hypertension: An Enigma

- Home measurements elevated despite elevated home recordings
- Significant health concern because easily and often missed
- The mechanism is unknown, but postulates include
 - Alcohol
 - Workplace and home stress
 - Smoking
 - Drug use
 - Poor BP measuring technique

Benefits of Automated Home BP



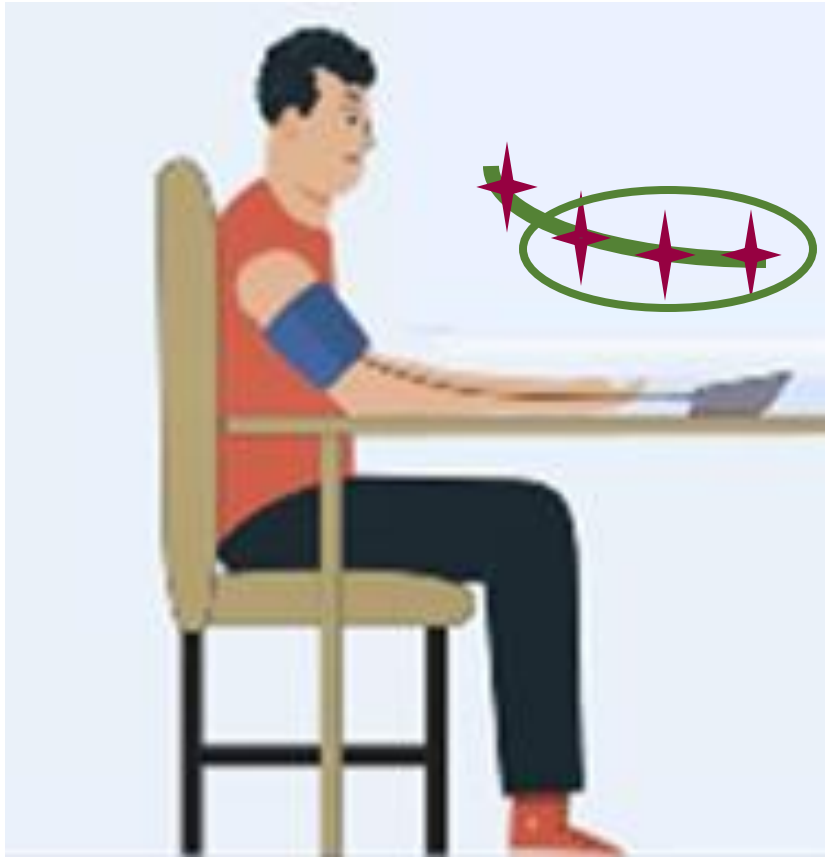
Strong correlation with end organ damage

Multiple BP Measurement Necessary

A study of 1000 consecutive patients

- 1st reading was 5mmHG high
- 2nd reading was on average 8mm lower
- Hypertension would have been misdiagnosed in 12% of patients

Give Clear Patient instruction



Measure BP sitting in chair

- Arm at mid chest height and fully supported
- Relax muscles for 1-2 minute
- Repeat measurement 3-5 time
- Ignore initial high readings

Engage Patients in Their Own Care



The screenshot shows the Hypertension Canada website. At the top left is the logo for Hypertension Canada. To the right of the logo is a navigation menu with links for "About Us", "Public Resources", "News/Info", "Events", "Contact Us", "Donate", and "Français". Below the navigation menu is a large heading: "How do I monitor my blood pressure?". Underneath this heading is the text "Educational Video on How to Measure Your Blood Pressure at Home". The main content area features a video player with a blue border. The video player has a title "HOME BLOOD PRESSURE MONITORING" and a subtitle "Promoting Patient Self-Measurement". The video thumbnail shows a man sitting at a desk with a laptop, a clock on the wall, and a potted plant. Below the video player are three bullet points: "How do I choose a blood pressure monitor?", "How do I properly measure my blood pressure?", and "The importance of tracking your blood pressure:".

Direct patients to a trusted Source
"The Hypertension Canada Website"

Engage Patients in Self Monitoring



Date		Time	Comments	Heart Rate (beats/min)	BP Reading #1		BP Reading #2	
					Systolic	Diastolic	Systolic	Diastolic
June 15	Sample Morning	8:00 a.m.	Meds at 9 a.m.		138	82	135	80
	Sample Evening	8:00 p.m.	Upset		157	92	154	90
	Day 1 Morning							
	Day 1 Evening							
	Day 2 Morning							
	Day 2 Evening							
	Day 3 Morning							
	Day 3 Evening							

Explain value of Therapy

Recommend purchase of brachial automated Device

Give clear instructions verbally or in pamphlet

- At rest mid day
- “chill out first”
- Arm supported at mid chest level
- Measure 3-5 consecutive readings
- Record the lowest values

Expect patients to maintain a diary and bring to each visit

24 Hour Ambulatory BP

Value: Home BP unreliable or the patient will not measure

Interpretation: Average 24 hr ABPM > **130/80** mmHg

Average daytime ABPM > **135/85** mmHg

Average nocturnal ABPM > **125/75** mmHg

Nocturnal dip $\geq 10\%$

Role of Echocardiography

NOT indicated routinely in hypertension management

Echocardiography of value potentially

- Abnormal EKG
- Elevated cardiovascular risk
- Cardiac symptoms
- Known ASCVD
- Heart failure

Benefit of BP Control

Poll Question

BP treatment Threshold



65-year-old retired asymptomatic welder

History: Hypertension (2000)
Hyperlipidemia
MI and bypass (2010)

Medications: Perindopril 8 mg. Amlodipine 5 mg Atorvastatin 80 Colchicine .5

Laboratory: normal CBC, lytes, BUN, Cr, EKG

Home BP: 125-140/75-85

POLL QUESTION: What should his BP threshold be?

