2016
Hypertension Canada CHEP Guidelines for the Management of Hypertension

What's new in the treatment of hypertension?
What's still really 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 recommendations involving clinical medicine are based on evidence that was vetted by the Canadian Hypertension Education Program. The presentation has been developed for dissemination by Hypertension Canada.

Hypertension Canada

Mission:

- Advancing health through the prevention and control of high blood pressure and its complications.

Vision:

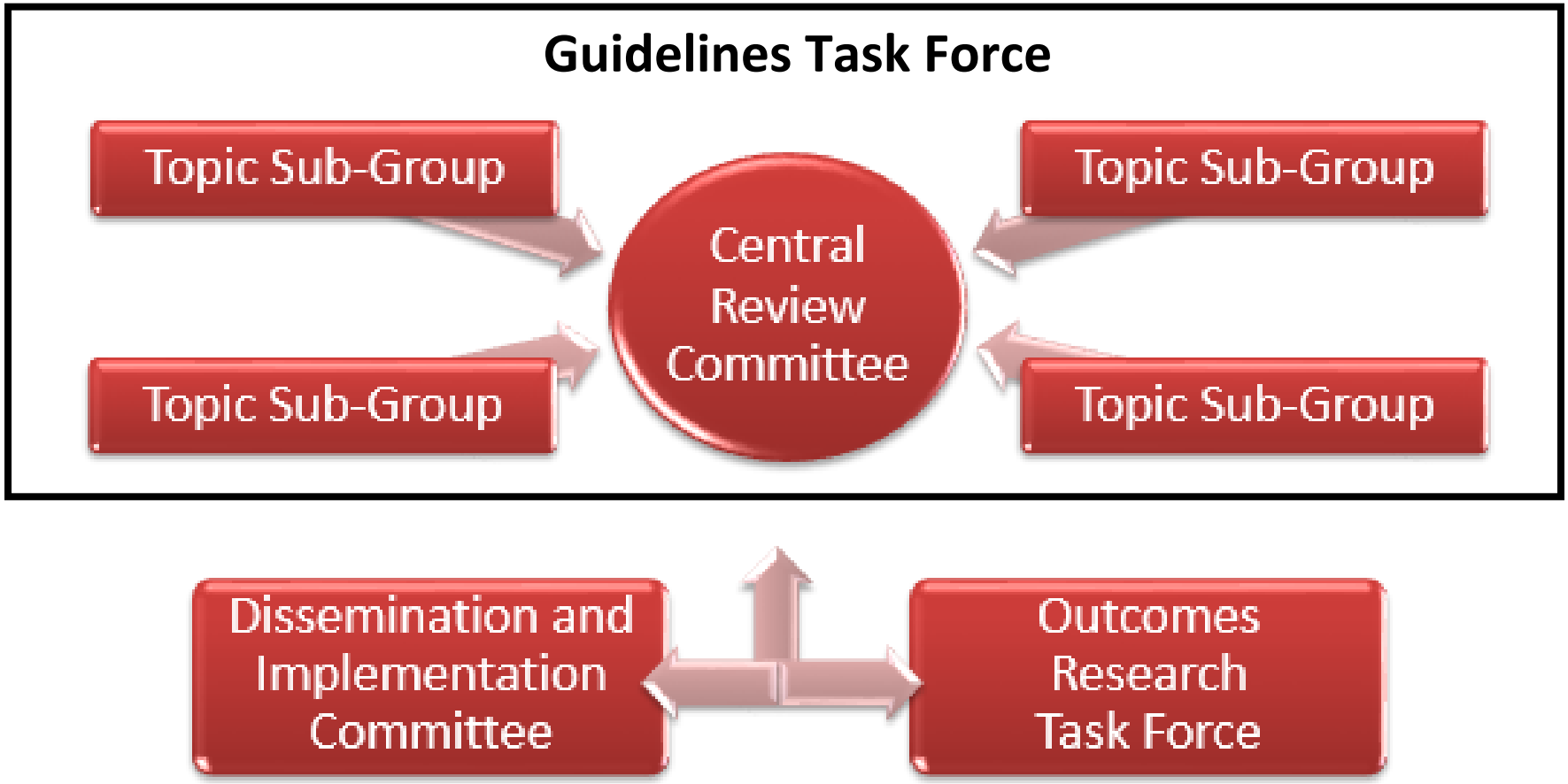
- Canadians will have the healthiest blood pressure in the world.

