Hypertension and Atrial Fibrillation

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Sunnybrook
HEALTH SCIENCES CENTRE
when it matters MOST

Objectives

- Describe the 2017 Hypertension Canada Guidelines
- Discuss what's old but still important

Presenter Disclosure

- Relationships with commercial interests:
  - Grants/Research Support:
  - Speakers Bureau/Honoraria:
  - Consulting Fees:
  - Data Safety and Monitoring:

Mitigating Potential Bias

- The information presented is based on recent information that is explicitly ‘‘evidence-based’’.

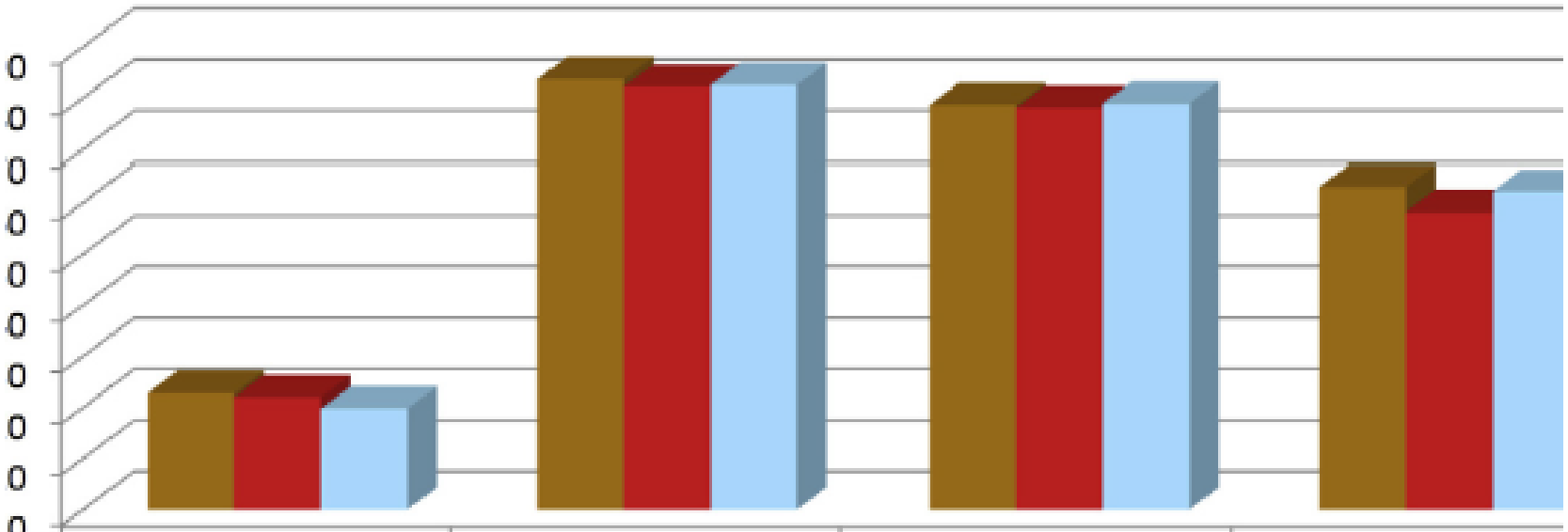
- This presentation and all the guidelines involving clinical medicine are based on evidence that was vetted by the Hypertension Canada Guidelines Committee.

The presentation has been developed for dissemination by Hypertension Canada.

Evidence-Based Annual Guidelines

- Canada has the world's highest reported national blood pressure control rates
- Hypertension Canada is known as the most credible source for evidence-based hypertension guidelines, with annual updates, a well-validated review process and effective dissemination techniques across Canada

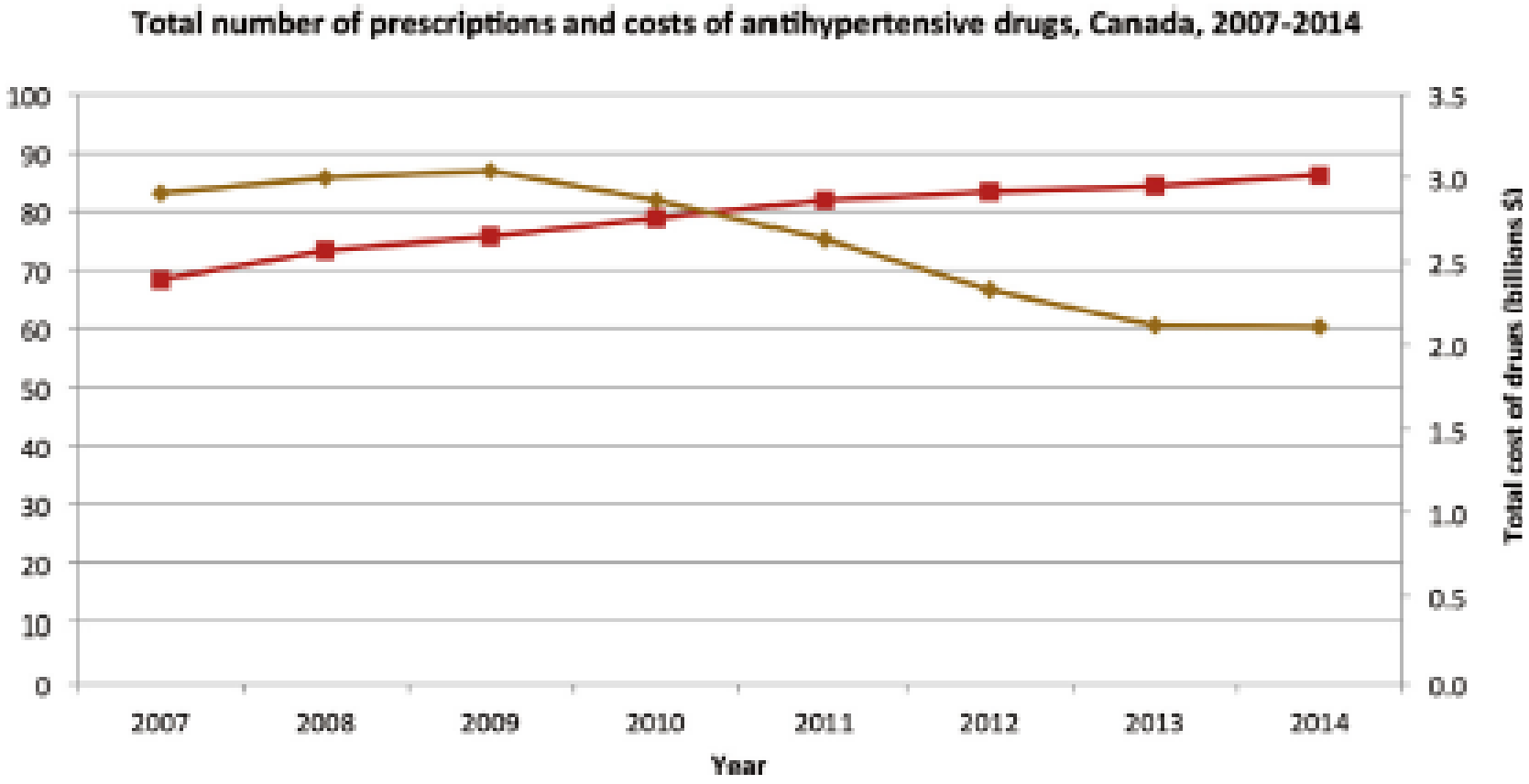
Prevalence, Diagnosis, Treatment, and Control of HT, age 20+. The Canadian Health Measures Survey 2007-2013. 130/80 DM, 140/90 Others



	Prevalence	Diagnosed	Treated	Controlled
e 3	22.9	83.7	78.7	63.0
e 2	22.1	82.2	78.1	58.2
e 1	19.8	82.6	79.0	62.1

Padwal R CJC 2015 Epidemiology of HT in Canada

Prescriptions and Costs of Antihypertensives 2007-2014



Padwal R CJC 2015 Epidemiology of HT in Canada

2017 Hypertension Canada Guidelines

What's still important?

- The diagnosis of hypertension should be based on **out-of-office** measurements
- The threshold and target blood pressures are lower in those at greater risk
- The treatment of hypertension is all about reducing global cardiovascular risk
- Adopting healthy behaviours is integral to the management of hypertension
- The most important step in prescription of antihypertensive therapy is achieving patient "buy-in" and adherence

2017 Hypertension Canada Guidelines

What's new?

- **New first line therapy guidelines**: i) Single pill combinations have been added as a recommended first line treatment (regardless of the extent of BP elevation) and ii) Longer acting (thiazide-thiazide-like) diuretics are preferred vs. shorter acting
- ***Updating*** the management of patients with hypertension secondary to renal artery stenosis
- ***New*** guidelines on the diagnosis and management of hypertension in pediatric patients ***(NOT the focus of this presentation)***

New first line therapy guidelines in "uncomplicated" hypertension*

(*aka- patients with hypertension with no other compelling indications for more specific therapy)

Initial therapy should be with either monotherapy **or** single pill combination (SPC)

- **Montherapy choices are**:
  i. a thiazide/thiazide-like diuretic (Grade A), with **longer acting diuretics preferred** (Grade B),
  ii. a β-blocker (in patients younger than 60 years; Grade B),
  iii. an ACE inhibitor (in non-black patients; Grade B),
  iv. a long-acting CCB (Grade B), or
  v. an ARB (Grade B).

- **SPC choices are** those combinations of
  i. an ACE-I with a CCB (Grade A),
  ii. an ARB with a CCB (Grade B),
  iii. an ACE-I **or** ARB with a diuretic (Grade B).

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Longer acting diuretics are preferred

(i.e., thiazide-like are preferred to thazides)

Longer-acting (thiazide-like): chlorthalidone, indapamide

Shorter-acting (thiazides): hydrochlorothiazide

Thiazide-type (shorter acting) vs Thiazide-like Diuretics: CV events and Mortality Meta-analysis

- **Design:** Meta-analysis of 21 RCTs of BP lowering comparing thiazide-type or thiazide-like diuretics vs. placebo or another antihypertensive on CV events and mortality
- >500,000 person years of observation combined
- Thiazide-type:
  - HCTZ
  - Bendrofluazide
  - Chlorothiazide
- Thiazide-like:
  - Indapamide
    - Chlorthalidone

Olde Engberink RH. Hypertension. 2015 May;65(5):1033-40

Diuretic Type Meta-Analysis vs Placebo

- **Both** types of diuretics reduced CV events, cerebrovascular events, and HF;
- **Only thiazide-like diuretics** additionally reduced coronary events and all-cause mortality

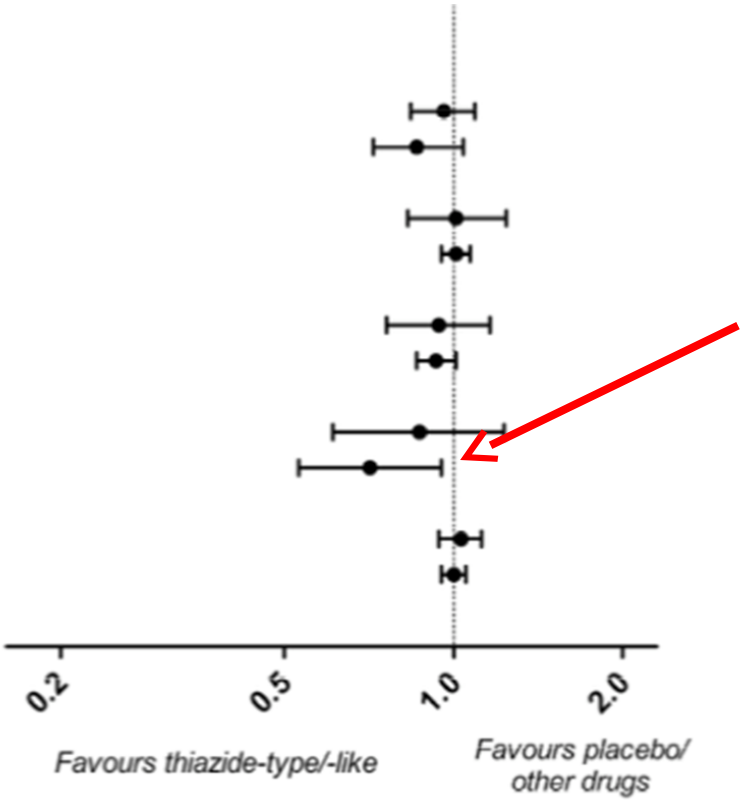
Event	Thiazide-Type	Thiazide-Like
CV	**0.67 (.56-.81)**	**0.67 (0.60-0.75)**
Coronary	0.81 (0.63-1.05)	**0.76 (0.61-0.96)**
Cerebrovascular	**0.52 (0.38-0.69)**	**0.68 (0.57-0.80)**
Heart Failure	**0.36 (0.16-0.84)**	**0.47 (0.36-0.61)**
All-cause Mortality	0.86 (0.75-1.00)	**0.84 (0.74-0.96)**