- a) < 140
- b) < 130
- c) < 120

CANADIAN BP THRESHOLDS

	BP Treatment Target	
	Systolic	Diastolic
Hypertension Canada "High Risk"	<120	N/A
Diabetes	<130	<80
Mod-High Risk (target organ damage or ASCVD risk factors)	<140	<90
Low Risk (No Target Organ Damage or ASCVD risk factors)		

Hypertension Canada High Risk Patient

Age ≥ 75

Age ≥ 50 and any of

- ✓ ASCVD
- ✓ CKD
- ✓ 10 Year CV risk ≥ 15%
- ✓ Age ≥ 75

The Sprint "High Risk Population"



Clinical or sub-clinical cardiovascular disease

OR

Chronic kidney disease

OR

†Estimated 10-year global cardiovascular risk $\geq 15\%$

OR

Age ≥ 75 years

Value of Intensive Therapy

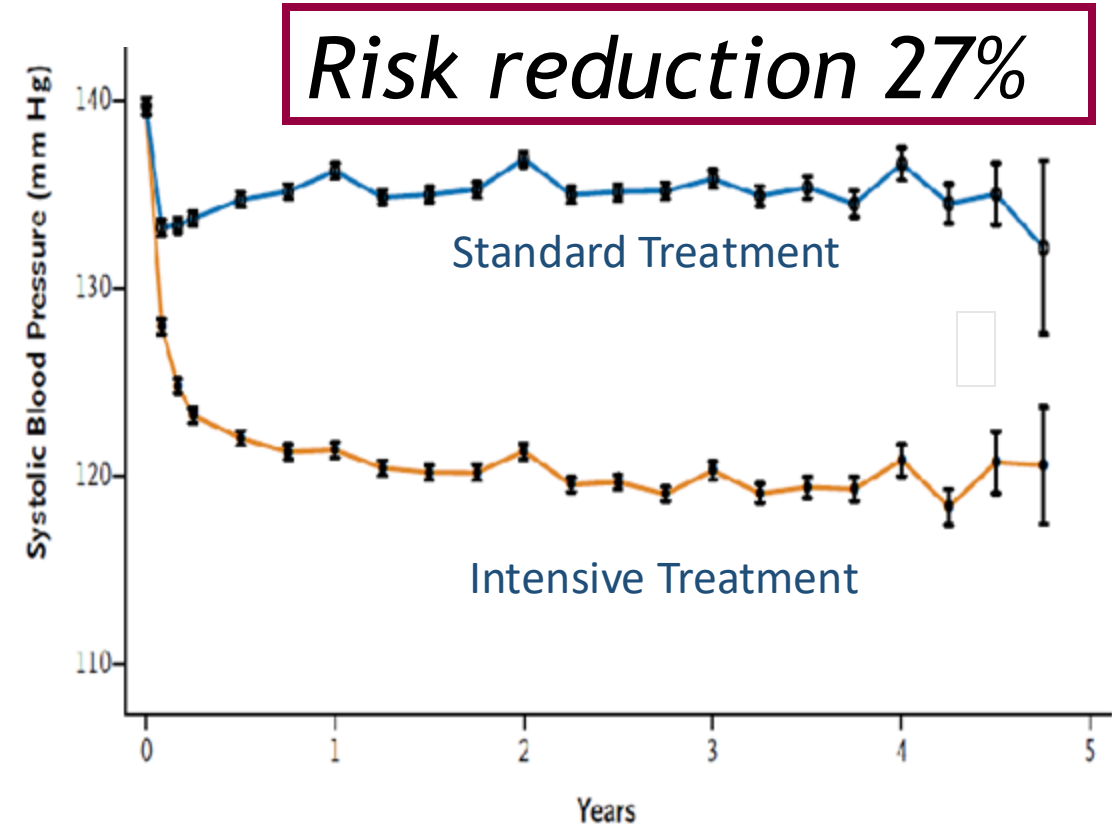


9361 Patients > 50 years at increased CV risk

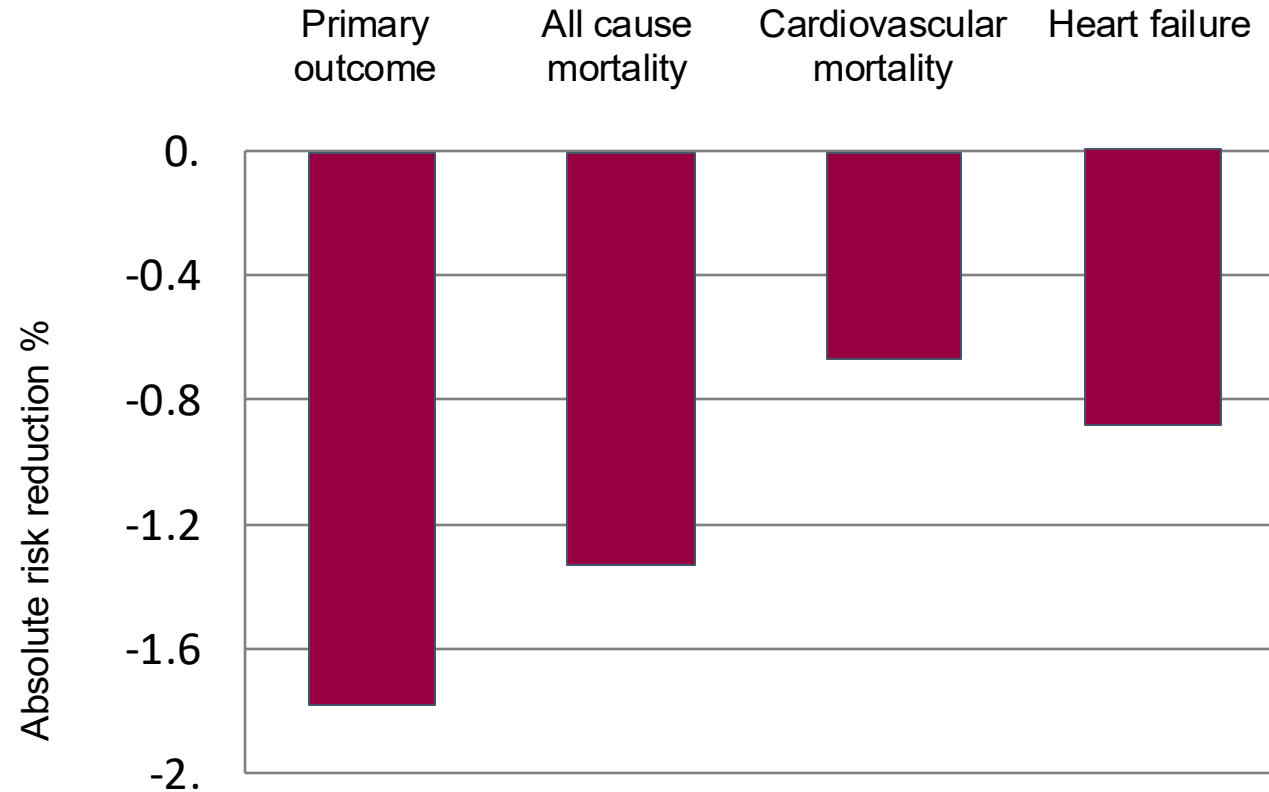
Intensive Threshold <120 mmHg better than
Standard Threshold <140 mmHg

Primary outcome:

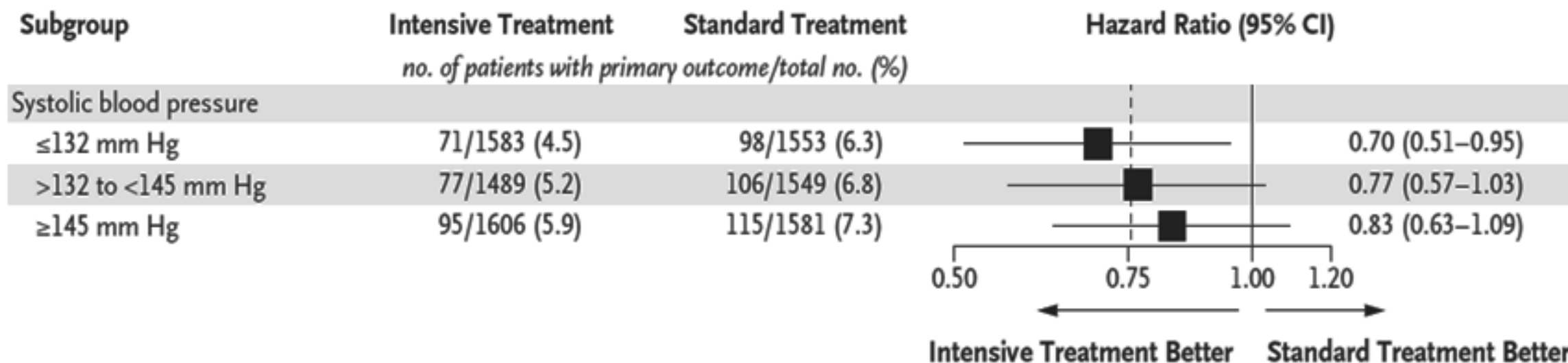
- ✓ MI and ACS
- ✓ Stroke
- ✓ Heart failure
- ✓ CV death