Evidence-based Annual Guidelines

- Canada has the world's highest reported national blood pressure control rates
- CHEP 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

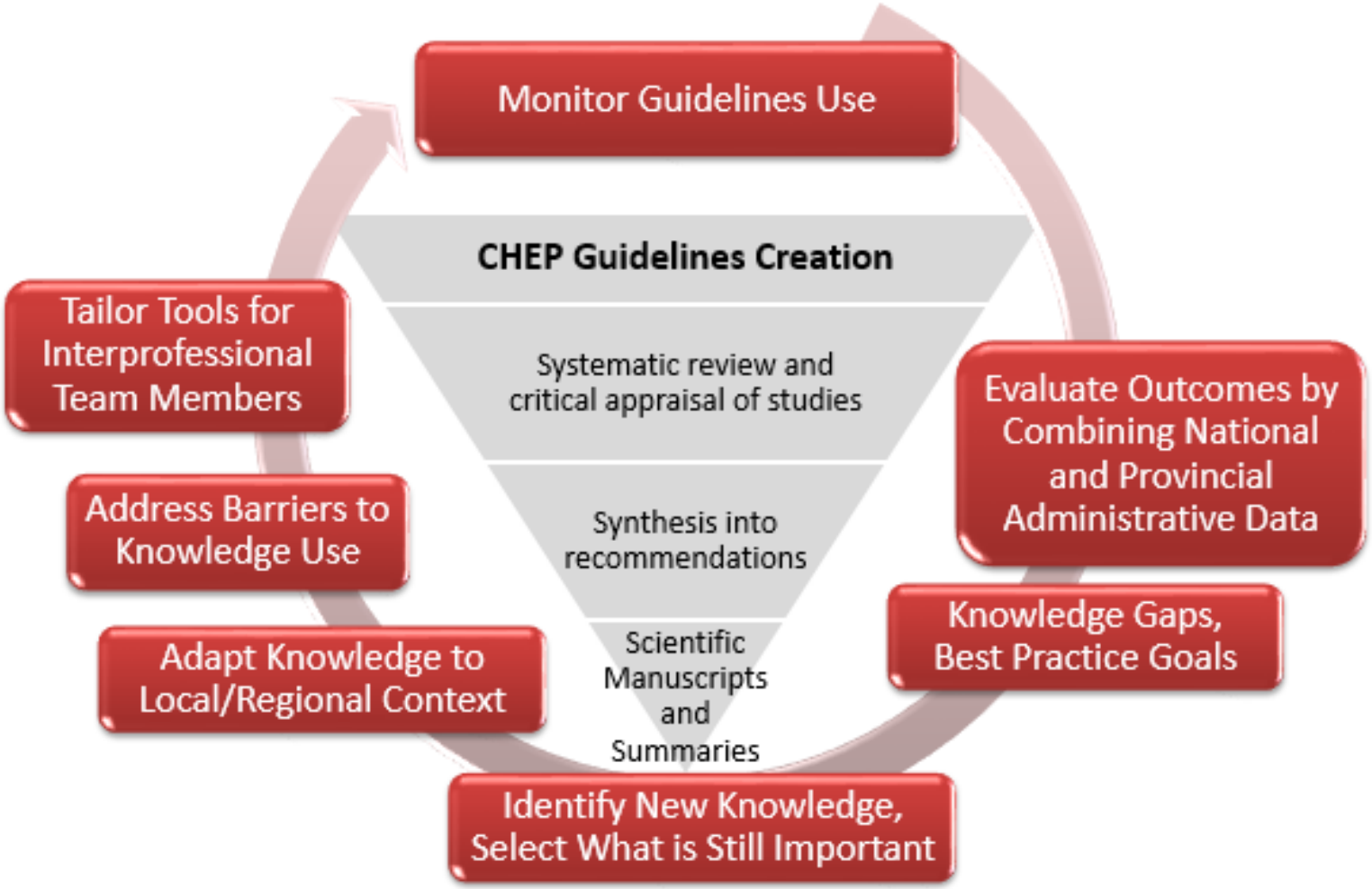
2016 CHEP Guidelines Task Force

CHEP Guidelines Organizational Chart



Hypertension Canada's Annual *KT* Cycle for Developing Management Guidelines

Dissemination and Implementation Committee



Outcomes Research Task Force

CHEP 2016 Guidelines

What's new?

- **New thresholds and targets for high risk patients (SPRINT)**
- ***Assessing*** clinic blood pressures using **automatic electronic** (oscillometric) monitors
- ***Adopting*** healthy behaviours is integral to the management of hypertension (focus on potassium supplementation)
- ***Updating*** the evaluation of patients with suspected secondary forms of hypertension (focus on primary hyperaldosteronism)
- ***Updating*** the treatment of patients with hypertension with concurrent coronary artery disease
- ***New*** recommendations on the diagnosis and management of hypertension in pediatric patients ***(NOT the focus of this presentation)***

CHEP 2016 Guidelines

What's still important?

