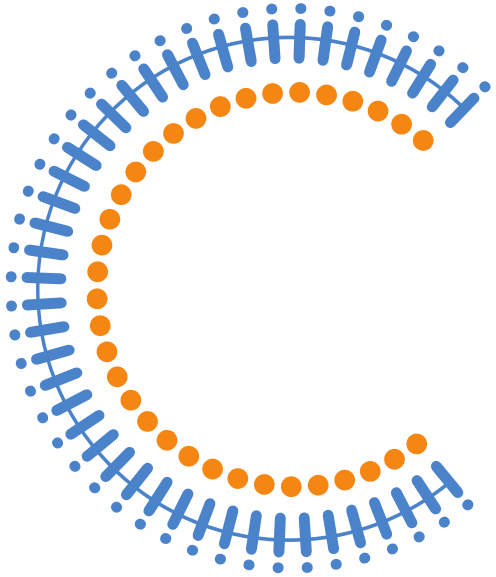

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The Complex Patient Case Module 3:

Hypertension and Stroke Prevention and Management in Patients

Case Development & Disclosures

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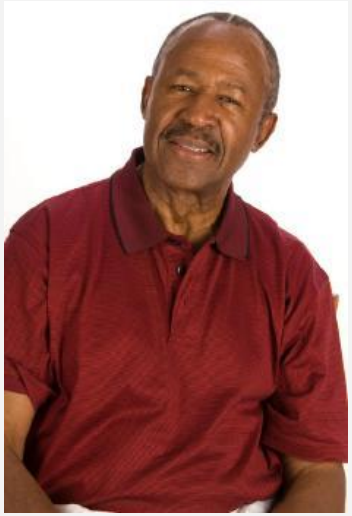
- Altering control over content: information and recommendations given in the program are evidence based and sourced from multiple clinical practice guidelines/scientific professional associations.
- Program material is peer reviewed by a committee with members representative of the target audience.

Outline of Today's Activity

- Introduction
- Case Presentation
- Key Learnings & Questions
- Wrap Up

Case 3:
Hypertension and Stroke Prevention in Patients



John

A 60 year old black male with severe hypertension. During his visit, his wife discusses her concerns about the risk of stroke.

Learning Objectives

Upon completion of this case study, participants should be able to:

1. Plan to assess and screen patients blood pressure at all appropriate visits
2. Discuss modifiable cardiovascular risk factors with patients.
3. Discuss blood pressure targets and need for anticoagulation/anti-platelet therapy in people who have just suffered a stroke.

Statement of Need

"My greatest challenge as a health care professional in the management of patients with ***multiple morbidities*** *is*

_____"

Question 1

How often should John have his blood pressure screened?

Question 1. How often should John have his BP screened?

a) 1 x/ month
b) Every other month
c) 1 x/ year
d) 2 x/ year
e) At each appropriate visit to his doctor's office

Question 1. How often should John have his BP screened?

e) *At all appropriate visits, at each health care encounter*

Risk Factor Screening

Hypertension

- Health care professionals who have been specifically trained to measure BP accurately should assess BP in all adult patients at all appropriate visits to determine CV risk and monitor antihypertensive treatment

Case Presentation

- John is a 60 year old male.
- Hypertensive.
- Sister who is 10 years older died from a hemorrhagic stroke 5 years ago.
- His wife is concerned about his risk of stroke and comes in with him to discuss this with you.

Patient history

- John is a plumber.
- He has a history of hypertension and obesity (BMI 32 kg/m2).
- He is also an ex-smoker, having smoked 20 cigarettes a day for 40 years, quitting when his sister had the stroke.

Family history

- Father, sister and paternal uncle
  - both suffered a stroke in their 60s.

Current Medications

- None
- He had been started on an ACE inhibitor 4 years ago but it had not lowered his blood pressure
- He was then started on atenolol but it also did not lower his BP and made him feel tired, he did not continue with either medication

Physical Examination

- Height: 175
- Weight: 98
- BMI: 32 kg/m^2
- BP (both arms, seated):

mmHg using an automated device

  - 164/102 mmHg

- Funduscopic: arteriolar narrowing, AV nicking
- Neck-Thyroid palpable, no nodule
- Heart: S4 gallop
- Lungs: Normal
- Abdomen: no murmurs
- Arteries: Normal
- Ankle edema: nil
- Neuro: grossly intact