Value of Intensive Therapy



Outcome BP Related

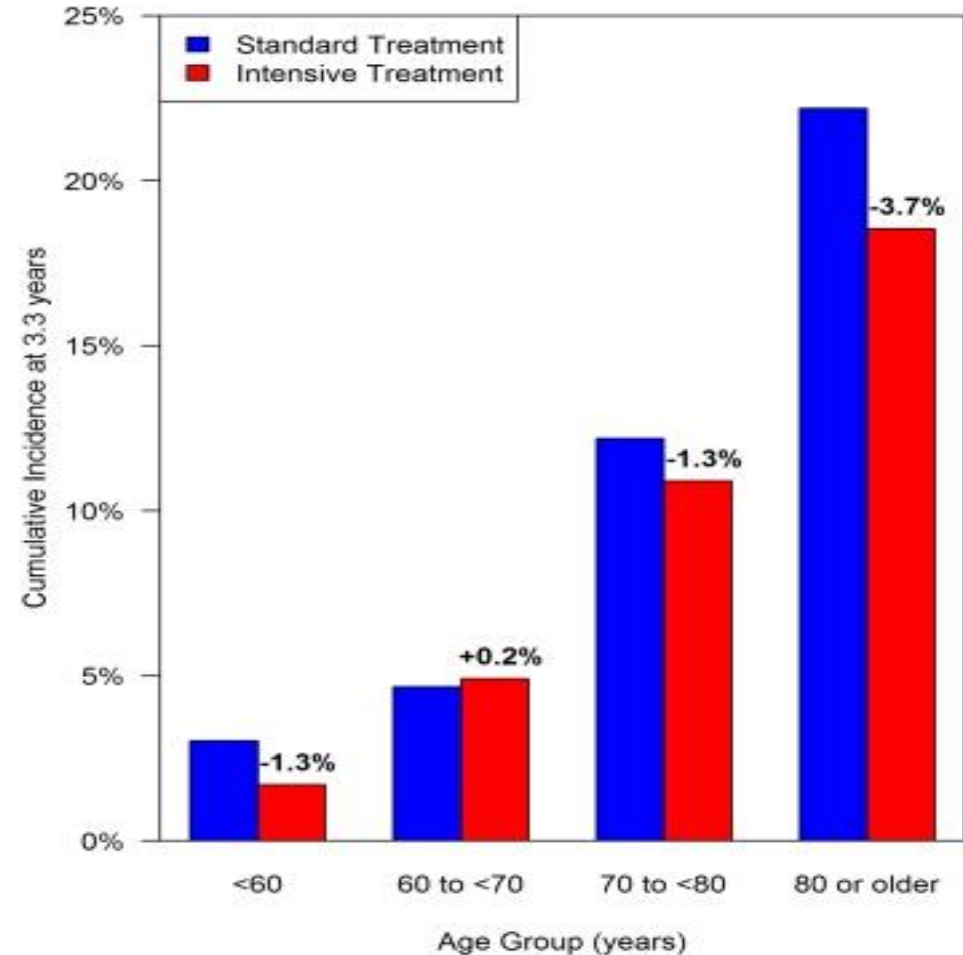


Hypertension and Dementia

Sprint lacked duration and size to confirm dementia although suggestive

Global dementia prevalence will increase from 57 to 152 million by 2050

Observational data supports strong relation between dementia and hypertension control



Huge Trial Confirms Dementia Reduction

A **Huge** trial in a **Very Large** population with **poorly controlled BP** (Mean 157/90)

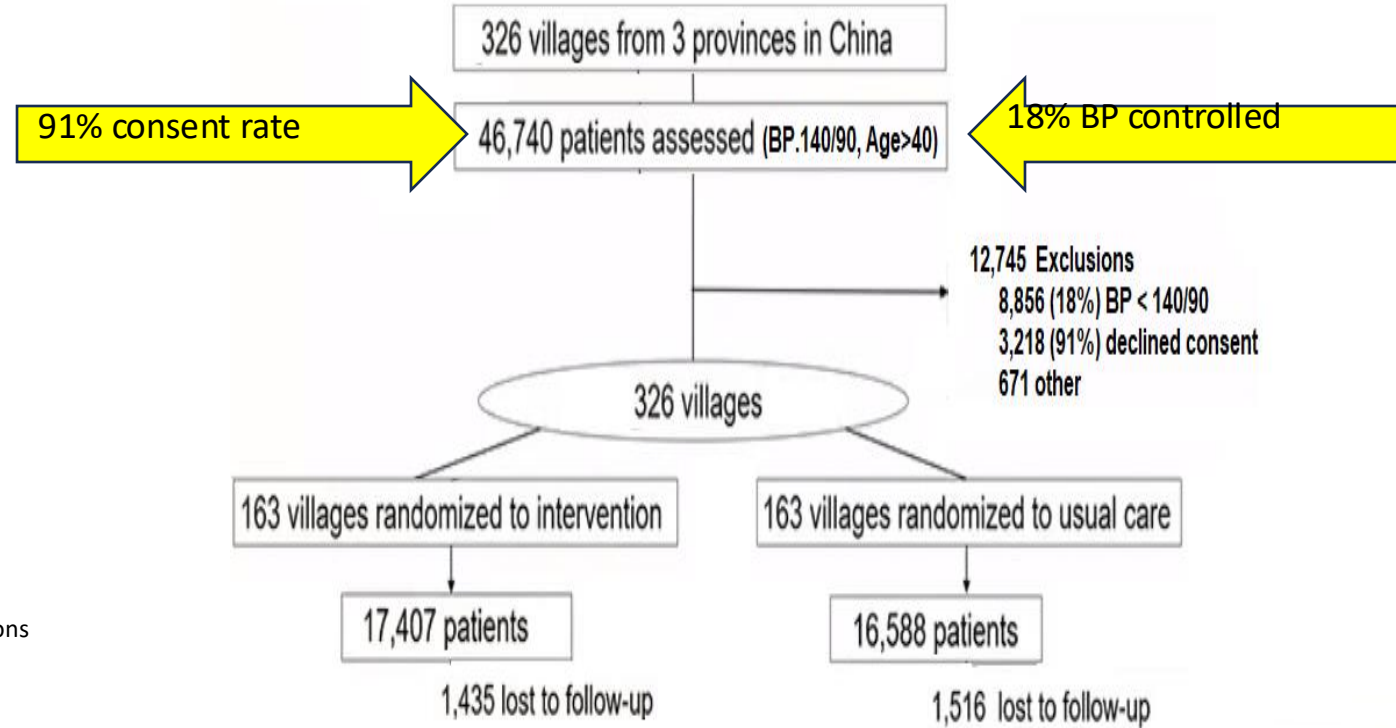


Process Primary care led treatment

Design Usual care vs Intensive Care

Resources Free Medications
Free Home BP monitors
Health Coaching

Testing 3 part neurologic assessment
Mini mental state Exam: 30 questions
Functional activity screen 10 questions
Quick dementia Survey 10 questions