- The diagnosis of hypertension should be based on **out-of-office** measurements
- The management of hypertension is all about global cardiovascular risk management and vascular protection
- The most important step in prescription of antihypertensive therapy is achieving patient "buy-in" and adherence

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	≤120	NA
Diabetes	< 130	< 80
All others*	< 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

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:

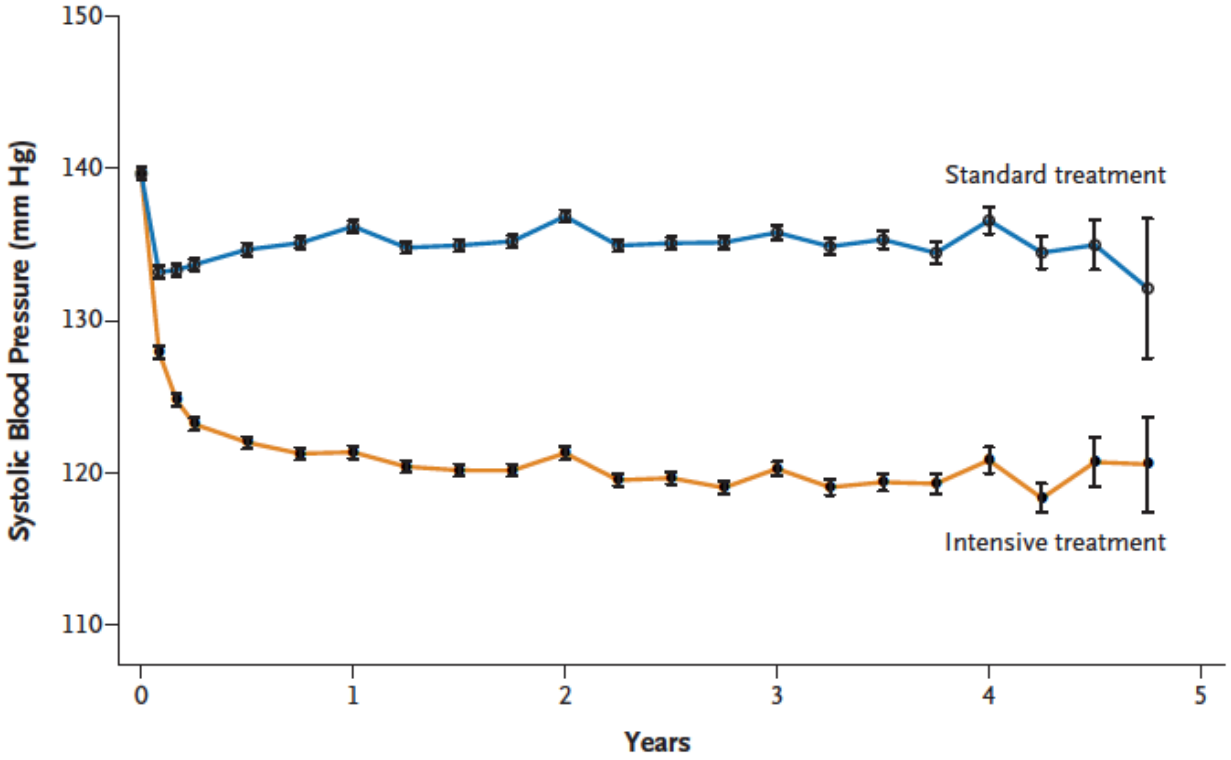
- Diabetes mellitus
- Prior stroke
- eGFR < 20 ml/min/1.73m2