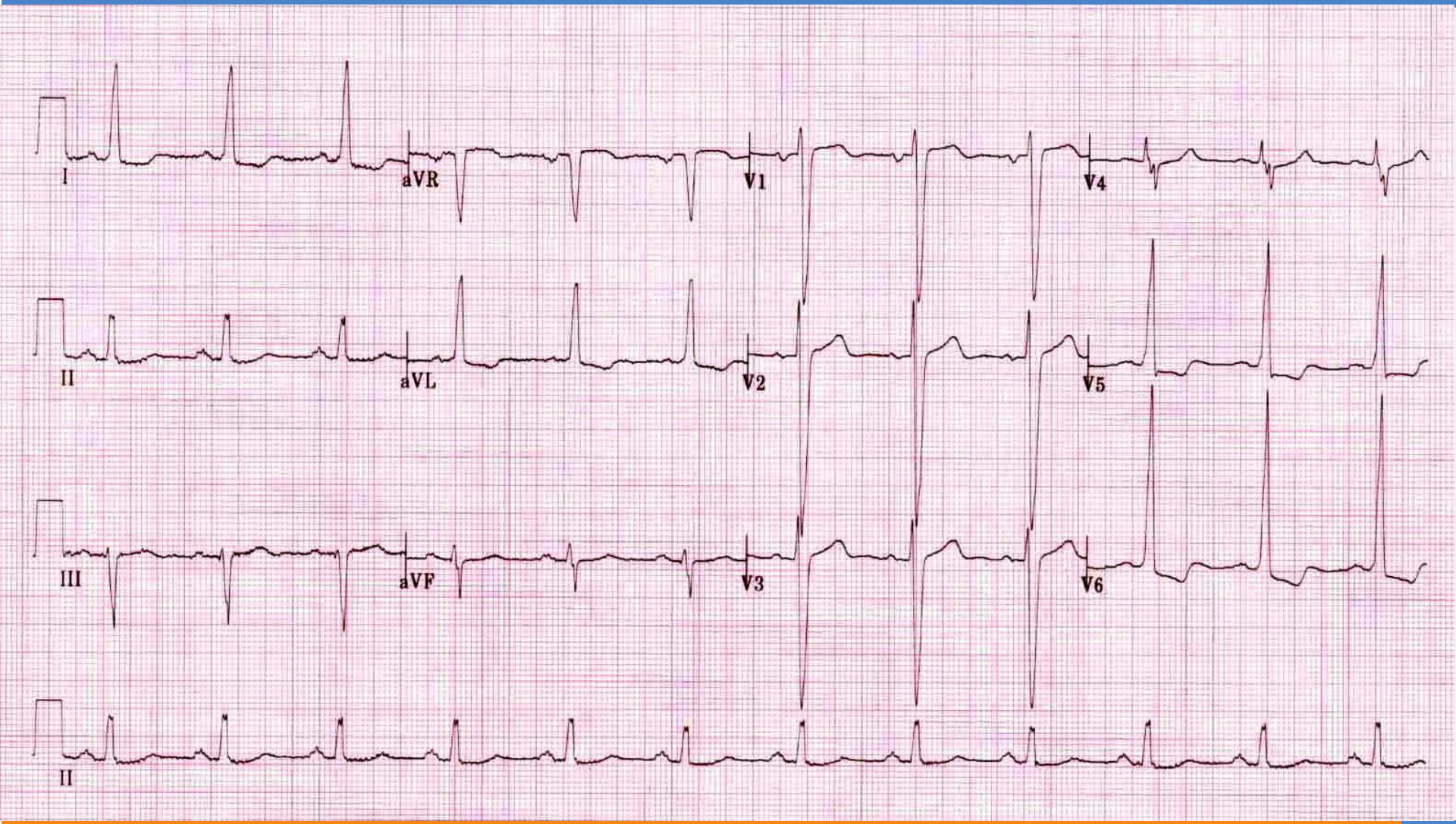
Laboratory Investigations

Test	Results	Normal Values
Glucose	6.0 mmol/L	4.0-8.0 mmol/L
Urea	5.2 mmol/L	3.0-7.0 mmol/L
Creatinine	87 µmol/L eGFR x ml/min	44-106 µmol/L
K	3.8 mmol/L	3.5-5.0 mmol/L
Na	138 mmol	135-145 mmol/l

- *Note that labs are done prior to the next visit*

Laboratory Investigations

Test	Results	Normal values
LDL	3.9 mmol/L	<2.0 mmol/L
Total chol	5.8 mmol/L	<5.20 mmol/L
TG	1.6 mmol/L	<1.70 mmol/L
HDL	0.8 mmol/L	>0.99 mmol/L
TC:HDL	7.25	High risk target: <4.0 Mod risk target: <5.0 Low risk target: <6.0


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II

Laboratory Investigations

Test	Results	Normal Values
HbA1c	0.053	0.045 - 0.057 mmol/L
Dipstick Urinalysis	Negative	Neg
Alb/creat	9.2 mg/mmol	< 2.0 mg/mmol
ECG confirms LVH and Strain pattern		

- *Note that labs are done prior to the next visit*

Question 2

What risk reduction strategies should be focused on to help John address his vascular risk?

Question 2. What areas should be discussed with John to help address his vascular risk?

a) Blood pressure control
b) Diet and sodium intake
c) Exercise and weight loss
d) Alcohol intake
e) Lipid management
f) All of the above

Question 2. What areas should be discussed with John to help address his vascular risk?