Olde Engberink RH. Hypertension. 2015 May;65(5):1033-40

Diuretic Type Meta-Analysis

- **<u>Only</u> thiazide-like diuretics additionally** reduced risk of HF, no additional difference for the other outcomes

Other drug comparisons	RR (95% CI)	I^2
Cardiovascular events		
Thiazide-type	0.96 (0.84-1.09)	59%
Thiazide-like	0.86 (0.72-1.04)	88%
Coronary events		
Thiazide-type	1.01 (0.83-1.24)	62%
Thiazide-like	1.01 (0.95-1.07)	0%
Cerebrovascular events		
Thiazide-type	0.94 (0.76-1.16)	56%
Thiazide-like	0.93 (0.86-1.01)	0%
Heart failure		
Thiazide-type	0.87 (0.61-1.23)	53%
Thiazide-like	0.71 (0.53-0.95)	91%
All-cause mortality		
Thiazide-type	1.03 (0.94-1.12)	0%
Thiazide-like	1.00 (0.95-1.05)	0%



Head to Head: HCTZ vs Chlorthalidone vs Indapamide

- Meta-analysis
- Used 3 dose levels to try to standardize dosing
  - HCTZ (12.5/25/50)
  - Chlorthalidone (6.25/12.5/25)
  - Indapamide (1.5/2.0/2.5)

Studies

BP Lowering	Metabolic effect
HCTZ vs Indap (10)	HCTZ vs Indap (7)
HCTZ vs chlor (3)	

Head to Head: HCTZ vs Chlorthalidone vs Indapamide

- **SBP reduction:**
  - Indapamide vs. HCTZ: −5.1 mmHg (p=0.004)
  - Chlorthalidone vs. HCTZ: −3.6 mmHg (p=0.052)
- **Metabolic effects:**
  - No differences between HCTZ vs. indapamide in adverse effects (K+, Na+, Cr, BG, cholesterol, uric acid);
  - no data for HCTZ vs. chlorthalidone

Chlorthalidone vs HCTZ for BP Lowering (ABPM)

- **Design:** 12-week RCTs (double-blind)
- **Population:** stage 1 hypertension (140 -159/ 90-99 mmHg), India (n=54)
- **Intervention:** chlorthalidone 6.25 vs HCTZ 12.5 vs HCTZ (ER) 12.5
- **1°outcomes:** 24 h ABPM baseline to weeks 4 & 12
  - ↓ **SBP & DBP with chlorthalidone** and HCTZ CR ($p < 0.01$), **but not conventional HCTZ**

Summary: Long-acting diuretics preferred

Long-acting (thiazide-like) diuretics appear more effective at reducing CV events and SBP & DBP

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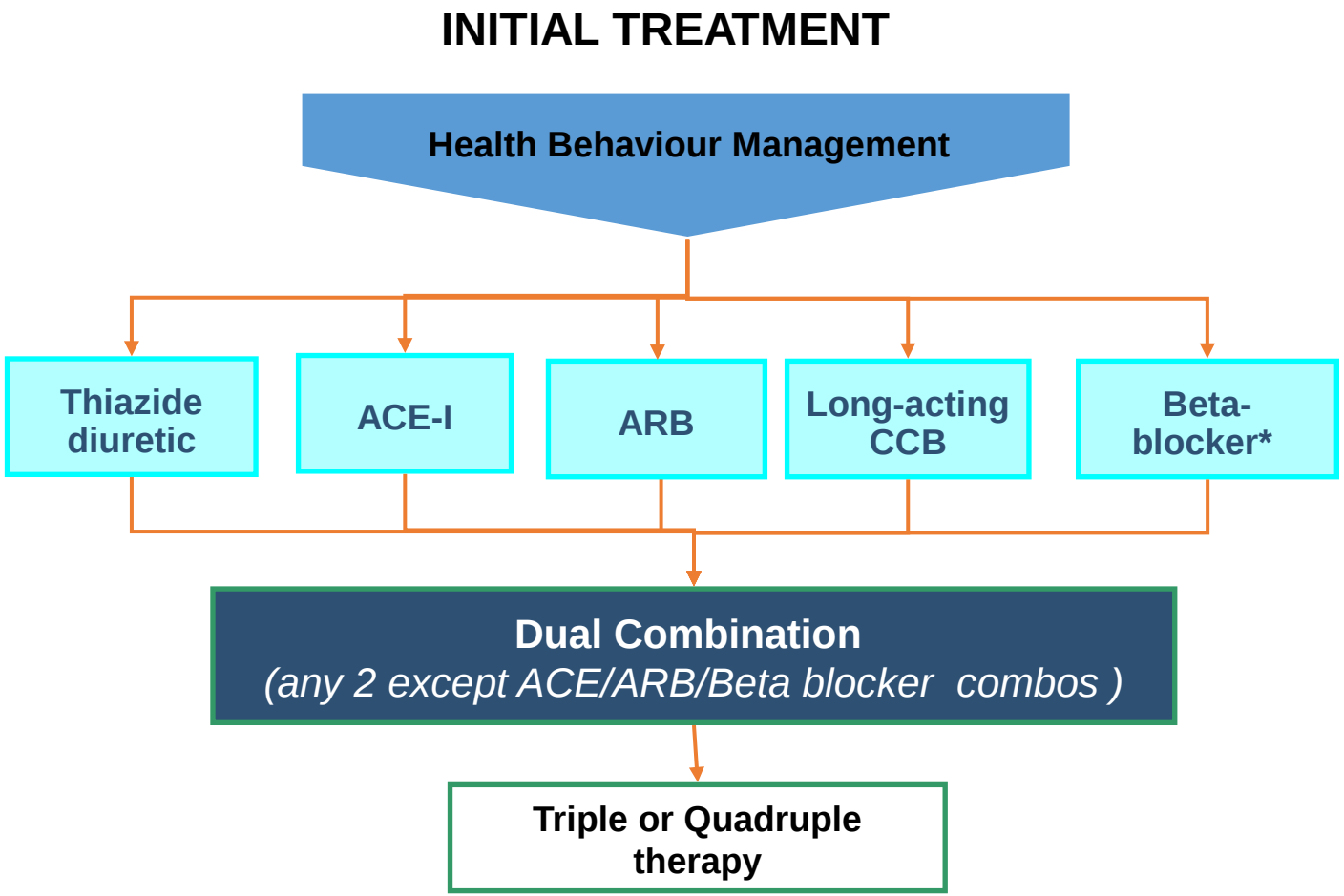
First line recommendations circa 1999-2016



***BBs are not indicated as first line therapy for age 60 and above**

Note: 2 drug therapy indicated for initial treatment only if BP > 20/100 mmHg above target

III. Treatment of Adults with Systolic/Diastolic Hypertension without Other Compelling Indications

TARGET <135/85 mmHg (automated measurement method)

INITIAL TREATMENT

Health Behaviour Management

- **Thiazide/ thiazide-like**
- **ACEI**
- **ARB**
- **Long-acting CCB**
- **Beta-blocker***
- **Single pill combination****

***BBs are not indicated as first line therapy for age 60 and above**

****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**

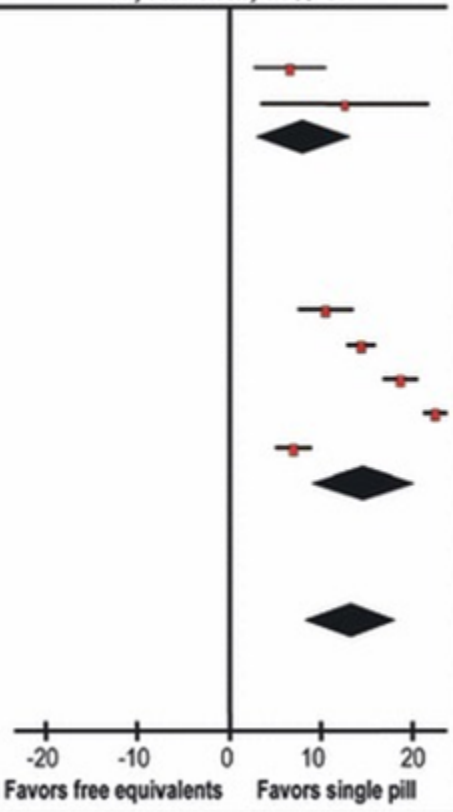
Renin angiotensin system (RAS) inhibitors are contraindicated in pregnancy and caution is required in prescribing to women of child bearing potential

Advantages of Single Pill Combinations

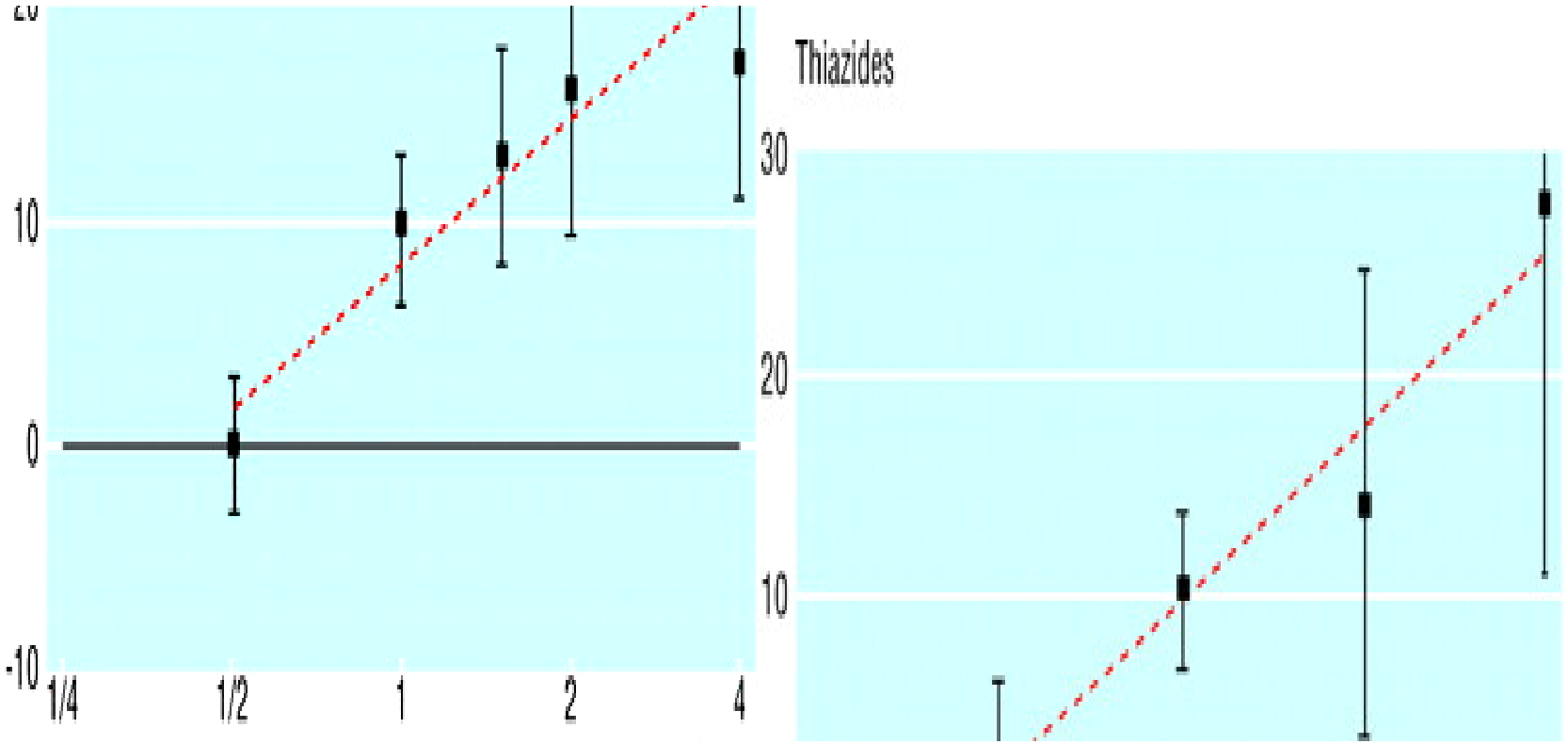
- Single pill combination therapy is associated with better adherence vs. free combinations
- A regimen featuring initial prescription of SPC leads to better blood pressure control
- Initial combination therapy is associated with ↓ risk of cardiovascular events than monotherapy.