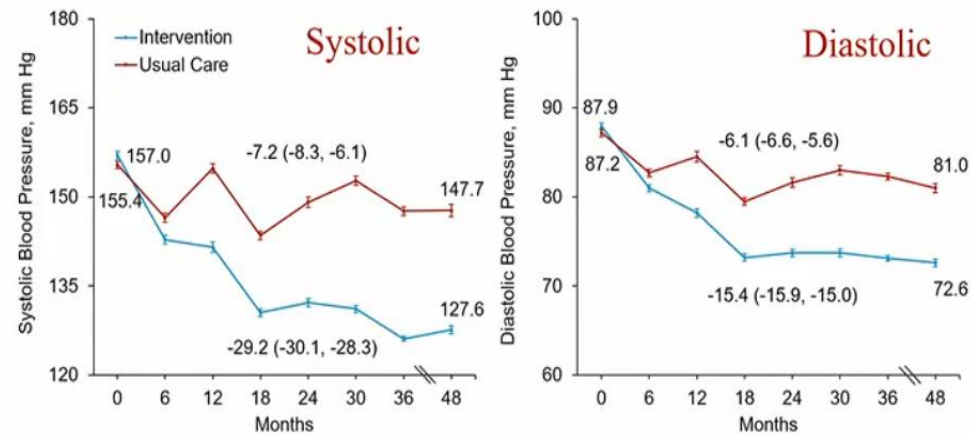
- He J. Effectiveness of blood pressure lowering intervention on risk of total dementia among patients with hypertension: a cluster-randomized effectiveness trial. Presented at: AHA 2023. November 11, 2023. Philadelphia, PA.

sBP Reduction Similar to Sprint @ 16mmHG

Modern Therapies

	Rx	Usual
ACE	50%	6%
ARB	30%	32%
CCB	87%	53%
Diuretics	64%	11%
Adherence	88%	66%
No Drugs	3.0	1.2

Effective BP lowering



Mean BP Change (mmHg)	SPRINT (1 year)
Systolic blood pressure	-18.3
Diastolic blood pressure	-9.5

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A Landmark Finding

Endpoint	P Value	Risk Reduction
All cause Dementia	.0035	15%
Cognitive impairment	<.0001	15%
<i>Either Dementia or Cognitive impairment</i>	<.0001	26%

The first definitive demonstration of relationship between BP therapy and dementia

A large clinical effect

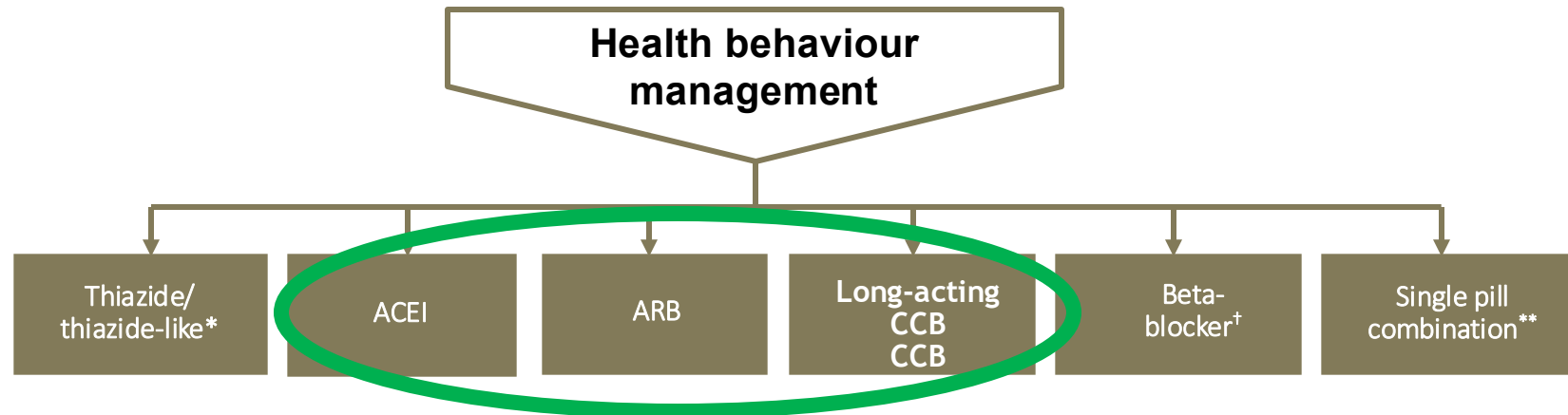
Generalizable, Scalable, Sustainable and Low Cost

- He J. Effectiveness of blood pressure lowering intervention on risk of total dementia among patients with hypertension: a cluster-randomized effectiveness trial. Presented at: AHA 2023. November 11, 2023. Philadelphia, PA.