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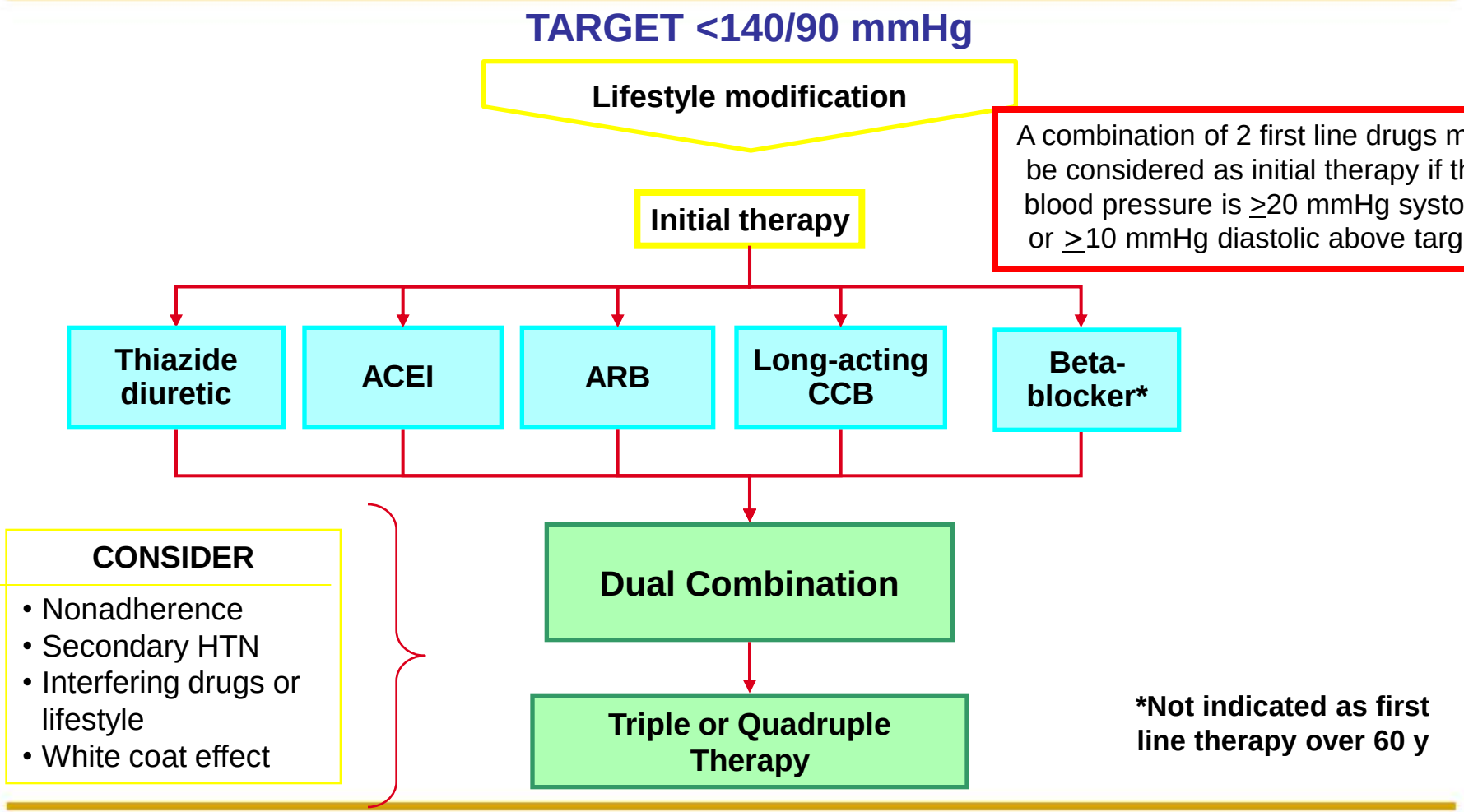
f) All of the above

a) Blood pressure control

Target BP is < 140/90

How to achieve BP control in this patient?

III. Summary: Treatment of Systolic-Diastolic Hypertension without Other Compelling Indications



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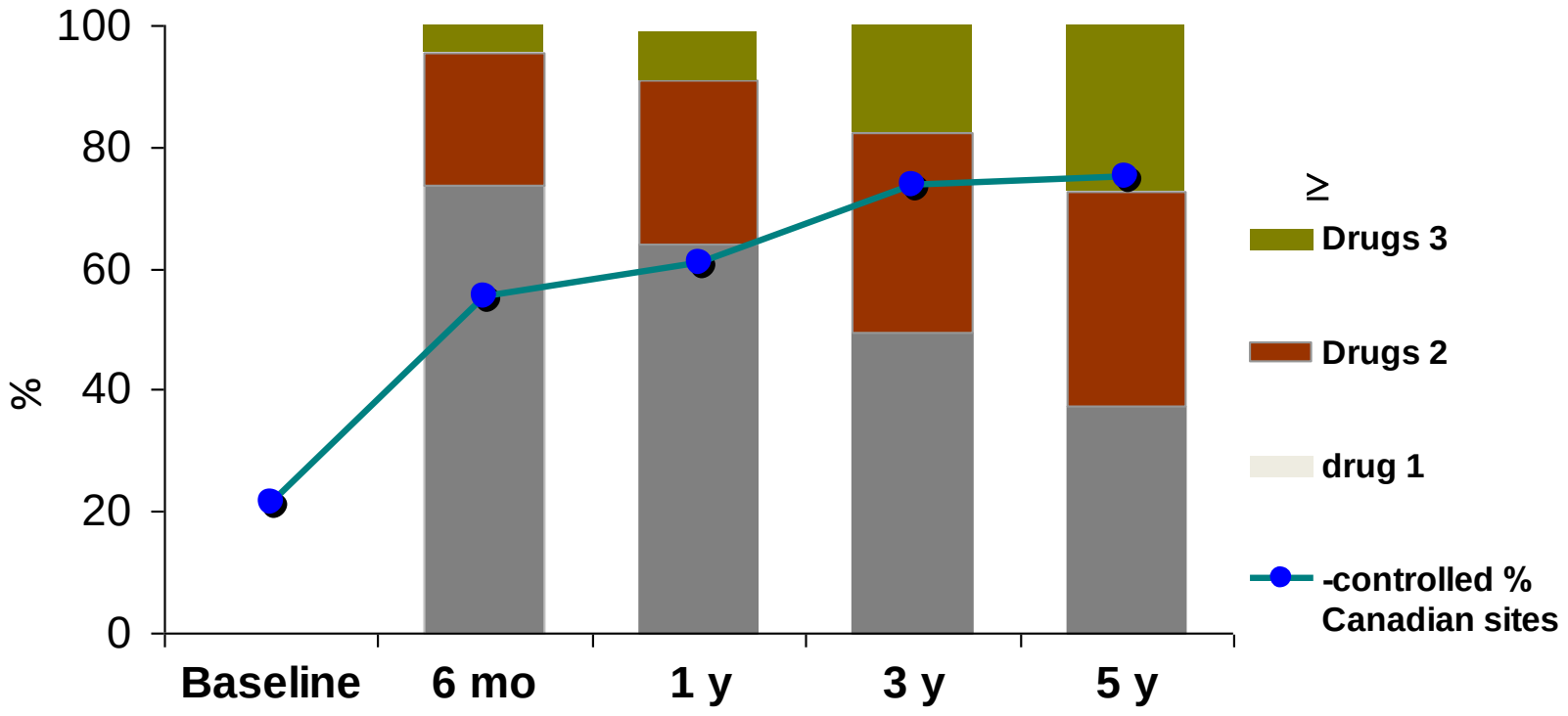
Hypertension CANADA