SPCs improve adherence

Study or Subgroup	Single Pill Mean	SD	N	Free Equivalent Mean	SD	N	Weight	Mean Difference IV, Random, 95% CI
Naive patients								
Brixner 2008	64.2	58.67	1628	57.6	30.21	561	14.2%	6.60 [2.81, 10.39]
Jackson 2008	73.1	35.42	619	60.5	35.42	65	10.3%	12.60 [3.55, 21.65]
Subtotal (95% CI)			**2247**			**626**	**24.5%**	**8.13 [3.00, 13.26]**
Heterogeneity: $Tau^2 = 5.47$; $Chi^2 = 1.44$, df = 1 ($P = 0.23$); $I^2 = 30\%$								
Test for overall effect: Z = 3.11 ($P = 0.002$)								
Experienced patients								
Dickson 2008	58.6	35.42	3363	48.1	35.42	713	14.7%	10.50 [7.64, 13.36]
Dickson-elderly 2008	63.4	29.4	2336	49	23.4	3368	15.2%	14.40 [12.97, 15.83]
Gerbino 2007	87.9	35.42	2839	69.2	35.42	3367	15.1%	18.70 [16.93, 20.47]
Hess 2008	76.9	35.42	7224	54.4	35.42	7225	15.3%	22.50 [21.34, 23.66]
Taylor 2003	80.8	35.42	2754	73.8	35.42	2978	15.1%	7.00 [5.16, 8.84]
Subtotal (95% CI)			**18516**			**17651**	**75.5%**	**14.66 [8.97, 20.36]**
Heterogeneity: $Tau^2 = 41.31$; $Chi^2 = 236.93$, df = 4 ($P < 0.00001$); $I^2 = 98\%$								
Test for overall effect: Z = 5.05 ($P < 0.00001$)								
Total (95% CI)			**20763**			**18277**	**100.0%**	**13.31 [8.26, 18.35]**
Heterogeneity: $Tau^2 = 42.94$; $Chi^2 = 264.57$, df = 6 ($P < 0.00001$); $I^2 = 98\%$								
Test for overall effect: Z = 5.17 ($P < 0.00001$)								
Test for subgroup differences: $Chi^2 = 26.20$, df = 1 ($P < 0.00001$), $I^2 = 96.2\%$								



At low doses the adverse effects of most antihypertensives approach those of placebo



Usual Office BP Threshold Values for Initiation of Pharmacological Treatment

Population	SBP	DBP
High Risk (SPRINT population)	≥130	NA
Diabetes	≥130	≥80
Moderate-to-high risk (TOD or CV risk factors)*	≥140	≥90
Low risk (no TOD or CV risk factors)	≥160	≥100

TOD = target organ damage

***AOBP threshold > 135/85**

Recommended Office BP Treatment Targets

Treatment consists of health behaviour ± pharmacological management

Population	SBP	DBP
High Risk (SPRINT)	<120	NA
Diabetes	< 130	< 80
All others (including CKD)*	< 140	< 90

* Target BP with AOBP < 135/85

New thresholds/targets for the high risk patient post-SPRINT: *who does this apply to??*

- Clinical or sub-clinical cardiovascular disease

  OR

- **Chronic kidney disease** (non-diabetic nephropathy, proteinuria <1 g/d, *estimated glomerular filtration rate 20-59 mL/min/1.73m^2)

  OR

- †Estimated 10-year global cardiovascular risk ≥15%

  OR

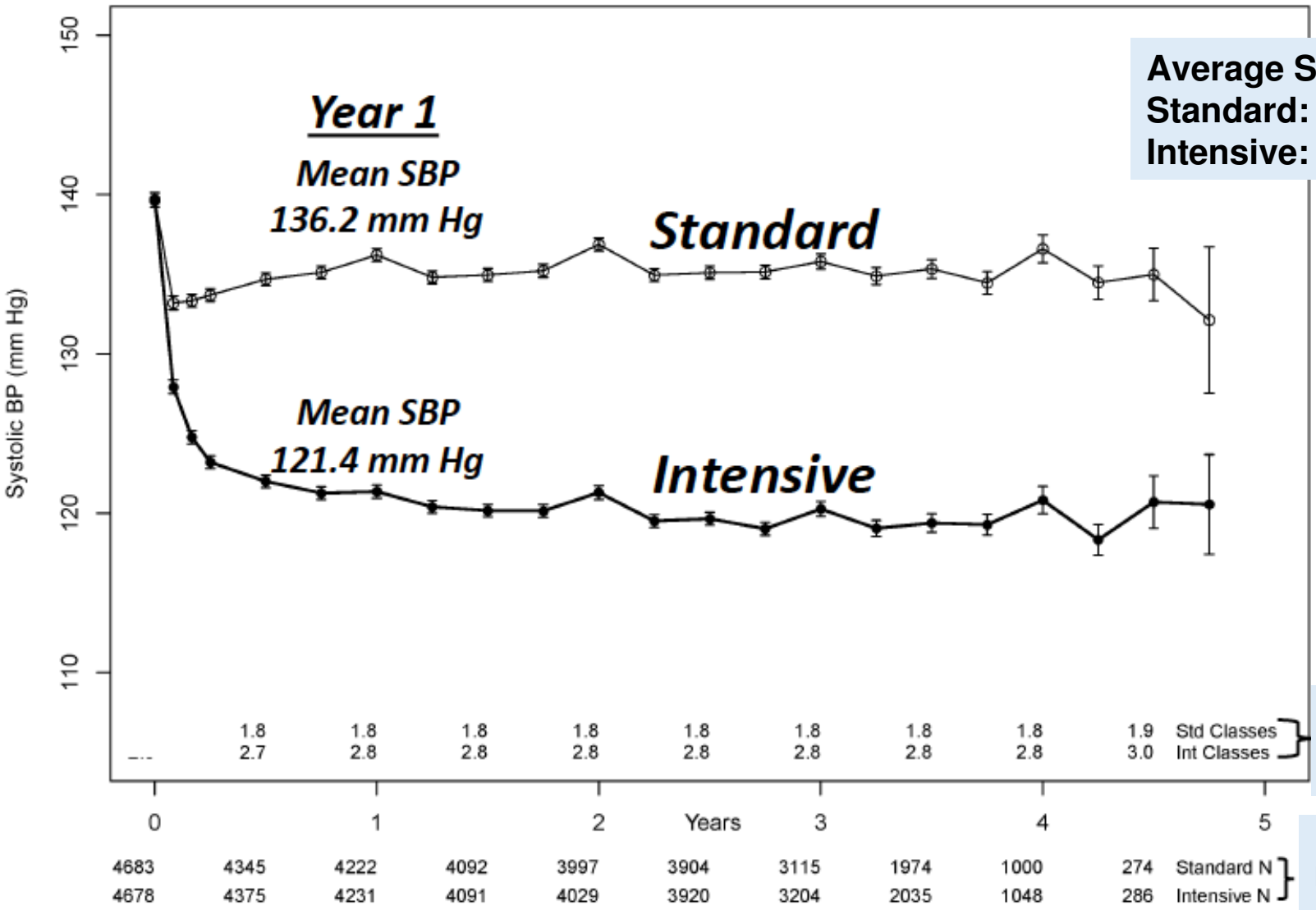
- **Age ≥ 75 years**

Patients with one or more clinical indications should consent to intensive management.

* Four variable MDRD equation

† Framingham Risk Score, D'Agastino, Circulation 2008

Systolic BP during follow up



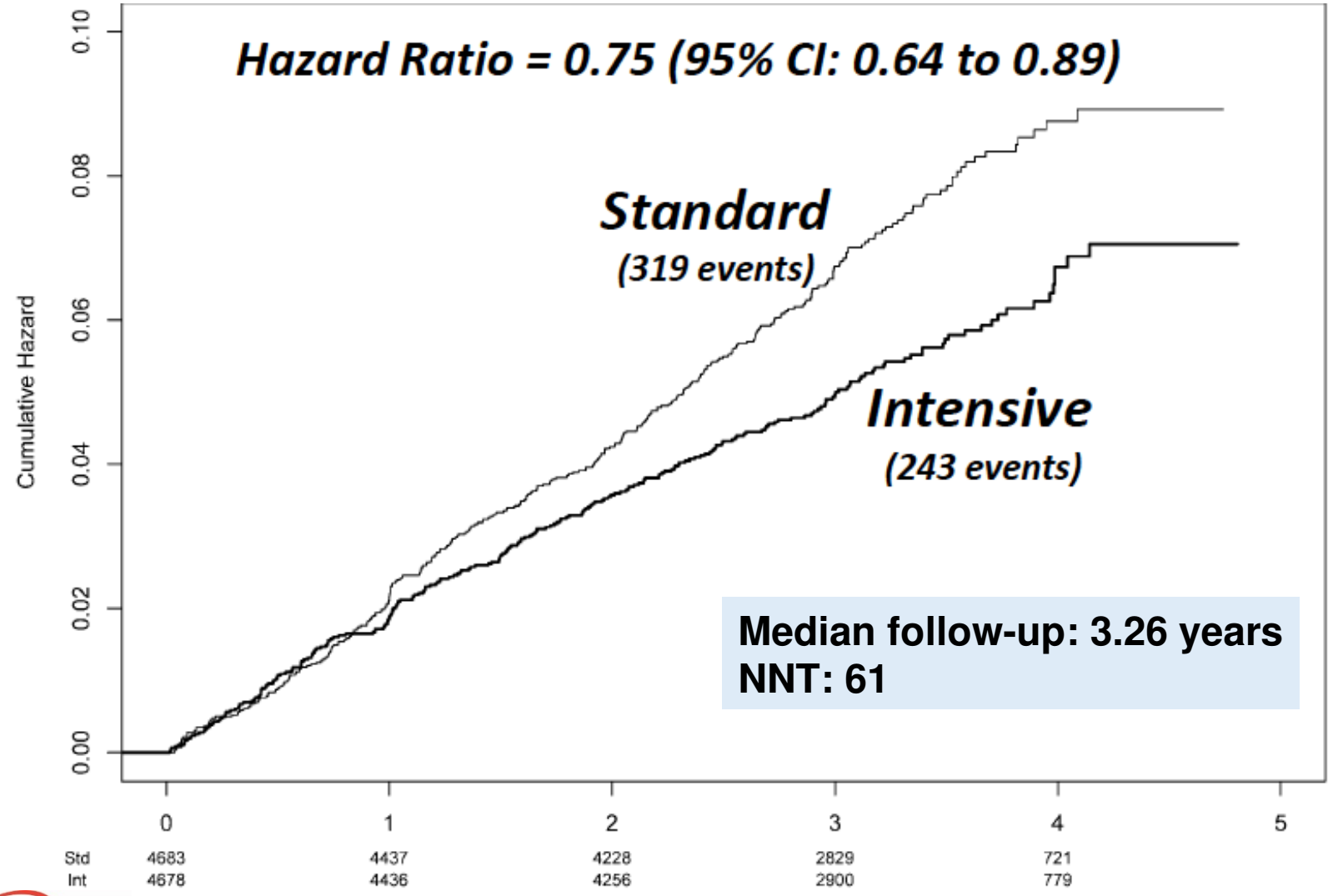
Average SBP:
Standard: 134.6 mm Hg
Intensive: 121.5 mm Hg

Average no. of anti-hypertensive meds

No. of participants

The SPRINT Research Group, NEJM, Nov 9th, 2015

Primary outcome – cumulative hazard



Median follow-up: 3.26 years
NNT: 61

SPRINT
Systolic Blood Pressure Intervention Trial

In Favor of ACEI/ARB with CCB/diuretic

2 key studies identified:

HOPE-3. N Engl J Med. 2016 26;374(21):2009-20
pivotal study demonstrating the superiority of an SPC vs. placebo
(ARB/diuretic)

ACCOMPLISH. N Engl J Med. 2008;359(23):2417-28.
demonstration of efficacy ACE-I/CCB SPC vs. active control

The NEW ENGLAND JOURNAL of MEDICINE

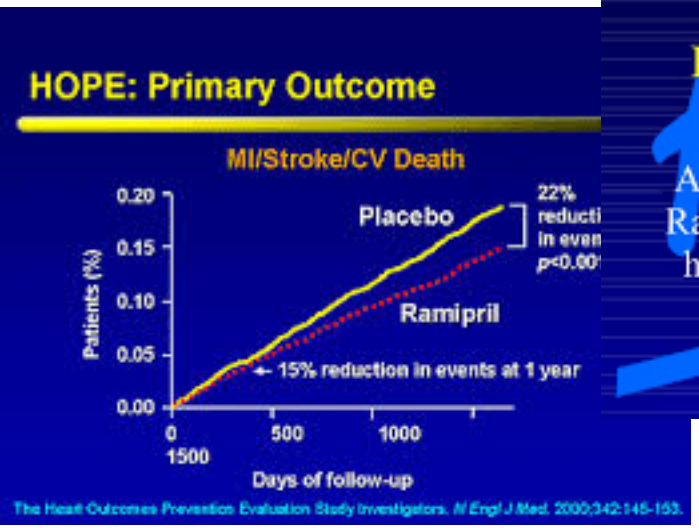
ESTABLISHED IN 1812 MAY 26, 2016 VOL. 374 NO. 21

Blood-Pressure Lowering in Intermediate-Risk Persons without Cardiovascular Disease