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

SPRINT: SBPs Achieved

Average no. of medications
Intensive care: 2.8
Standard care: 1.8

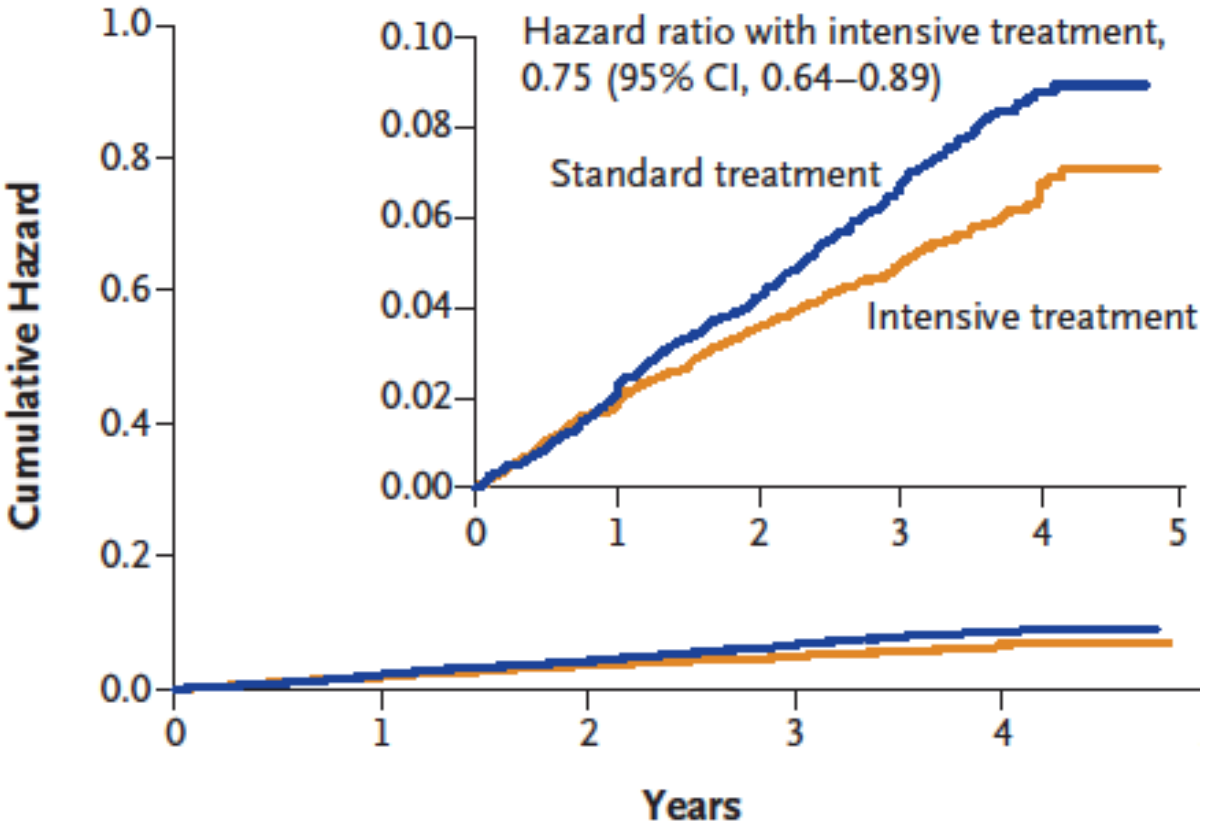


No. with Data										
Standard treatment	4683	4345	4222	4092	3997	3904	3115	1974	1000	274
Intensive treatment	4678	4375	4231	4091	4029	3920	3204	2035	1048	286
Mean No. of Medications										
Standard treatment	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Intensive treatment	2.3	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0

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

Primary Outcome

NNT=61



No. at Risk

Standard treatment	4683	4437	4228	2829	721
Intensive treatment	4678	4436	4256	2900	779

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

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.

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Office BP Measurement Methods

Office (attended):

- Auscultatory (mercury, aneroid) – not recommended
- Non-automated oscillometric (electronic)

Automated office (unattended): AOBP

- Oscillometric (electronic)

2015 Recommendation on BP Measurement

New 2015

AOBP:

- Measurement using electronic (oscillometric) devices in the upper arm
- Provider outside the room/area (mitigates white coat effect)
- Multiple readings
- Mean automatically calculated

New 2016 Recommendation
BP Measurement

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

Automated Office (unattended, AOBP)

Oscillometric (electronic)

Comparison of Automated Office, Ambulatory and Pharmacy BP measurements

AOBP is Not Affected by the Setting in Which BP is Recorded

- Readings recorded in an ABPM unit or in an office waiting room are similar to AOBP recorded in a physician's examination room

Myers MG, et al. Blood Press Monit 2009;14:108-11
Greiver M, et al. Blood Press Monit 2012;17:137-8
Armstrong D, et al. Blood Press Monit 2015;20:204-8

- AOBP results obtained in the pharmacy were comparable with AOBP results from the physician's office

Chambers LW, et al. CMAJ Open 2013;1:E37-42

Comparisons of blood pressure readings obtained in clinical settings using different methods of blood pressure measurement

	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.*

Predictive value of AOBP

AOBP predicts end-organ damage

- Systolic AOBP correlates with **LVMI** similarly to awake ABPM
- AOBP and 24-h ABPM have similar predictive ability for **microalbuminuria**
- AOBP is more strongly associated with **cIMT** (compared to OBPM)

cIMT: Carotid Intima Media Thickness
LVMI: Left Ventricular Mass Index

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.