Medication Use and BP Control in ALLHAT Trial



<140/90 mm Hg

Cushman et al. *J Clin Hypertens* 2002;4:393-404

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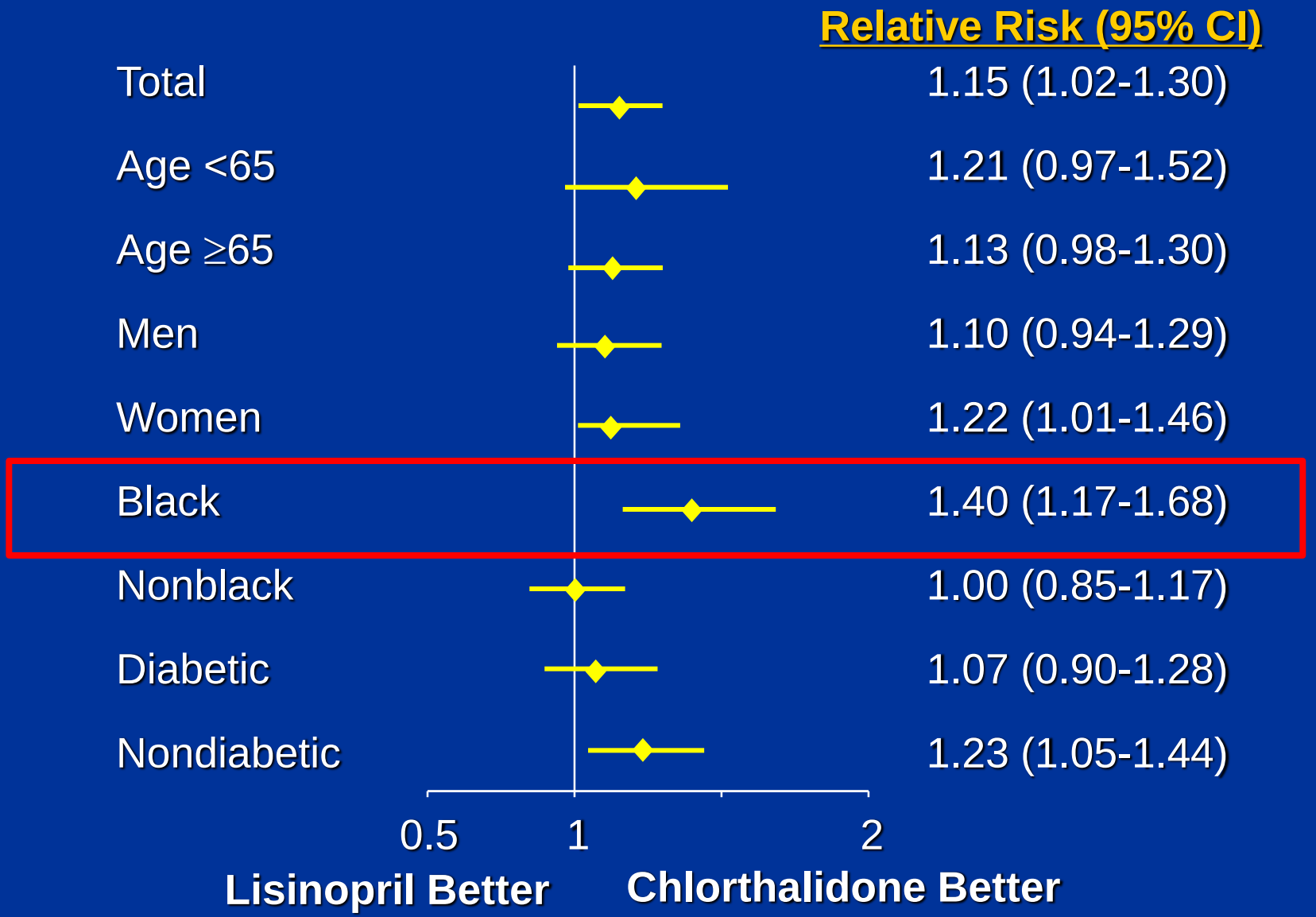
Hypertension CANADA