Eva M. Lonn, M.D., Jackie Bosch, Ph.D., Patricio López-Jaramillo, M.D., Ph.D., Jun Zhu, M.D., Lisheng Liu, M.D.,

- **Design:** 2x2 factorial RCT (double-blind)
- **Population:** intermediate-risk (no CVD); 22% had BP Rx at baseline; n=12 705
- **Intervention:** candesartan 16 mg/d plus HCTZ 12.5 mg/d vs. candesartan 16 mg/d plus placebo
- **1° outcomes:** overall, no significant differences in first (p=0.40) or the second coprimary outcomes (p=0.51)
  - coprimary #1: CV death, nonfatal MI, or nonfatal stroke
  - coprimary #2: #1 plus resuscitated cardiac arrest, HF, revascularization

Heart Outcomes Protection Evaluation



Hope

Heart Outcomes Prevention Evaluation Study

A large, simple, randomized trial of Ramipril and vitamin E in patients at high risk for cardiovascular events

Hope-Too

Hope-3

Population Health Research Institute

HEALTH THROUGH KNOWLEDGE

HOPE - 3

- 12,705 Median follow-up 5.6 years
- Men 55+ or women 65+ with one of:
  - Elevated waist/hip
  - Low HDL
  - Smoking
  - Dysglycemia
  - FHx of CVD
  - CKD stage 3
- Women age 60+ with 2 of these

HOPE - 3 BP

- Double blinded RCT
- Placebo controlled
- 228 centres in 21 countries
- 2 x 2 factorial design
- Fixed dose of Candesartan/HCTZ (16/12.5) or placebo
- Rosuvastatin 10 vs placebo

HOPE - 3

Rosuvastatin	Candesartan/HCTZ		Rosuvastatin Margins
	Active	Placebo	
Active	Rosuvastatin Active/ Candesartan/HCTZ Active n=3,180	Rosuvastatin Active/ Candesartan/HCTZ Placebo n=3,181	Rosuvastatin Active n=6,361
Placebo	Rosuvastatin Placebo/ Candesartan/HCTZ Active n=3,176	Rosuvastatin Placebo/ Candesartan/HCTZ Placebo n=3,168	Rosuvastatin Placebo n=6,344
Candesartan/HCTZ Margins	Candesartan/HCTZ Active n=6,356	Candesartan/HCTZ Placebo n=6,349	

HOPE - 3

Valsartan/HCT 12	Valsartan/HCT 12
Active	Placebo
n=6,356	n=6,349

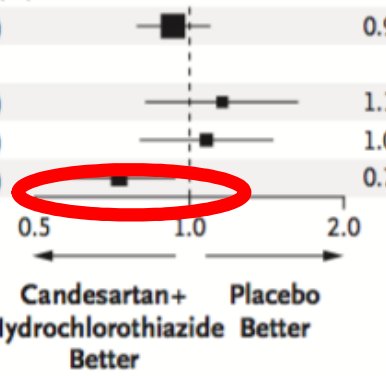
BP Change in HOPE - 3 BP

	Active-Placebo
Change from BL	6.0/3.0 mmHg

- 1/3 at baseline had a history of hypertension and 22% were on antihypertensives at baseline.
- Annual event rates were 0.8% vs 2.1% in ACCORD and 2.2% in SPRINT.

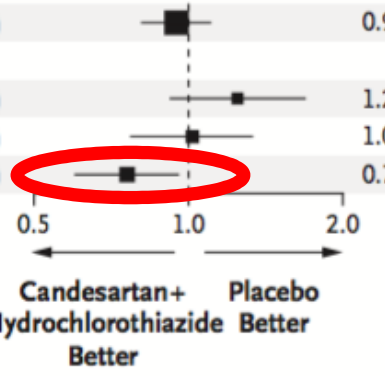
A First Coprimary Outcome

Subgroup	Mean Systolic Blood Pressure	Difference in Blood Pressure	Candesartan+ Hydrochlorothiazide	Placebo	Hazard Ratio (95% CI)	P Value for Trend
	mm Hg		*no. of events/total no. of participants (%)*			
Overall	138.1	6.0/3.0	260/6356 (4.1)	279/6349 (4.4)	0.93 (0.79–1.10)	—
Systolic blood pressure						0.02
≤131.5 mm Hg	122.2	6.1/3.1	70/2080 (3.4)	62/2122 (2.9)	1.16 (0.82–1.63)	
131.6–143.5 mm Hg	137.6	5.6/2.7	87/2120 (4.1)	81/2141 (3.8)	1.08 (0.80–1.46)	
>143.5 mm Hg	154.1	5.8/3.0	103/2156 (4.8)	136/2084 (6.5)	0.73 (0.56–0.94)	



B Second Coprimary Outcome

Subgroup	Mean Systolic Blood Pressure	Difference in Blood Pressure	Candesartan+ Hydrochlorothiazide	Placebo	Hazard Ratio (95% CI)	P Value for Trend
	mm Hg		*no. of events/total no. of participants (%)*			
Overall	138.1	6.0/3.0	312/6356 (4.9)	328/6349 (5.2)	0.95 (0.81–1.11)	—
Systolic blood pressure						0.009
≤131.5 mm Hg	122.2	6.1/3.1	90/2080 (4.3)	74/2122 (3.5)	1.25 (0.92–1.70)	
131.6–143.5 mm Hg	137.6	5.6/2.7	99/2120 (4.7)	98/2141 (4.6)	1.02 (0.77–1.34)	
>143.5 mm Hg	154.1	5.8/3.0	123/2156 (5.7)	156/2084 (7.5)	0.76 (0.60–0.96)	



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 4, 2008 VOL. 359 NO. 23

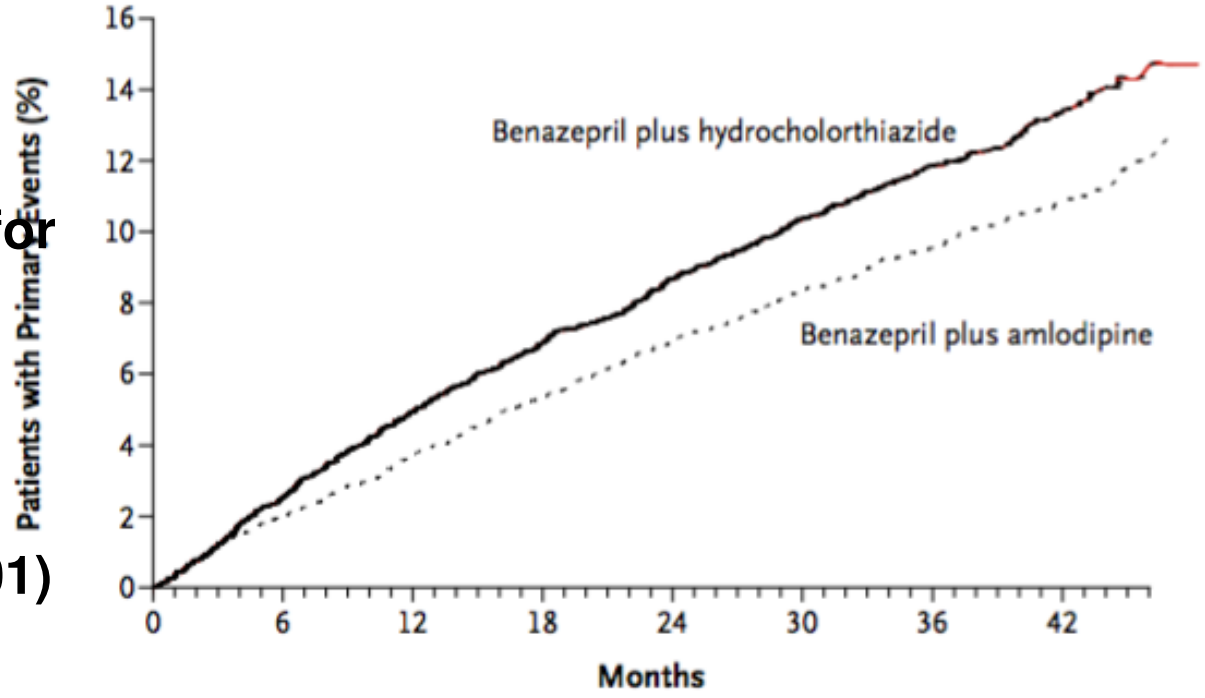
Benazepril plus Amlodipine or Hydrochlorothiazide for Hypertension in High-Risk Patients

Kenneth Jamerson, M.D., Michael A. Weber, M.D., George L. Bakris, M.D., Björn Dahlöf, M.D., Bertram Pitt, M.D.,

- **Design:** RCT (double-blind)
- **Population:** high-risk; 97% had BP Rx at baseline; n=11 506
- **Intervention:** benazepril plus amlodipine vs. benazepril plus HCTZ
- **1° outcome:** CV death, nonfatal MI, nonfatal stroke, hosp. for angina, resuscitation after cardiac arrest, and coronary revasc.
  - Terminated early after mean follow-up of 36 m

ARR = 2.2%
(11.8% vs. 9.6% for ACEI-HCTZ vs. ACEI-CCB)

RRR = 19.6%
(HR, 0.80; p<0.001)



No. at Risk							
Benazepril plus amlodipine	5512	5317	5141	4959	4739	2826	1447
Benazepril plus hydrochlorothiazide	5483	5274	5082	4892	4655	2749	1390

Figure 2. Kaplan–Meier Curves for Time to First Primary Composite End Point.

There were 552 patients with events (9.6%) in the benazepril–amlodipine group, as compared with 679 patients with events (11.8%) in the benazepril–hydrochlorothiazide group. The relative risk reduction was 20% (hazard ratio, 0.80; 95% CI, 0.72 to 0.90; P<0.001).

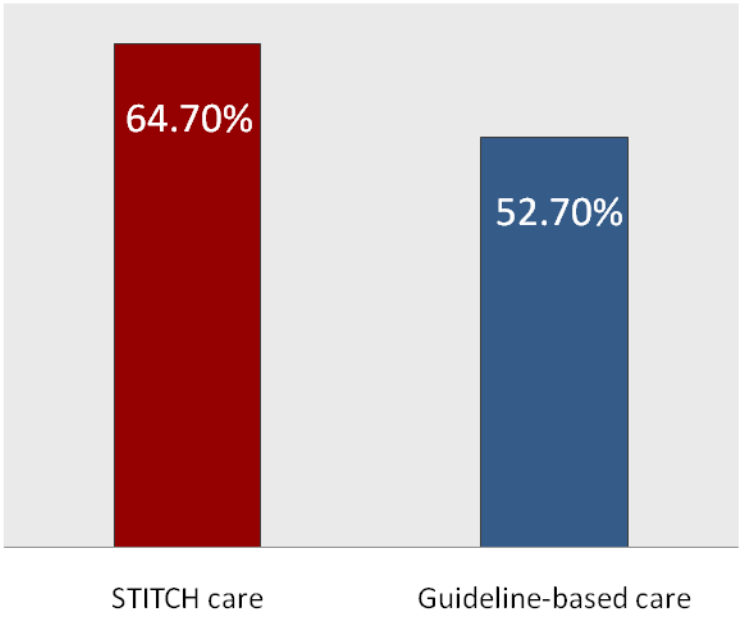
- Benazepril–amlodipine superior to benazepril-HCTZ in reducing MACE

Initial SPC therapy improves BP control rates: STITCH Study

- Cluster randomized controlled trial - hypertension in family practices
- Simplified algorithm featuring initial therapy with **low-dose antihypertensive single drug combination**, compared with conventional guideline-based care
- **Low-dose - by splitting usual starting dose in half**
- Practitioners randomly assigned to use STITCH care or usual stepwise management according to CHEP guidelines