Predictive Value of AOBP
The CHAP Study

AOBP Predicts Cardiovascular Events

- 3627 community-dwelling residents, aged >65 yrs, untreated for hypertension – part of the CHAP trial
- BpTRU® device in community pharmacies
- f/u 4.9 ± 1.0 yrs for **fatal and non-fatal CV events**

Myers MG, et al. Hypertension 2015;66:489-95. Kaczorowski J, et al. 2008 Preventive Medicine 46: 537–544

Predictive Value of AOBP

Cardiovascular Events

Systolic Blood Pressure

Systolic BP	Hazard Ratio
< 110	1.35 (0.8-2.3)
110-119 (referent)	1.00
120-129	1.08 (0.7-1.7)
130-139	1.30 (0.9-2.0)
135-144	1.66 (1.1-2.5)
140-149	1.79 (1.2-2.8)
150-159	1.96 (1.2-3.2)
160+	2.06 (1.3-3.4)

Diastolic Blood Pressure

Diastolic BP	Hazard Ratio
< 60	1.06 (0.6-1.9)
60-69 (referent)	1.00
70-79	1.15 (0.8-1.6)
80-89	1.72 (1.2-2.5)
90 +	2.07(1.3-3.2)

Myers MG, et al. Hypertension 2015;66:489-95.

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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**

New 2016 Recommendation: Health Behaviours

Potassium intake:

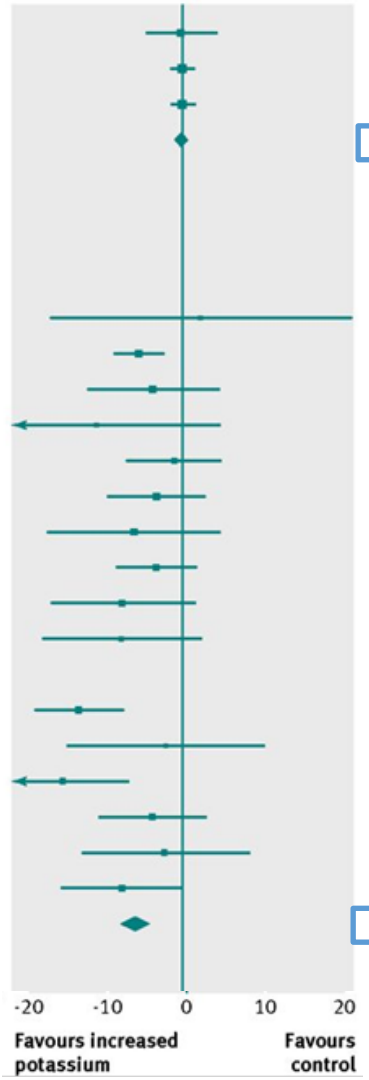
- In patients *not* at risk of hyperkalemia, increase dietary potassium intake to reduce blood pressure.

Systematic Reviews Showing Significant Effect of Potassium on BP

Author	Year	RCTs	Total N	Pooled effect SBP	Pooled effect DBP	Notes
Cappuccio	1991	19	586	-5.9 (-6.6 to -5.2)	-3.4 (-4.0 to -2.8)	Mixed status, 5-112 days, 10-150 participants; ?all RCTs
Whelton	1997	33	2609	-3.11 (-4.3 to -1.9)	-1.97 (-3.4 to -0.5)	Mixed status; 4d-3yrs; 10-484 N
Geleijnse	2003	27	NR	-2.4 (-3.8 to -1.1)	-1.57 (-2.6 to -0.5)	Mixed status; >2 wks duration
Dickinson	2006	5	425	-3.9 (-8.6 to 0.8) *-11.2 (-25.2 to 2.7)*	-1.5 (-6.2 to 3.1) *-5.0 (-12.5 to 2.4)*	Cochrane; hypertensive only; >8wks; 12-212 N; still significant heterogeneity; one trial not pooled – no ss dec in BP
van Bommel	2012	10	563	-7.12 (-8.5 to -5.7) *-9.5 (-10.8 to -8.1)*	-4.9 (-5.8 to -4.0) *-6.4 (-7.3 to – 5.6)*	Hypertensive pts with high Na diet; heterogeneity dec. after exc. of outlier
Aburto	**2013**	**22**	**1606**	**-3.49 (-5.2 to -1.8)**	**-1.96 (-3.1 to -0.9)**	**Mixed status; >4 wks; measured urinary K**
Binia	2015	15	917	-4.7 (2.4 to -7)	- 3.5 (1.3 to 5.7)	Pts not on anti-htn Rx; mixed status; >=4wks;