Considerations Regarding the Choice of First-Line Therapy

- Use caution in initiating therapy with 2 drugs in those whom adverse events are more likely (e.g. frail elderly, those with postural hypotension or who are dehydrated).
- ACE inhibitors, renin inhibitors and ARBs are contraindicated in pregnancy and caution is required in prescribing to women of child bearing potential.
- Beta blockers are not recommended as first line therapy for patients age 60 and over without another compelling indication.
- Diuretic-induced hypokalemia should be avoided through the use of potassium sparing agents if required.
- The use of dual therapy with an ACE inhibitor and an ARB should only be considered in selected and closely monitored people with advanced heart failure or proteinuric nephropathy.
- **ACE-inhibitors are not recommended (as monotherapy) for black patients without another compelling indication.**

ALLHAT: Stroke (Lisinopril vs Chlorthalidone) Subgroups



ALLHAT Collaborative Research Group. *JAMA* 2002;288:2981-97.

ALLHAT Sub-analysis by Race and Metabolic Syndrome

- ALLHAT (n=42,418) randomized to chlorthalidone, amlodipine, lisinopril or doxazosin.
- Second drug added was usually a beta-blocker atenolol
- Men and women age 55+ with hypertension and one other CHD risk
- Metabolic syndrome defined as hypertension and 2 of: dysglycemia, BMI of 30+, elevated fasting TG, low HDL present in 54.4%

JT Wright Jr, Archives Internal Medicine 2008:168(2):207-217,

ALLHAT Subanalysis in Blacks with Metabolic Syndrome: Lisinopril vs Chlorthalidone

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- Chlorthalidone was associated with fewer
  - CAD events
  - CHF
  - Stroke
  - ESRD
- BP control achieved in 67.2% on C vs 58.4% on L
- Fasting Glucose at 4 years 8.1 mmol/L on C vs 7.7% on L

JT Wright Jr, Archives Internal Medicine 2008:168(2):207-217,

Unexpected Findings

- The ALLHAT results in Black patients were unexpected
- They were present despite higher blood glucose levels with the diuretic
- May have resulted in part from poorer BP control when atenolol is added to an ACE inhibitor in black patients

Question 2. What areas should be discussed with John to help address his vascular risk?

C•CHANGE

f) All of the above

Weight and Diet: John's BMI is 32 kg/m2. (Class II obesity BMI 25 to 39.9 kg/m2). You discuss eating a nutritionally balanced diet to achieve and maintain a healthy body weight

Sodium: To decrease blood pressure, consider reducing sodium intake towards 2,000 mg (5g of salt) per day.

Exercise: To achieve health benefits, adults aged 18-64 should accumulate at least 150 minutes of moderate-vigorous intensity aerobic physical activity per week, in bouts of 10 minutes of more.

Question 2. What areas should be discussed with John to help address his vascular risk?

C•CHANGE

f) All of the above

Smoking: You review John's smoking status (former smoker)

Alcohol: You review John's alcohol consumption and advise that he have two or fewer standard drinks per day (fewer than 14 drinks per week for men).

Lipid Status: You start John on a statin with the goal of reducing his LDL < 2.0

Case Progression

You start John on Chlorthalidone 25 mg/d and ask him to come back to see you within 2 months to check his BP and further titrate his medication.

Follow-up of blood pressure above targets

- Patients with blood pressure above target are recommended to be followed at least every 2nd month
- Follow-up visits are used to increase the intensity of lifestyle and drug therapy, monitor the response to therapy and assess adherence

Case Progression

John misses his appointment despite phone calls to remind him.

Three months after John's last visit with you, he develops a stroke. He comes to see you in your office after the acute phase, to be monitored. His BP remains uncontrolled. His only anti-hypertensive is chlorthalidone. His statin has been restarted.

Question 3

What is John’s BP target?

Question 3. What is John's BP target?

a) < 140/90 mmHg

b) < 135/85 mmHg

c) < 130/80 mmHg

d) < 120/80 mmHg

Question 3. What is John's BP target?