STITCH study: Results

BP targets achieved at 6 months

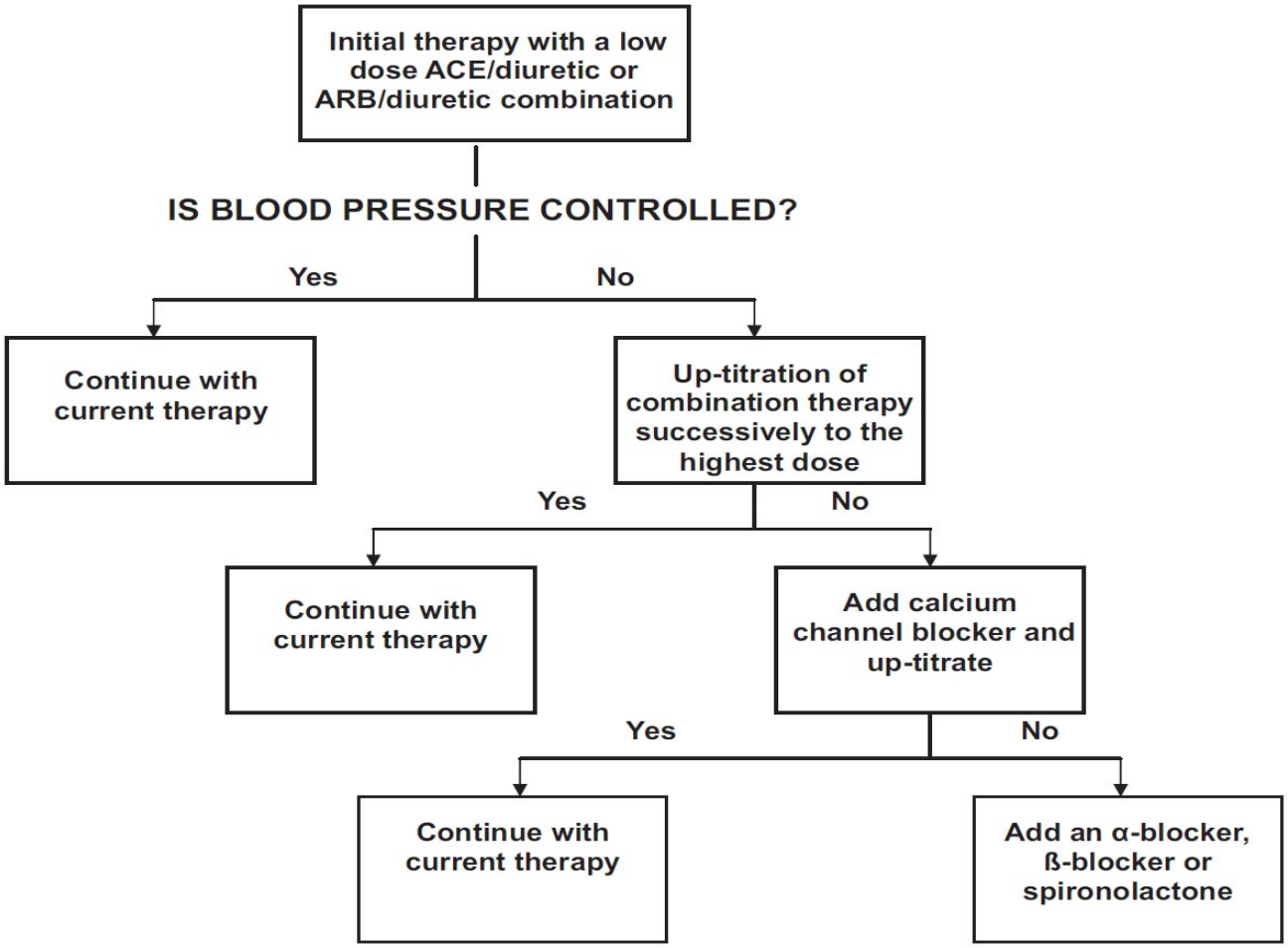


e: 12.0%

e: 23%

STITCH algorithm: initiating RX with a low dose SPC

(Simplified Treatment Intervention To Control Hypertension)



Feldman RD, et al. *Hypertension.* 2009;53(4):646-653.

2017 Hypertension Canada Guidelines

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- Adopting healthy behaviours is integral to the management of hypertension
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Thank you!

Diagnosis of renovascular hypertension-1

Patients with hypertension and presenting with at least one of the following clinical clues should be investigated for fibromuscular dysplasia (FMD) related renal artery stenosis (RAS) (Grade D):

- Age < 30 years;
- Failure to reach BP target despite use of 3 or more drugs;
- Significant (>1.5cm), unexplained asymmetry in kidney sizes;
- Abdominal bruit without apparent atherosclerosis;
- FMD in another vascular territory;
- Positive family history for FMD.

Diagnosis of renovascular hypertension-2

In patients with confirmed renal FMD (Grade D):

i. Screening for cervicocephalic lesions and intracranial aneurysm is recommended.
ii. Screening for FMD in other vascular beds in the presence of suggestive symptoms is recommended.

The following tests are recommended to screen for renal FMD (both with similar sensitivity and specificity) (Grade D):
magnetic resonance angiography OR
computed tomography angiography.

2017 Hypertension Canada Guidelines

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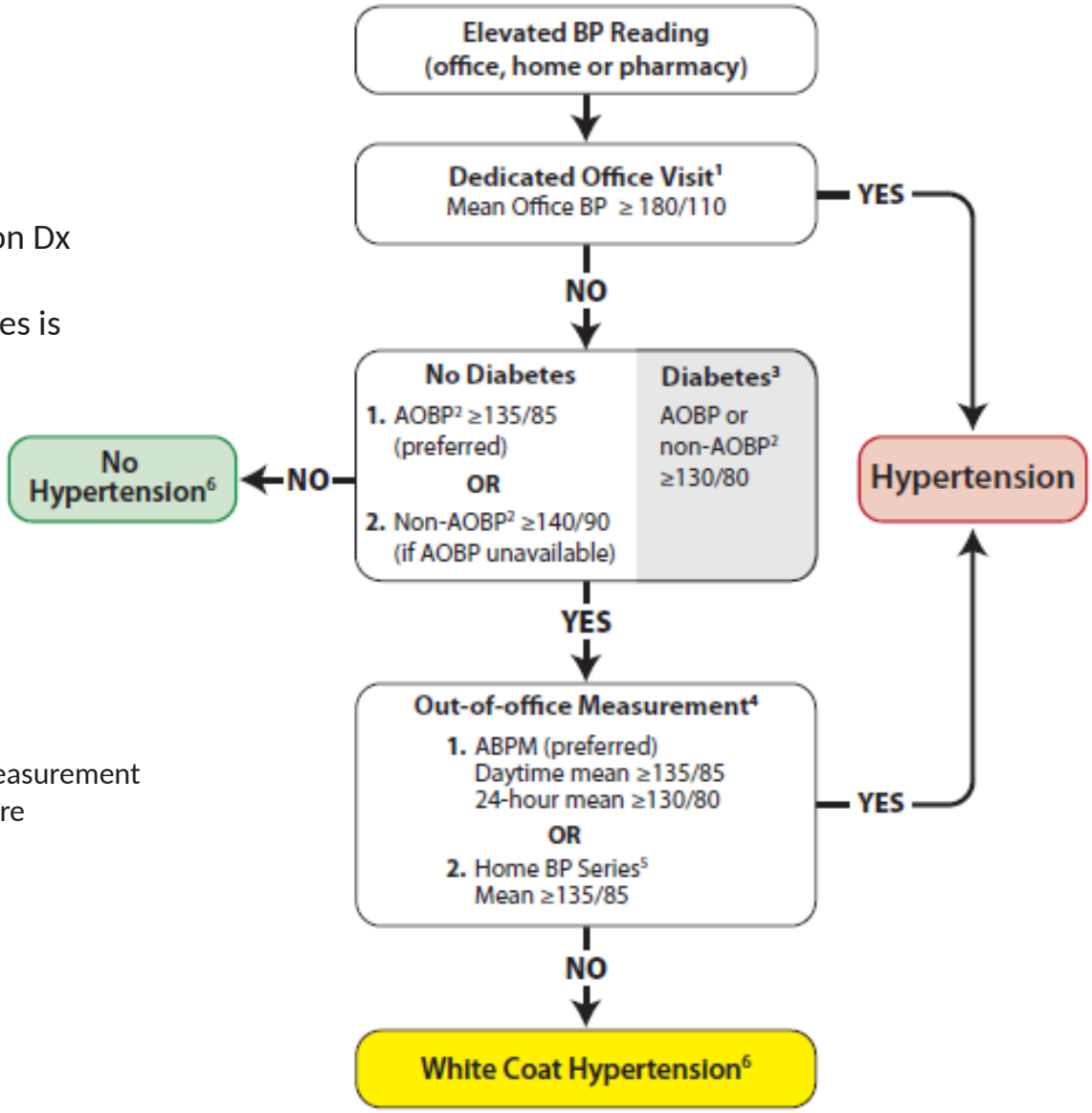
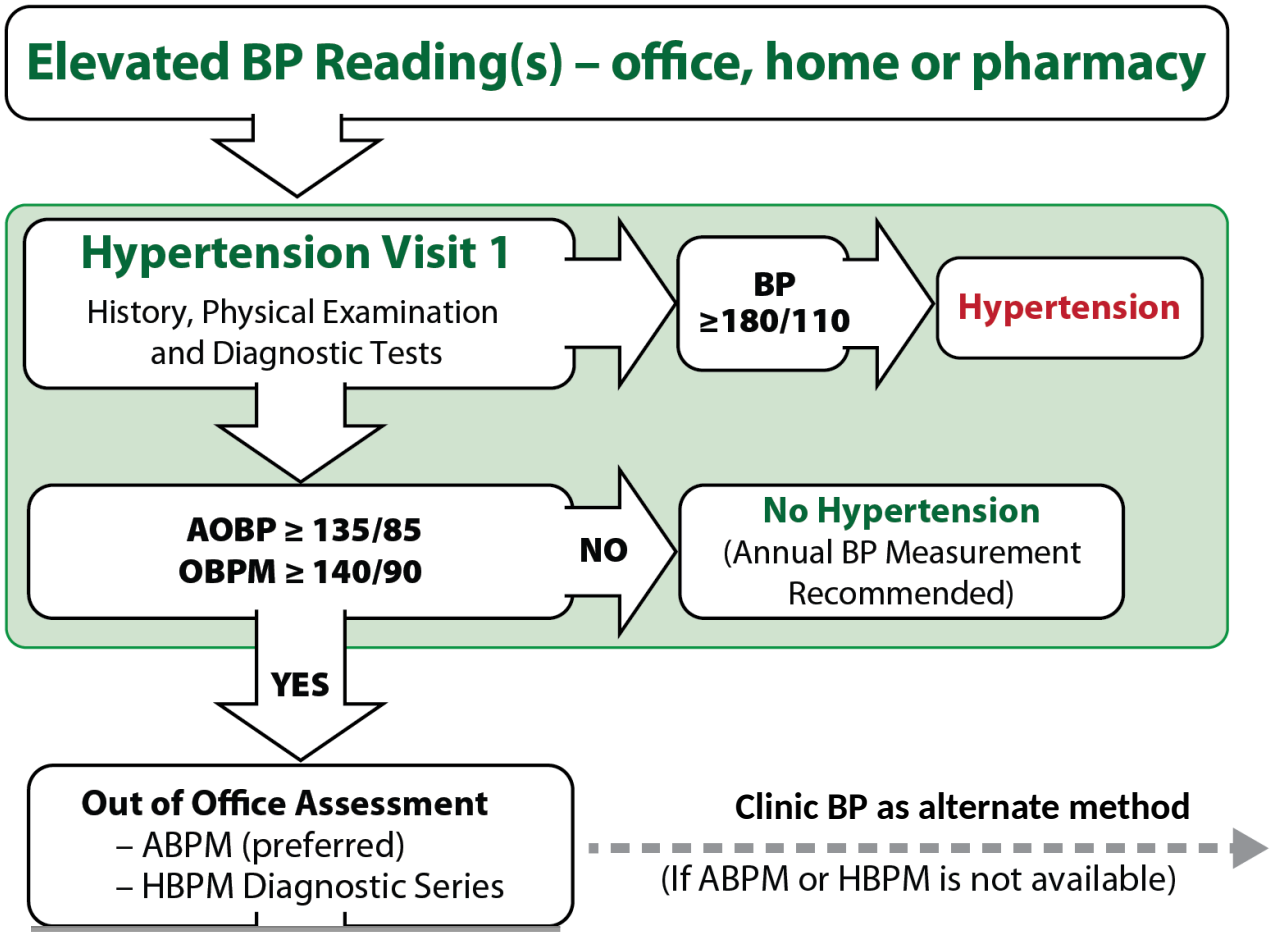
Hypertension Diagnostic Algorithm

1. **Out of office** assessment is the preferred means of hypertension Dx
2. **Measurement using electronic** (oscillometric) upper arm devices is preferred over auscultation



ABPM: Ambulatory Blood Pressure Measurement
AOBP: Automated Office Blood Pressure