Guideline Directed Medical Therapies

First Line Treatment of Adults

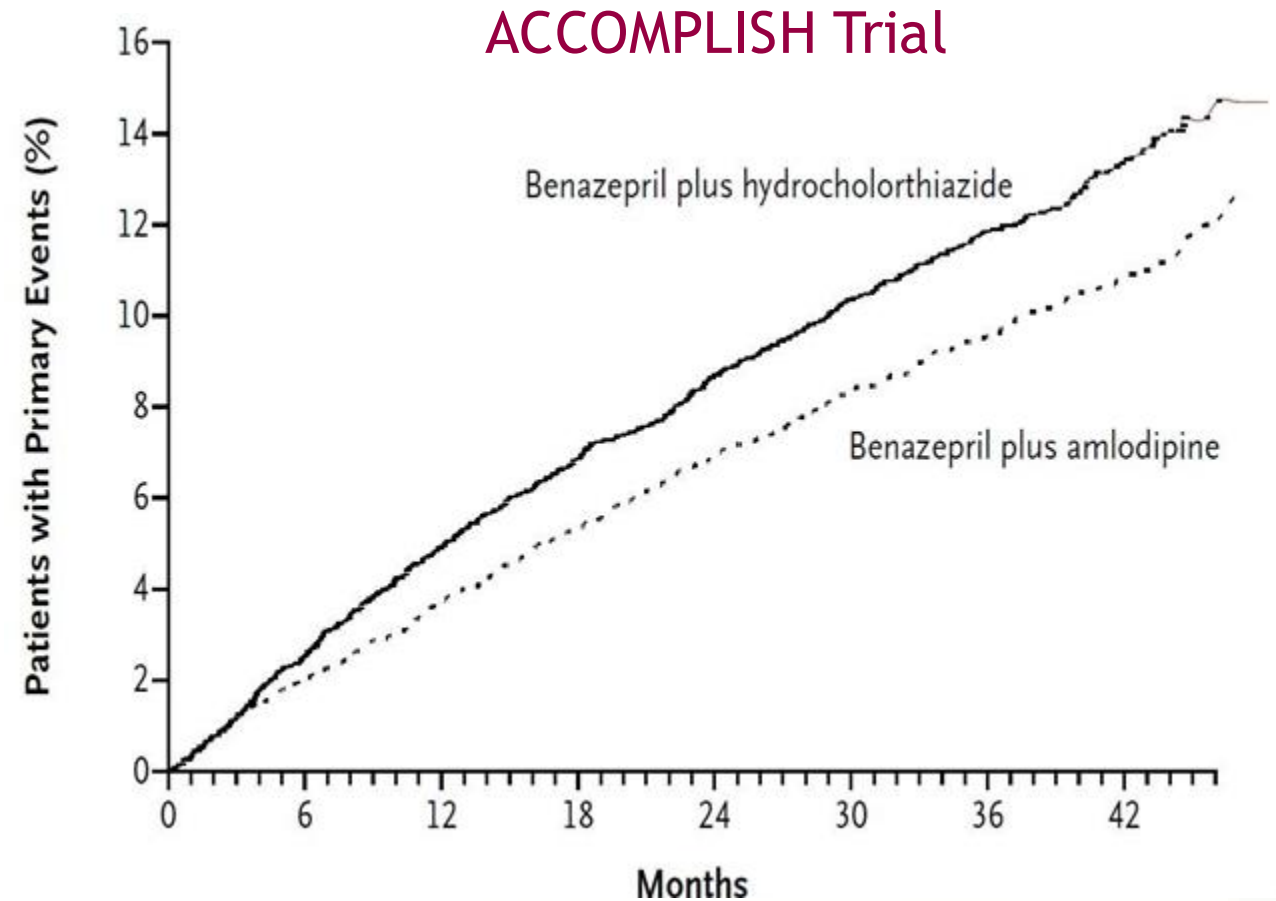
ACE/ARB + Amlodipine preferred



****Recommended SPC choices are those in which an ACE-I is combined with a CCB, an ARB with a CCB, or an ACE-I or ARB with a diuretic**