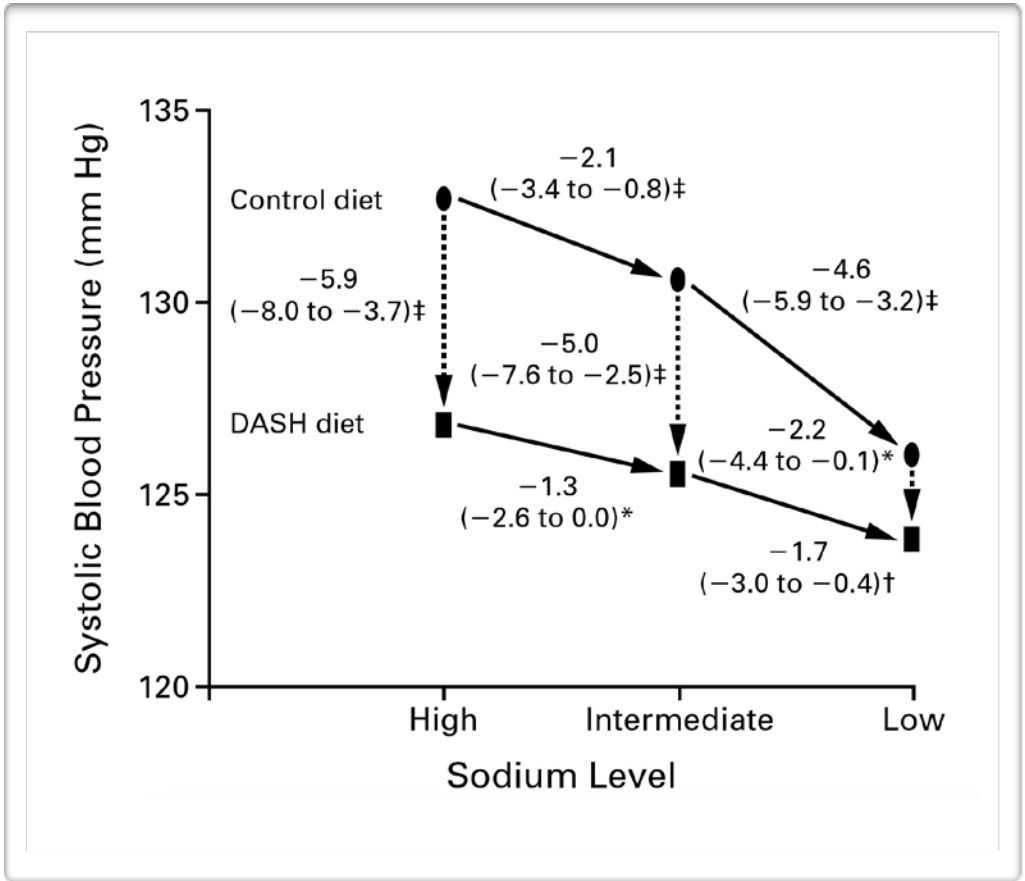
Increased Potassium intake decreases BP:

Study	Mean (SD)/Total No of participants: Increased potassium intake	Control	Mean difference (inverse variance, random) (95% CI)	Weight (%)	Mean difference (inverse variance, random) (95% CI)
Blood pressure status (normotensive)					
Barden BPARA 1986	113.67 (8.87)/43	113.69 (9.44)/43		6.90	-0.02 (-3.89 to 3.85)
Trial Hyp Prv Col BPA 1992	-0.78 (5.88)/178	-0.84 (5.82)/175		10.50	0.06 (-1.16 to 1.28)
Whelton BPA 1995	-0.87 (5.94)/161	-1.00 (5.69)/157		10.40	0.13 (-1.15 to 1.41)
Subtotal	382	375		27.80	0.09 (-0.77 to 0.95)
Test for heterogeneity: τ^2=0.00, χ^2=0.01, df=2, P=1.00, I^2=0%					
Test for overall effect: z=0.20, P=0.84					
Blood pressure status (hypertensive)					
Bulpitt BPA 1985	-5.20 (27.50)/19	-7.50 (23.90)/14		0.80	2.30 (-15.30 to 19.90)
Chalmers BPA 1986	-8.90 (7.00)/49	-3.80 (7.40)/52		8.40	-5.10 (-7.91 to -2.29)
Forrester BPA 1988	129.80 (13.50)/23	133.20 (12.70)/23		3.40	-3.40 (-10.97 to 4.17)
Fotherby BPA 1992	176.00 (20.00)/18	186.00 (24.00)/18		1.20	-10.00 (-24.43 to 4.43)
Grobbee BPA 1987	135.00 (13.28)/40	135.90 (11.38)/40		5.10	-0.90 (-6.32 to 4.52)
He BPA 2010	142.00 (11.00)/42	145.00 (15.00)/42		4.90	-3.00 (-8.63 to 2.63)
Kaplan BPA 1985	127.60 (11.60)/16	133.20 (16.80)/16		2.20	-5.60 (-15.60 to 4.40)
Kawano BPA 1998	147.90 (11.70)/55	150.80 (12.61)/55		6.10	-2.90 (-7.45 to 1.65)
MacGregor AEBPA 1982	148.00 (13.91)/23	155.00 (14.87)/23		2.90	-7.00 (-15.32 to 1.32)
Matlou BPA 1986	144.00 (18.10)/32	151.00 (19.20)/32		2.60	-7.00 (-16.14 to 2.14)
Obel BPA 1989	133.00 (10.00)/24	172.00 (7.00)/24		0.00	-39.00 (-43.88 to -34.12)
Patki BPARA 1990	143.60 (10.80)/37	155.70 (11.40)/37		5.50	-12.10 (-17.16 to -7.04)
Richards BPAAEA 1984	148.00 (14.20)/12	149.90 (14.50)/12		1.80	-1.90 (-13.38 to 9.58)
Siani BPA 1987	131.80 (12.70)/18	145.80 (11.30)/19		3.30	-14.00 (-21.76 to -6.24)
Siani BPARA 1991	142.10 (11.50)/21	145.50 (9.70)/26		4.40	-3.40 (-9.57 to 2.77)
Smith BPARA 1985	160.00 (16.10)/20	162.00 (15.20)/20		2.30	-2.00 (-11.70 to 7.70)
Valdes BPA 1991	138.00 (14.70)/24	145.00 (9.80)/24		3.70	-7.00 (-14.07 to 0.07)
Subtotal	449	453		58.50	-5.32 (-7.20 to -3.43)
Test for heterogeneity: τ^2=2.89, χ^2=19.06, df=15, P=0.21, I^2=21%					
Test for overall effect: z=2.15, P=0.03					



Effect of increased potassium intake on cardiovascular risk factors and disease: systematic review and meta-analyses. Aburto et al, BMJ 2013.

A K rich diet has additive effects to Na restriction



Sacks et al. N Engl J Med, Vol. 344, No. 1 · January 4, 2001

Enriching dietary potassium lowers BP: Summary

- Potassium supplementation leads to a decrease in BP
- Effect most consistently seen in patients with hypertension
- Effect of K is modified by Na intake, with greater effect at higher baseline Na

Risk of Hyperkalemia with K Supplementation

Identify those at Risk of Hyperkalemia with Potassium supplementation

Prior to advising increase in potassium intake, the following kinds of patients – who are at high risk of hyperkalemia, should be assessed for suitability, and monitored closely:

- Patients taking renin-angiotensin-aldosterone inhibitors
- Patients on other drugs that can cause hyperkalemia (trimethoprim and sulfamethoxazole, amiloride, triamterene)
- Patients with CKD (GFR < 45mL/min)
- Patients with baseline serum potassium > 4.5 mmol/L

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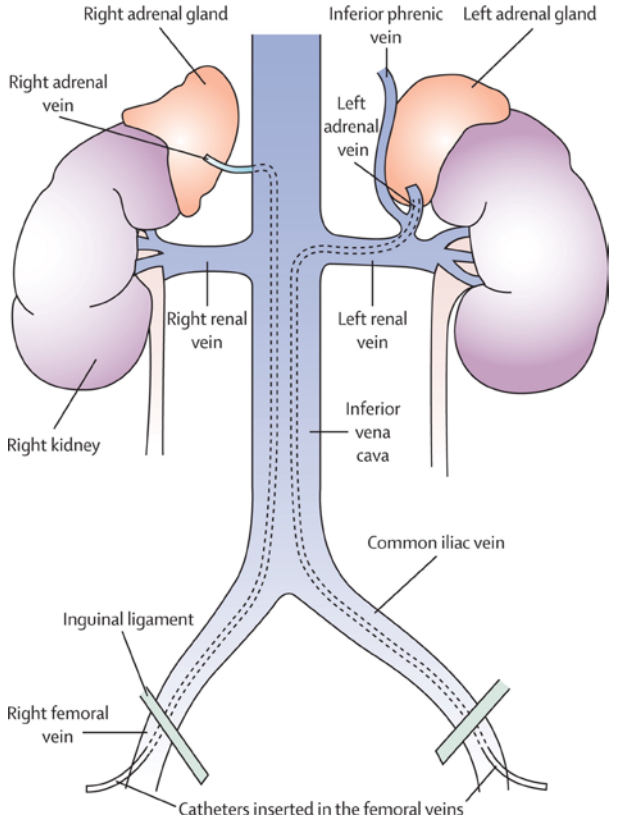
New 2016 Recommendation: Endocrine Hypertension