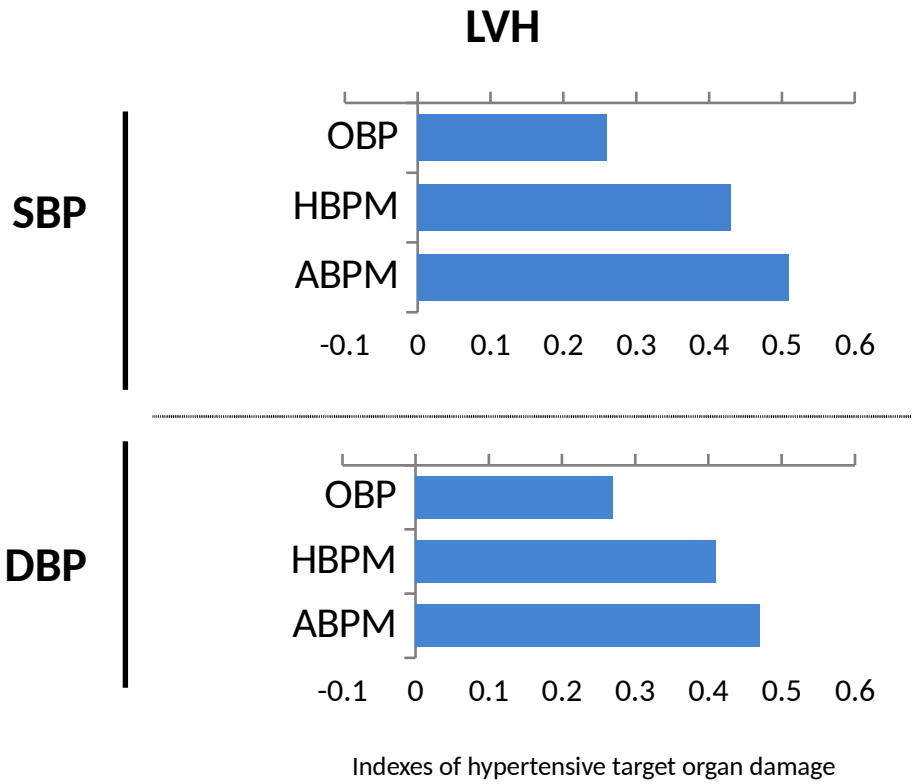
Out of office assessment is the preferred means of diagnosing hypertension

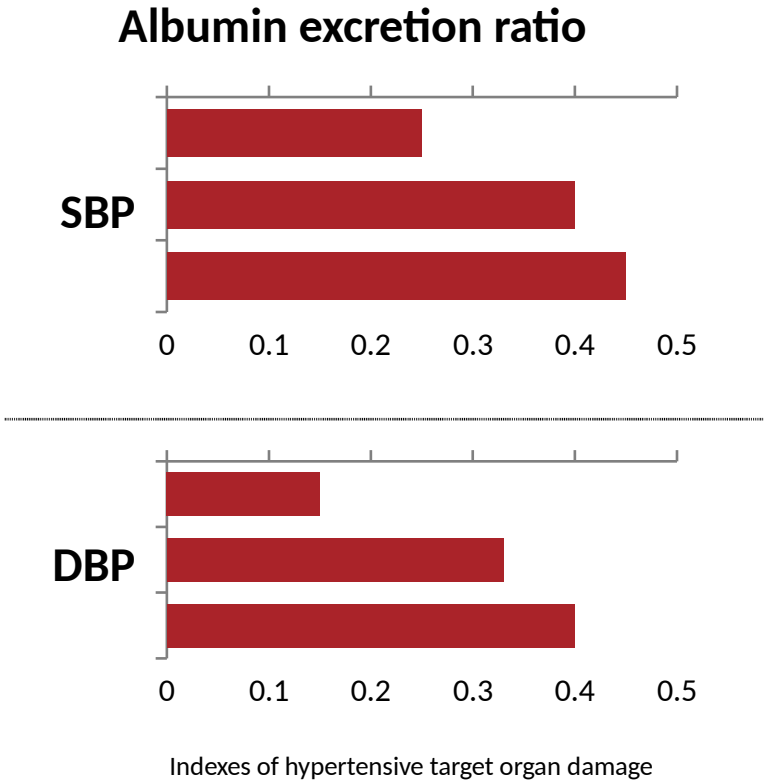


Out-of-Office BP Measurements

- ABPM has better predictive ability than OBPM and is the recommended out-of-office measurement method.
- HBPM has better predictive ability than OBPM and is recommended if ABPM is not tolerated, not readily available or due to patient preference.
- Identifies white coat hypertension and masked hypertension.

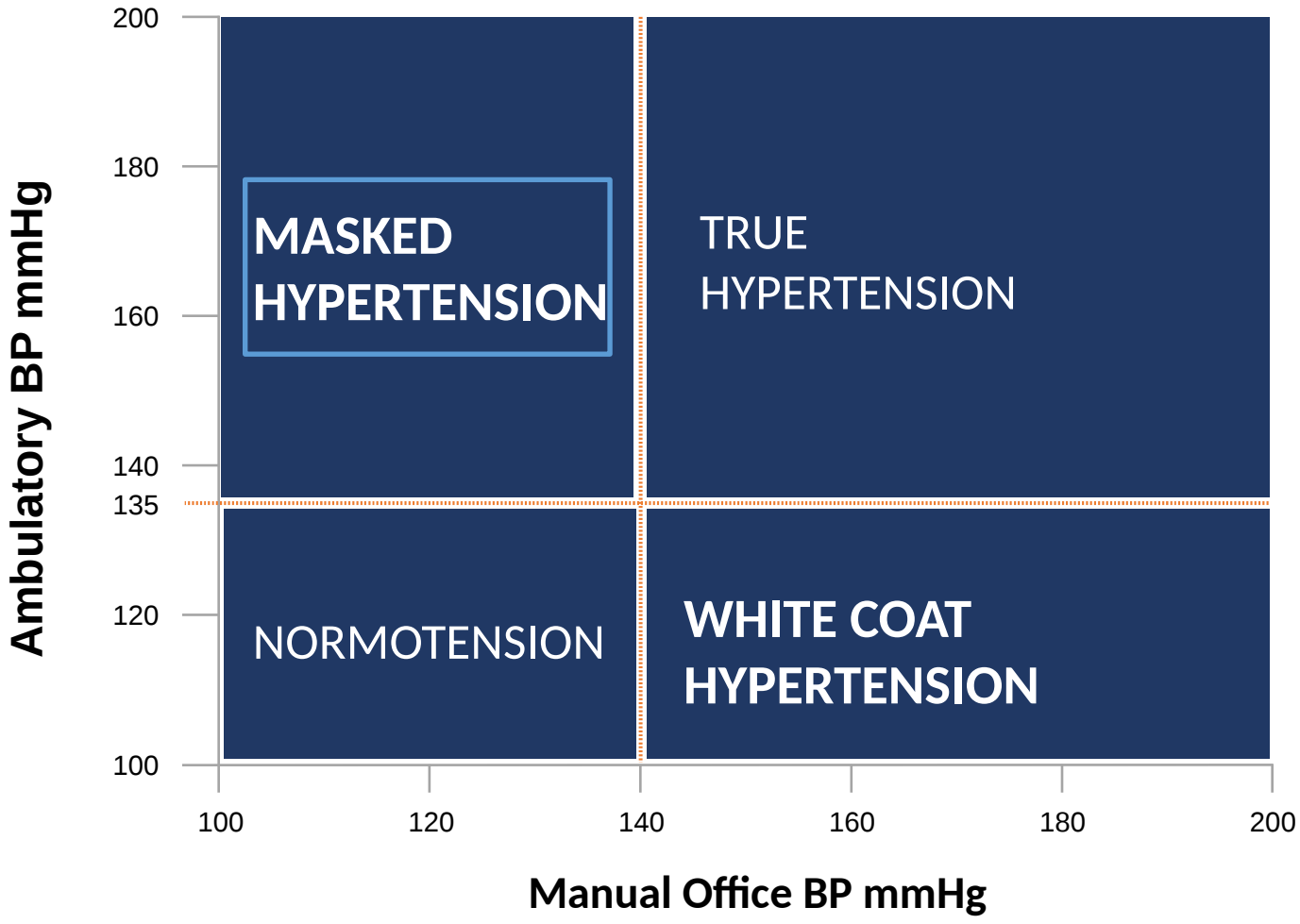
Out-of-Office BP Measurements are More Highly Correlated with BP-Related Risk





Value of Home Blood Pressures as Predictor of Target Organ Damage in Mild Arterial Hypertension
Mulè G. et al. *J Cardiovasc Risk* 2002;9:123-9.

White Coat and Masked Hypertension



Derived from Pickering *et al. Hypertension* 2002: 40: 795-796.

Criteria for the Diagnosis of Masked Hypertension

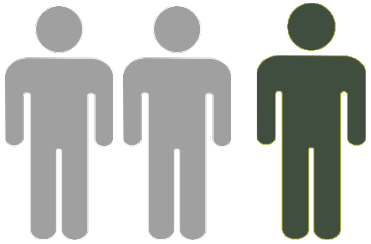
	BP (mm Hg)
Office BP Automated OBP	< 140/90 135/85
Awake Ambulatory	≥ 135/85
24-hour Ambulatory BP	≥ 130/80

Prevalence of Masked Hypertension

about
10%
in the general population

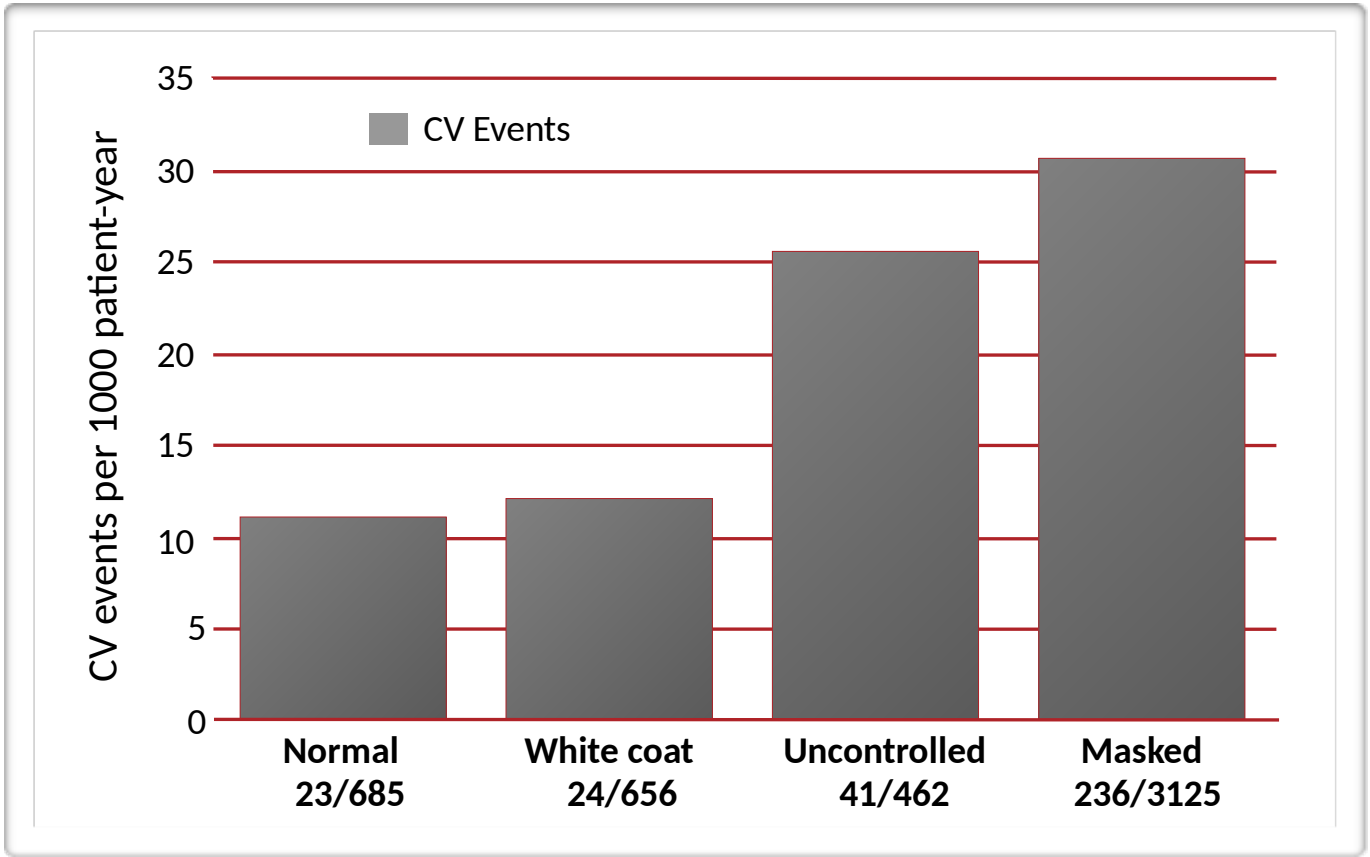
about
30%
in treated hypertensive patients*

higher
in patients with
diabetes
and
chronic kidney
disease patients



One out of three treated hypertensive patients has masked hypertension

The Prognosis of *White Coat* and *Masked* Hypertension



Okhubo et al. *J. Am. Coll. Cardiol.* 2005;46;508-515

Office BP Measurement

New in 2016

- Automated office blood pressure (AOBP) is the preferred method of performing in-office BP measurement.

Automated Office (unattended, AOBP)

Oscillometric (electronic)

Automated Office BP Measurement

- More closely approximates ABPM than routine office BPs (mitigates white coat effect).