The Evidence for the Recommendations

****Recommended SPC choices are
ACE-I/ARB combined with
CCB or diuretic**



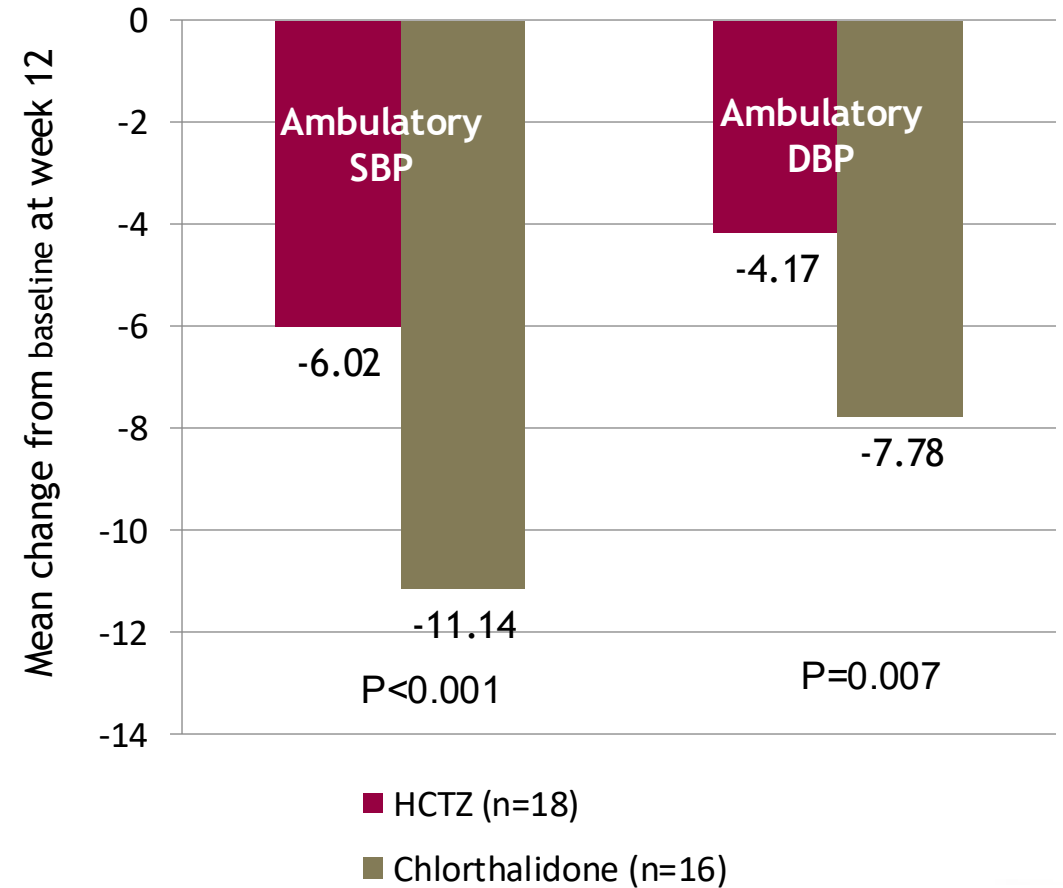
The Evidence for the Recommendations

Recommend *Longer-acting thiazide-like diuretics*

- ✓ chlorthalidone
- ✓ indapamide

Discourage *Shorter-acting thiazides*

- ✓ Hydrochlorothiazide



Evidence for Longer Acting Diuretics

Both reduce

- ✓ CV events
- ✓ Cerebrovascular events
- ✓ Heart failure

ONLY thiazide-*like* diuretics reduce

- ✓ coronary events and
- ✓ all-cause mortality

Event	Thiazide-Type	Thiazide-Like
CV Events	0.67 (.56-.81)	0.67 (0.60-0.75)
Coronary	0.81 (0.63-1.05)	0.76 (0.61-0.96)
Cerebrovascular	0.52 (0.38-0.69)	0.68 (0.57-0.80)
Heart Failure	0.36 (0.16-0.84)	0.47 (0.36-0.61)
All-cause Mortality	0.86 (0.75-1.00)	0.84 (0.74-0.96)

ASA NOT RECOMMENDED FOR PRIMARY PREVENTION

ASA is indicated only in hypertension

WITH established ASCVD

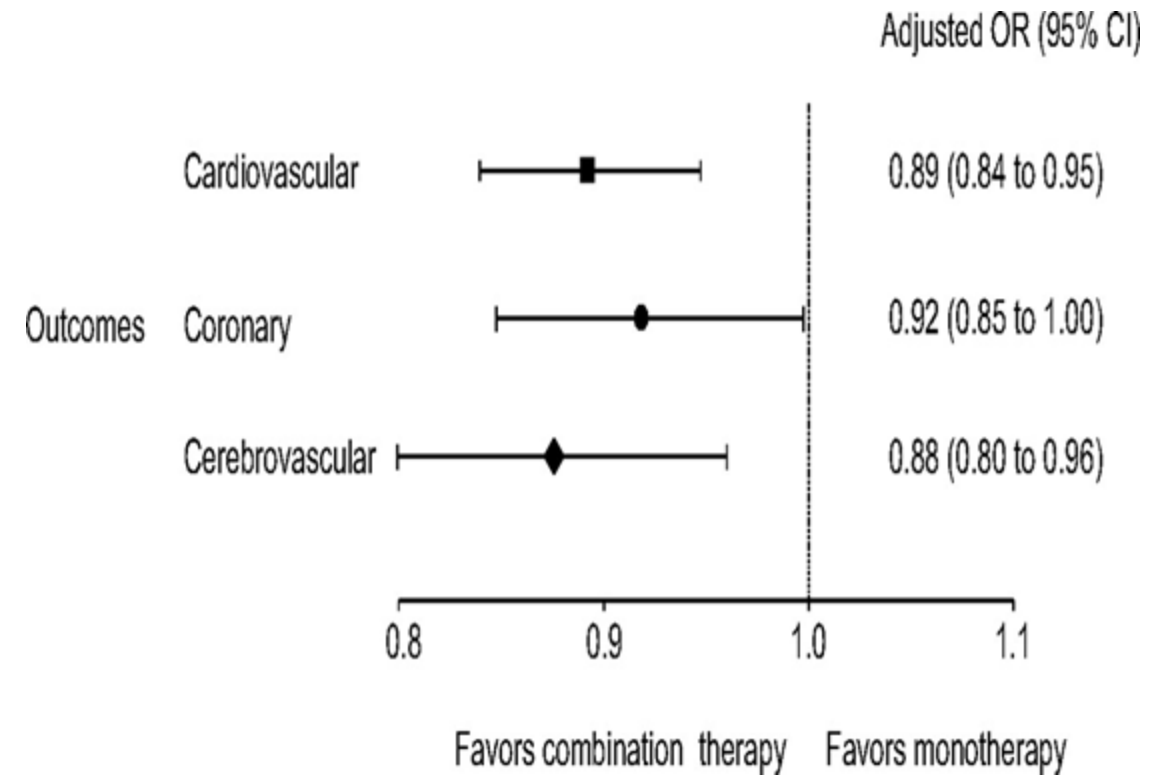
Adherence to GDMT

Improving Adherence

1. Be clear about risk and benefits of therapy
 1. Cardiovascular 'Age'
 2. ASCVD and Dementia reduction
2. Engage the Patient and family in health behavior change (ie logging BP)
3. Engage Community Partners
 1. Pharmacy
 2. cardiac rehabilitation
4. Reduce complexity
 1. Single pill combinations
 2. Once daily, HS dosing preferred
5. Attention to adverse effects and quality of life