a) < 140/90 mmHg

SPRINT

Treatment Targets

Stroke Rehabilitation

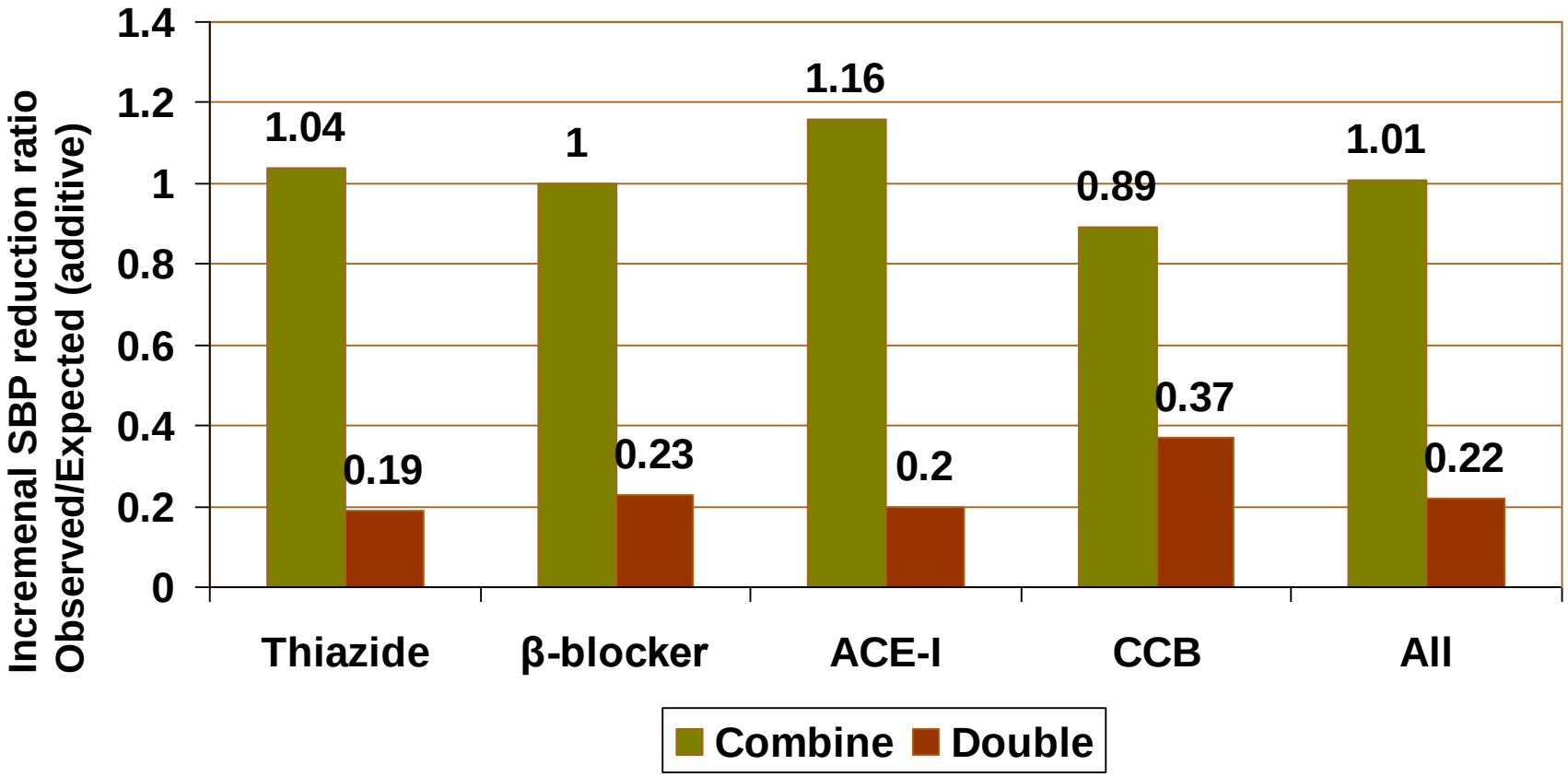
- Following the acute phase of a stroke, BP lowering treatment is recommended to a target of consistently <140/90 mmHg

BP lowering effects from antihypertensive drugs

- Dose response curves for efficacy are relatively flat
- 80% of the BP lowering efficacy is achieved at half-standard dose
- Combinations of standard doses have additive blood pressure lowering effects

Law. *BMJ* 2003

Ratio of Incremental SBP lowering effect at "standard dose"– Combine or Double?



Wald et al. Combination Versus Monotherapy for Blood Pressure Reduction, *The American Journal of Medicine*, Vol 122, No 3, March 2009

CHEP

Hypertension CANADA

Case Progression

You add an ACE inhibitor and a calcium channel blocker to chlorthalidone over the next few weeks and achieve BP control < 140/90 mm Hg. Given his history of non-adherence, you discuss the importance of taking the medication regularly.

His renal function and potassium are unchanged.

Question 4

Upon examining John, you note no evidence of atrial fibrillation (confirmed with ECG). What would you prescribe, what options are available?

Question 4. What would you prescribe, what options are available?

a) dabigatran (150 mg)

b) warfarin (5 mg)

c) clopidogrel (75 mg)

d) ASA (81 mg)

e) ASA (25mg)/dipyridamole (200 mg)

Question 4. What would you prescribe, anti-platelet therapy, what options are available?

d) ASA (81 mg)

Pharmacologic and/or procedural therapy

- Antiplatelet therapy: all patients with ischemic stroke or transient ischemic attack should be prescribed antiplatelet therapy for secondary prevention of recurrent stroke unless there is an indication for anticoagulation.
- ASA (81mg), combined ASA (25 mg) and extended-release dipyridamole (200 mg), or clopidogrel (75 mg) are all appropriate options and selection should depend on the clinical circumstances.

Discussion & Reflection

1. Do you need to change your current practice to implement any of these recommendations?
2. How do you engage patients and their families in therapy and manage expectations?
3. What are some other adherence strategies that were discussed or not discussed that could work for your practice?
4. Who are some agents of change who can help you implement the recs?