Beckett L et al *, BMC Cardiovasc. Disord. 2005; 5: 18;* ***Myers MG et al****, J. Hypertens. 2009; 27: 280;* ***Myers MG, et al****. BMJ 2011; 342: d286.*

- Is more predictive of end organ damage (LVMI, proteinuria and cIMT), similar to ABPM

Campbell NRC, et al*. J Hum Hypertens 2007;21:588-90;* ***Andreadis EA, et al****. Am J Hypertens 2011;24:661-6;* ***Andreadis EA, et al.*** *Am J Hypertens 2012;25:969-73.*

2017 Hypertension Canada Guidelines

What's still important?

- The diagnosis of hypertension should be based on **out-of-office** measurements
- **The threshold and target blood pressures are lower in those at greater risk**
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Usual Office BP Thresholds for Initiation of Pharmacological Treatment

Population	SBP	DBP
High Risk (SPRINT population)	≥130	NA
Diabetes	≥130	≥80
Moderate-to-high risk (TOD or CV risk factors)*	≥140	≥90
Low risk (no TOD or CV risk factors)	≥160	≥100

TOD = target organ damage

*AOBP threshold ≥135/85

Recommended Office BP Treatment Targets

Treatment consists of health behaviour ± pharmacological management

Population	SBP	DBP
High Risk	≤120	NA
Diabetes	< 130	< 80
All others*	< 140	< 90

* Target BP with AOBP < 135/85

New Guideline Post-SPRINT

New 2016

For high-risk patients, aged ≥ 50 years, with systolic BP levels >/=130 mm Hg, intensive management to target a systolic BP </=120 mm Hg should be considered.

Intensive management should be guided by automated office BP measurements.

Patient selection for intensive management is recommended and caution should be taken in certain high-risk groups.

New Thresholds/Targets for the High Risk Patient Post-SPRINT: *who does this apply to??*

- Clinical or sub-clinical cardiovascular disease

  OR

- Chronic kidney disease (non-diabetic nephropathy, proteinuria <1 g/d, *estimated glomerular filtration rate 20-59 mL/min/1.73m^2)

  OR

- †Estimated 10-year global cardiovascular risk ≥15%

  OR

- Age ≥ 75 years

Patients with one or more clinical indications should consent to intensive management.

* Four variable MDRD equation

† Framingham Risk Score, D'Agastino, Circulation 2008

New Thresholds/Targets for the High Risk Patient Post-SPRINT: *who does this NOT apply to??*

Limited or No Evidence:

- Heart failure (EF <35%) or recent MI (within last 3 months)
- Indication for, but not currently receiving a beta-blocker
- Frail or institutionalized elderly

Inconclusive Evidence:

- Diabetes mellitus
- Prior stroke
- eGFR < 20 ml/min/1.73m^2

Contraindications:

- Patient unwilling or unable to adhere to multiple medications
- Standing SBP <110 mmHg
- Inability to measure SBP accurately
- Known secondary cause(s) of hypertension

2017 Hypertension Canada Guidelines

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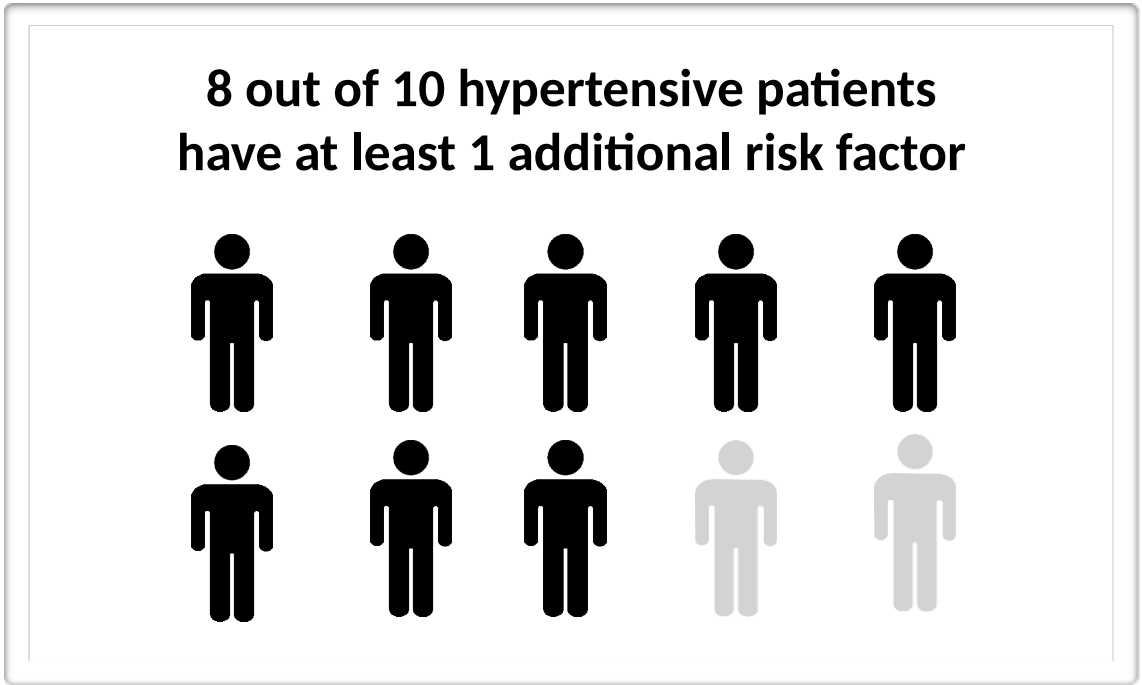
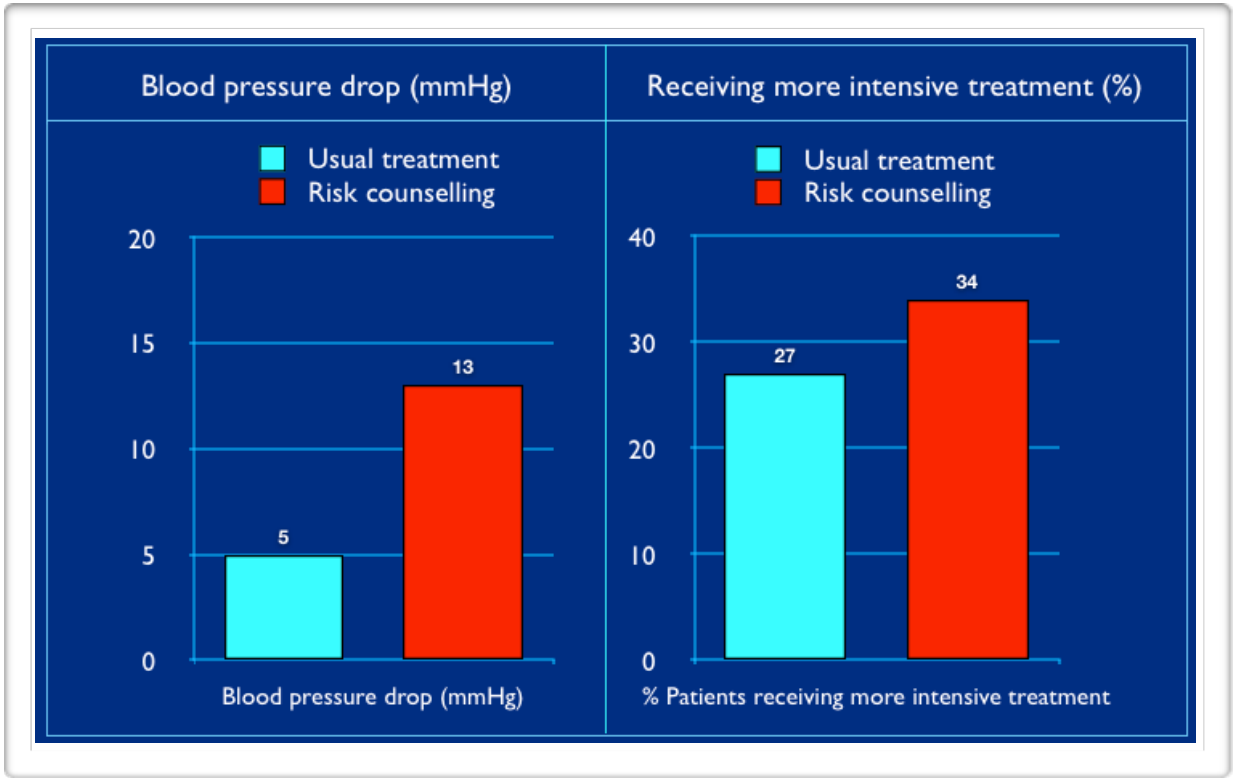
Cardiovascular Risk Factors in Hypertensive Patients



Gee ME, Bienek A, McAlister FA, et al. Factors Associated With Lack of Awareness and Uncontrolled High Blood Pressure Among Canadian Adults With Hypertension. Can J Cardiol. 2012;28:375-382.

Impact of Discussing CAD Risk for Patients With Hypertension

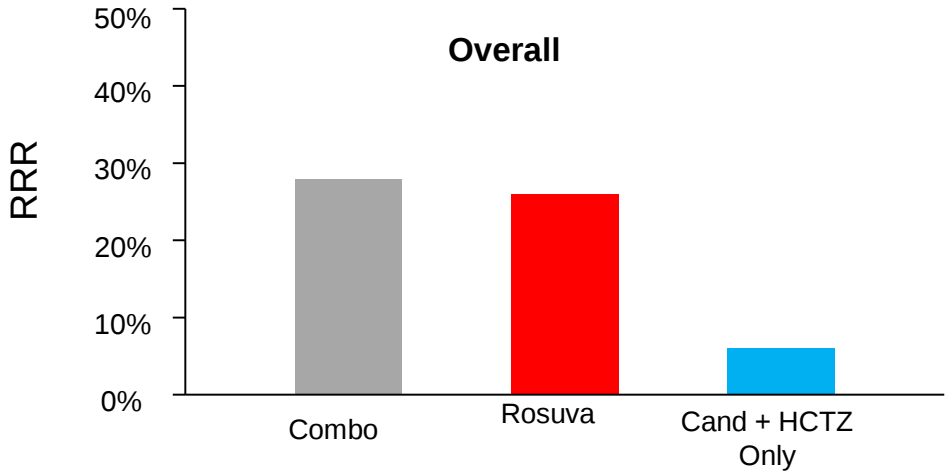
Informing Patients of Their Global Risk improves BP Control
Cardiovascular Age™ www.myhealthcheckup.com

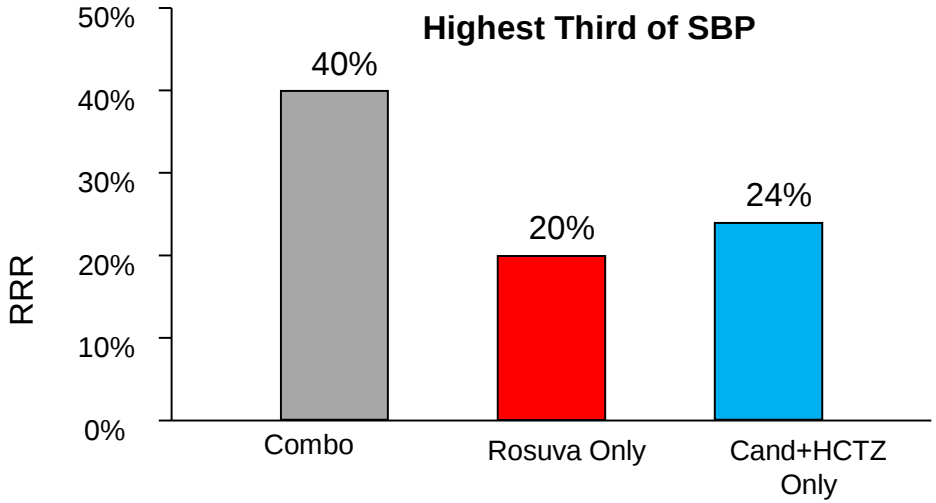


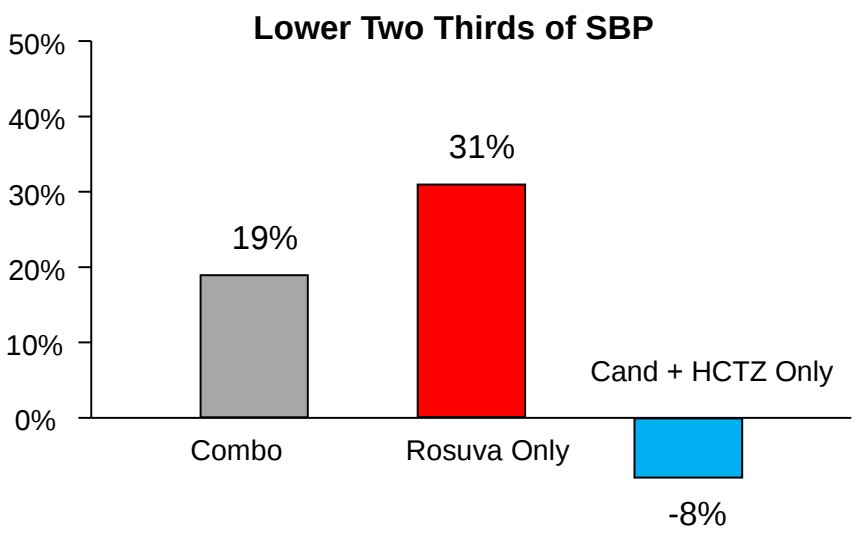
Grover SA, et al. J Gen Intern Med 2009;24(1);33-9.