Single Pill Combination Therapies Improve Outcomes

- ✓ better adherence vs. free combinations¹
- ✓ better BP control²
- ✓ ↓ risk of CV events than monotherapy^{3,4}



HS Dosing Reduces CV events or death

19,084 patients randomized to HS vs AM Rx
with Ambulatory BP followed for 6.3 years

Improved ABP control

Improved outcomes

- CVD death 0.44 (0.34-0.56)
- Myocardial infarction 0.66 (0.52-0.84)
- Coronary revascularization 0.60 (0.47-0.75)
- Heart failure 0.58 (0.49-0.70)
- Stroke 0.51 (0.41-0.63)

Poll Question



PAUL

44-year-old GM worker

Past health: all good

Values home BP 130-140 over past 6mo

Rx: no medication

WHAT NOW?

- a) Follow-up and review BP diary in 3 months
- b) Lifestyle counselling
- c) Start amlodipine
- d) Start ACE
- e) Start amlodipine-ACE combination

Lifestyle Modifications Important



Regular physical activity

Accumulation of 30-60 minutes of moderate intensity dynamic exercise four to seven days per week, in addition to daily activities



Attaining and maintaining ideal body weight

BMI 18.5-24.9 kg/m²



Waist Circumference



<102 cm



<88 cm



Healthy diet

High in fresh fruits, vegetables, low-fat dairy products, dietary and soluble fibre, whole grains and protein from plant sources; low in saturated fat, cholesterol and salt in accordance with Canada's Guide to Healthy Eating



Reduce sodium intake

towards 2000 mg/day



Minimize alcohol consumption

≤ 2 standard drinks/day with less than



14/week



9/week

Refractory Hypertension

Resistant Hypertension

Definition: BP above threshold despite 3+ BP lowering drugs

Differential Diagnosis

- White coat hypertension
- Non-adherence
- Primary resistant hypertension
 - Primary
 - Drug use (cocaine, amphetamines, licorice)
- Secondary
 - Renal
 - Endocrine

Primary Resistant Hypertension

Associated conditions

- Obesity
- Tobacco use
- Excessive alcohol consumption
- Sleep apnea
- Chronic pain
- Thyroid disease
- Mental health (i.e. depression)

Drug interactions

- **Nonsteroidal** anti-inflammatory drugs
- Oral contraceptives
- Corticosteroids and anabolic steroids
- Cocaine
- Amphetamines
- Erythropoietin
- Cyclosporine, tacrolimus
- Licorice
- Over-the-counter dietary supplements
- Oral decongestant use (pseudoephedrine)
- Monoamine oxidase inhibitors

Secondary Hypertension

Renal

- Renovascular

Endocrine

- Primary Aldosteronism
- Pheochromocytoma

Adrenal: Pheochromocytoma

Clinical clues

- Paroxysmal hypertension
- Resistance to treatment with 3 drugs
- Sensitivity to beta blockers
- incidental adrenal mass
- Family history (Multiple endocrine neoplasia, Neurofibromatosis)

To screen

24 hour total urine metanephrines and catecholamines (sensitivity 90%-95%)

Adrenal: Primary Aldosteronism

Mechanism: Excess secretion of Aldosterone with fluid retention/hypertension

Clinical clues

- ✓ Unexplained spontaneous hypokalemia
- ✓ Marked diuretic-induced hypokalemia
- ✓ Resistance to treatment with 3 drugs
- ✓ Incidental adrenal mass

To screen: Plasma aldosterone and plasma renin

Renovascular Hypertension

Mechanism: Renal Artery stenosis with increased aldosterone

Clinical : 2 or more of the following

1. Complicated Hypertension

1. Sudden onset
2. worsening of hypertension
3. Resistant hypertension

2. Renal

1. Abdominal bruit
2. Increase eGFR > 30% with use of an ACE inhibitor or ARB
3. Asymmetry of kidney size

3. Fibromuscular dysplasia

1. Family history
2. Fibromuscular dysplasia or ASVD in another territory

Diagnosis

1. MRI or CTA if eGFR > 30
2. Renal doppler
3. Captopril renal scan if eGFR > 60
4. Nephrology consultation

Online Resources



2020 - 2022 HYPERTENSION HIGHLIGHTS



A Practical Guide informed by the Hypertension Canada Guidelines for the Prevention, Diagnosis, Risk Assessment, and Treatment of Hypertension



Key Messages

- The diagnosis of hypertension
 - should be based on *out-of-office measurements*
 - 24 ambulatory BP useful for borderline BP . masked hypertension or compliance
- Encourage Patient self management and BP logging
- Threshold pressures are lower in those at greater risk
- First line therapy principles to improve outcomes
 - Single pill combinations
 - Combinations of ARB/ACE with Amlodipine
 - Longer-acting (thiazide-like) diuretics (vs. thiazides)
- Consider Secondary Causes in Resistant Hypertension

THANK YOU