Systolic blood Pressure INtervention Trial SPRINT

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- Compares < 120 vs < 140 mmHg
- NHLBI RCT
  - **Age 50+**
  - SBP 130-180
  - **High CV risk (other than stroke)**
    - CKD (eGFR 20 - <60)
    - 10 Year Framingham risk of 15%+
    - Age 75+
- Excludes: DM and prior stroke

Would John Initially be a SPRINT Patient?

Framingham Risk Score - RESULTS [2,3]

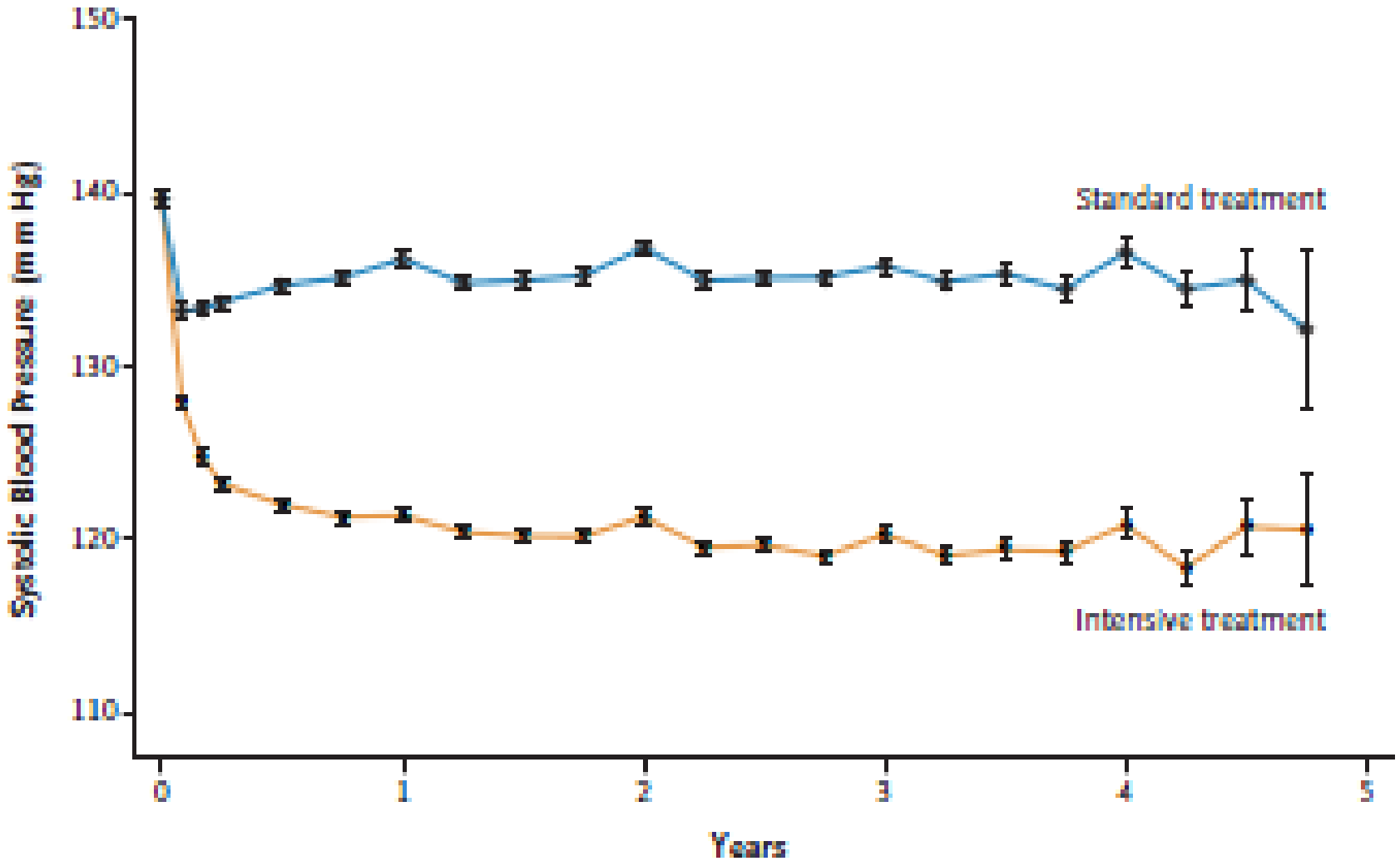
Your patient's Framingham Risk Score is > 30%

2009 CCS Canadian Cholesterol Guidelines Recommendation [1]

Risk Level	Initiate/consider treatment if any of the following:	Primary LDL-C targets
High* (FRS > 20% RRS > 20%)	Consider treatment in all patients.	**Either:** - 2.0 mmol/L or ≥ 50% reduction

Adapted from Genest et al. Can J Cardiol. 2009. [1]