RRR of Combination and Each Intervention vs Double Placebo

Co-Primary 2







Vascular Protection: Statins for High Risk Hypertensive Patients

Statins are recommended in high risk hypertensive patients based on having established atherosclerotic disease or at least 3 of the following:

- Male
- 55 y or older
- Smoking
- Type 2 Diabetes
- Total-C/HDL-C ratio of 6 or higher
- Premature Family History of CV disease
- Previous Stroke or TIA
- LVH
- ECG abnormalities
- Albuminuria or CKD
- Peripheral Vascular Disease

The Treatment of Hypertension is All About Vascular Protection

Not discussed at Rec Committee ,but HOPE 3 could be added as per extra slide at the end

Vascular protection: ASA for Hypertensive Patients

Low dose ASA in hypertensive patients

is recommended for patients ≥50 years

Caution should be exercised if BP is not controlled.

Hansson L, Zanchetti A, Carruthers SG, et al. Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: principal results of the Hypertension Optimal Treatment (HOT) randomised trial. Lancet 1998;351:1755-1762.

Strong Evidence for Vascular Protection: Smoking Cessation

- **Tobacco use status** of all patients should be updated on a regular basis and health care providers should clearly advise patients to quit smoking.
- **Advice** in combination with pharmacotherapy (e.g., varenicline, bupropion, nicotine replacement therapy) should be offered to all smokers with a goal of smoking cessation.

2017 Hypertension Canada Guidelines

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Health Behaviour Management

Intervention	Target
Reduce foods with added sodium	→ 2000 mg /day
Weight loss	BMI <25 kg/m^2
Alcohol restriction	≤ 2 drinks/day
Physical activity	30-60 minutes 4-7 days/week
Dietary patterns	DASH diet
Smoking cessation	Smoke-free environment
Waist circumference	Men < 102 cm Women < 88 cm
Potassium supplementation	**NEW RECOMMENDATION IN 2016**

New 2016

Health Behaviours: potassium intake

- In patients *not* at risk of hyperkalemia, increase dietary potassium intake to reduce blood pressure.

2017 Hypertension Canada Guidelines

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Adherence in Hypertensive Patients

Adherence Can Be Improved by a Multi-Pronged Approach

- Educate patients and patients' families about their disease/treatment regimens verbally and in writing
- Use an interdisciplinary care approach coordinating with work-site health care givers and pharmacists if available
- Healthcare practitioner-based telephone contact, particularly, over the first three months of therapy
- Encourage greater patient responsibility/autonomy in regular monitoring of their blood pressure

Adherence in Hypertensive Patients-II

Adherence Can Be Improved by a Multi-Pronged Approach

- Assess adherence to pharmacological and health behaviour therapies at every visit
- Teach patients to take their pills on a regular schedule associated with a routine daily activity e.g. brushing teeth.
- Simplify medication regimens using long-acting once-daily dosing
- Utilize single pill combinations
- Utilize unit-of-use packaging e.g. blister packaging

2017 Hypertension Canada Guidelines

What's new?

- **New first line therapy guidelines**: i) Single pill combinations have been added as a recommended first line treatment (regardless of the extent of BP elevation) and ii) Longer acting (thiazide-thiazide-like) diuretics are preferred vs. shorter acting
- ***Updating*** the management of patients with hypertension secondary to renal artery stenosis
- ***New*** guidelines on the diagnosis and management of hypertension in pediatric patients ***(NOT the focus of this presentation)***

2017 Hypertension Canada Guidelines

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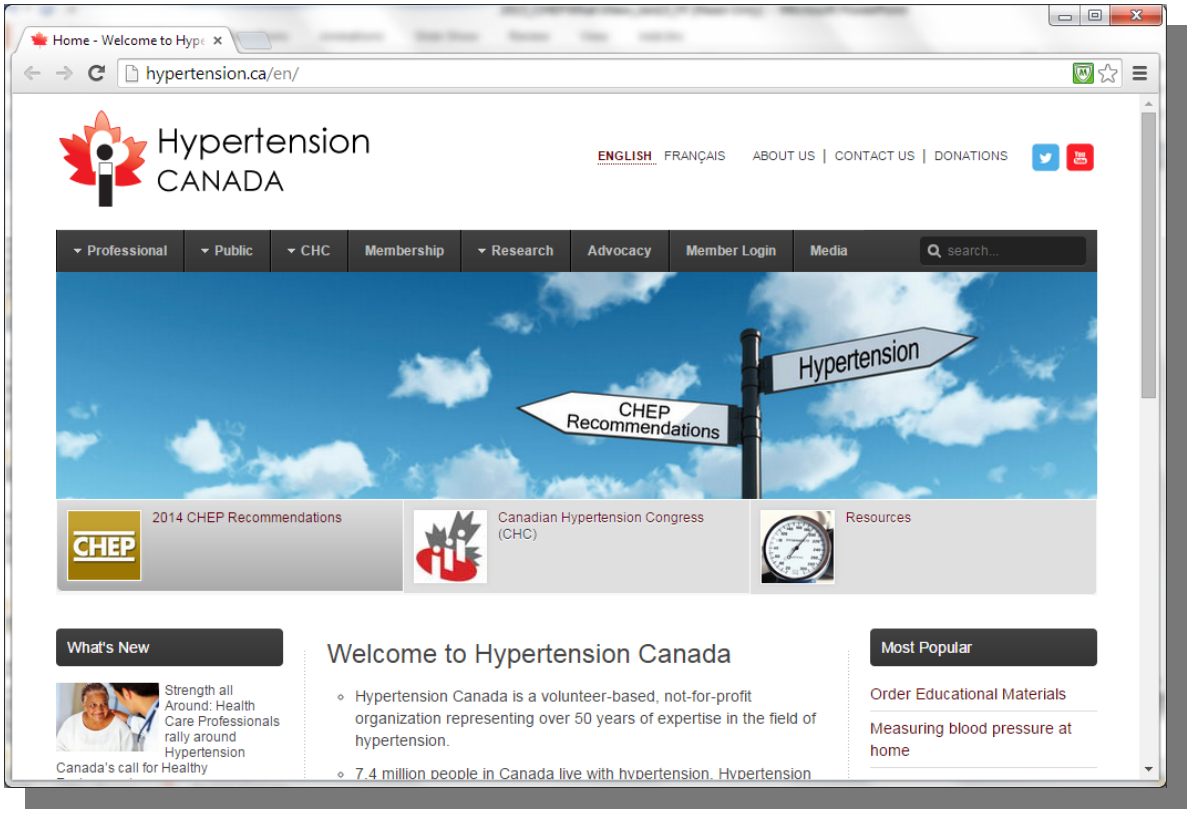
hypertension.ca



For patients:

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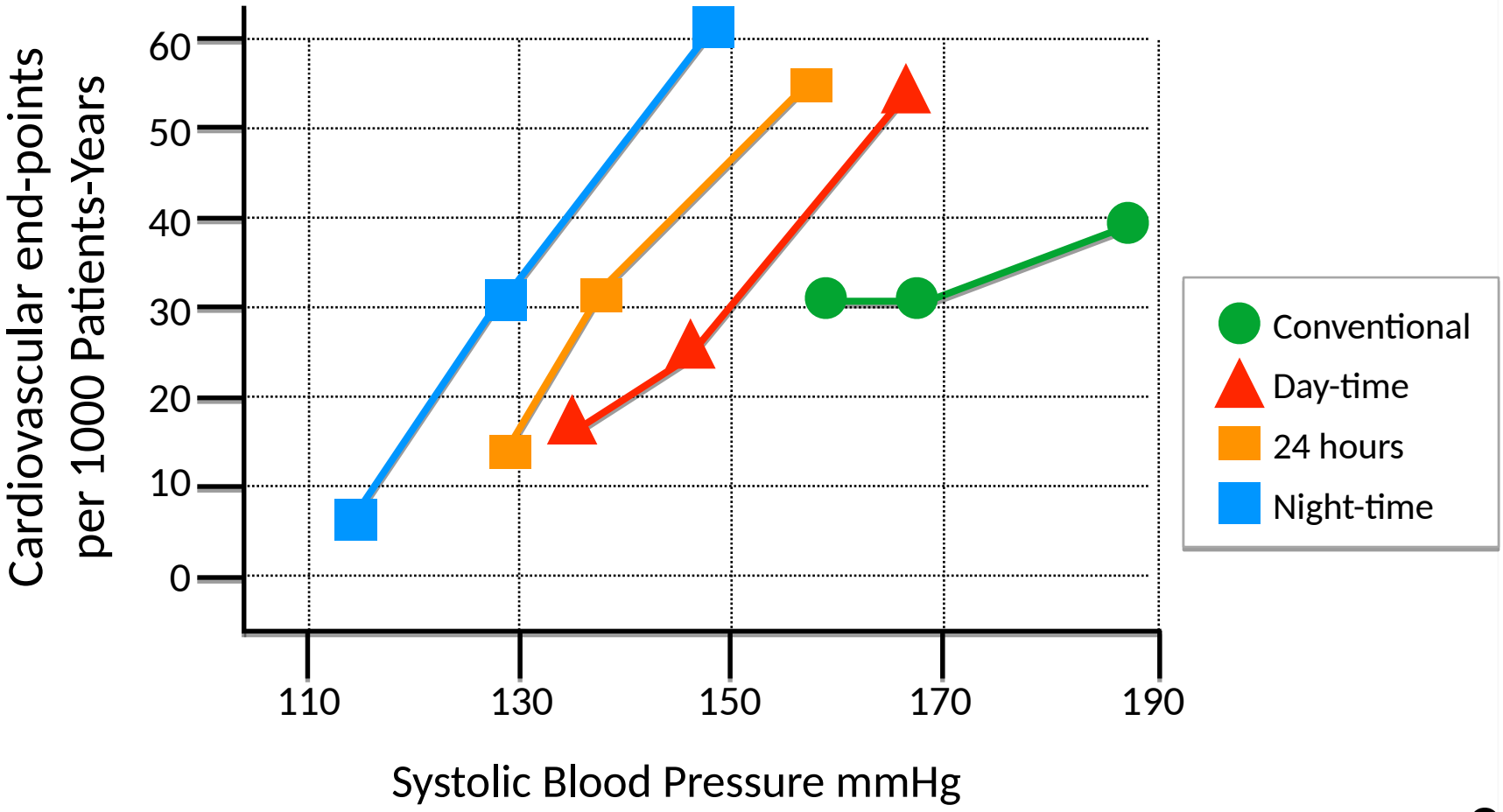
For professionals:

- Accredited 15.5 hour interdisciplinary training program
- Free monthly news updates, featured research and educational resources
- Become a member for special privileges and savings

Backup Slides

Incidence of cardiovascular end-points in tertiles of systolic BP at entry (placebo group)



Syst-Eur Sub-study; Staessen et al, 1999

AOBP More Closely Approximates ABP Than Routine Office BP

	Mean blood pressure* (mmHg)		
	Centre for Studies in Primary Care[1]	ABPM referral unit[2]	CAMBO trial[3]
Routine manual office BP	151/83	152/87	150/81
Automated office BP	140/80	132/75	135/77
Awake ambulatory BP	142/80	134/77	133/74

* *The automated office blood pressure (BP) and awake ambulatory BP were similar, and both were lower than the routine manual BP obtained in community practice.*

1. *Beckett L et al , BMC Cardiovasc. Disord. 2005; 5: 18.* **2.** *Myers MG et al, J. Hypertens. 2009; 27: 280.* **3.** *Myers MG, et al. BMJ 2011; 342: d286.*

Daytime **ambulatory and well-performed office based automated measures are similar**

		Type of Blood Pressure Measurement (mm Hg)			
Study, First Author	N	Routine Clinical Practice	Research Quality Office	Automated Office	Mean Awake Ambulatory
Myers[7]	147	146/87	140/83	…	132/78
Brown[8]	611	161/95	152/85	…	139/82
Myers[9]	309	152/87	140/80	132/75	134/77
Graves[10]	104	152/84	138/74	136/79	…
Gustavsen[11]	420	165/104	156/100	…	147/96
Beckett[12]	481	151/83	…	140/80	142/80
Dawes[13]	5918	164/96	…	…	149/90

Myers MG. Clin Exp Pharmacol Physiol 2014;41:46-53
Myers MG, et al. Hypertension 2010;55:195-200