SPRINT BP Over Time



SPRINT: NEJM Nov 9 2015

SPRINT Primary Outcome
MI, ACS, Stroke, CHF, CV death

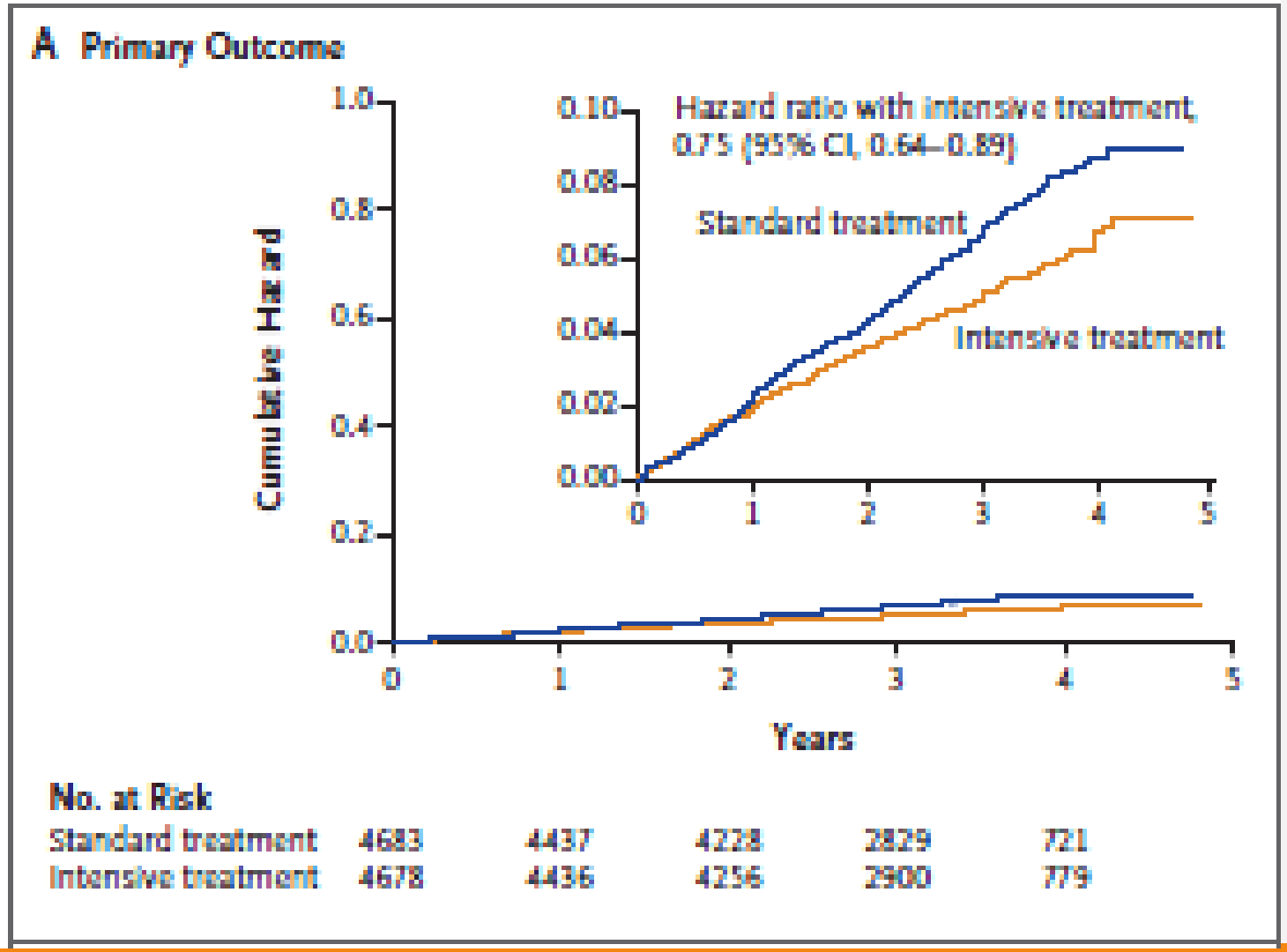


Table 3. Serious Adverse Events, Conditions of Interest, and Monitored Clinical Events.

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

SPRINT Implications for John

- Should his BP target now be < 120 mmHg?
  - (he would have been a SPRINT candidate prior to his stroke but not after – should this impact on his BP target?)
- How would we achieve the lower BP target and at what risk and benefit?
  - Current meds
    - ACEi, chlorthalidone 25 mg, amlodipine 5 mg/d

Key Learnings:

- Assess BP in all adult patients at all appropriate visits to determine CV risk and monitor antihypertensive treatment
- Persons at risk of stroke should be assessed for vascular disease risk factors and lifestyle management issues
- Following the acute phase of stroke, patients should have their BP controlled to target of less than 140/90 mm Hg
- Antiplatelet therapy should be prescribed in all patients with ischemic stroke or transient ischemic attack for secondary prevention of recurrent stroke, unless indication for anticoagulation

The C-Change Collaborative

Founding Partners

- Institute of Circulatory and Respiratory Health (ICRH) and the Public Health Agency of Canada (PHAC)

Partner Organizations

- Canadian Association for Cardiac Rehabilitation (CACR)
- Canadian Action Network for the Advancement, Dissemination and Adoption of Practice-informed Tobacco Treatment (CAN ADAPTT)
- Canadian Cardiovascular Society (CCS) - Lipids
- Canadian Diabetes Association (CDA)
- Canadian Hypertension Education Program (CHEP)
- Canadian Society for Exercise Physiology (CSEP)
- Heart and Stroke Foundation Canadian Stroke Best Practice Recommendations
- Cardiac Care Network of Ontario (CCN)
- Canadian Obesity Network
- KT Canada