- In patients with primary hyperaldosteronism and a definite adrenal mass who are eligible for surgery, adrenal venous sampling (AVS) is recommended to assess for lateralization of aldosterone secretion. AVS should be performed exclusively by experienced teams working in specialized centres.



adapted from Monticone S et al. The Lancet Volume 3, No. 4, p296–303, April 2015
DOI: http://dx.doi.org/10.1016/S2213-8587(14)70069-5

Role for adrenal venous sampling in primary aldosteronism

- Cohort of 203 patients from Mayo Clinic with PA, receiving CT and AVS
- 41% of those with normal CT had unilateral hypersecretion
- Only 51% of those with unilateral micronodules (<1 cm) had ipsilateral hypersecretion; 66% of those with unilateral macronodules (>1 cm) had ipsilateral hypersecretion
- 15% with micronodules and 3% with macronodules had contralateral hypersecretion
- 49% with bilateral micronodules and 33% with bilateral macronodules had unilateral hypersecretion

CT alone would incorrectly exclude 21% of patients for surgery

Based on CT alone, 25% would have received unnecessary surgery

Young WF, et al. Surgery. 2004 Dec;136(6):1227-35.

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Change in 2016 Recommendation: Hypertension in CAD

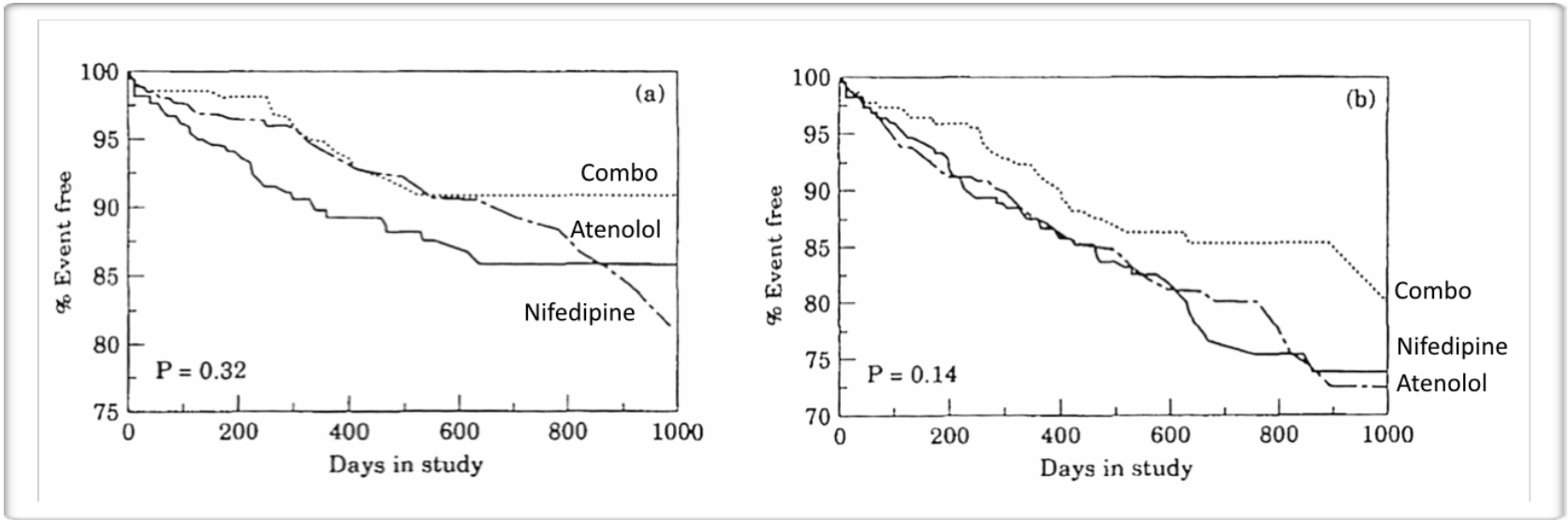
Prior recommendation:
For patients with stable angina, β-blockers are preferred as initial therapy. *CCBs may also be used*.

New recommendation:
For patients with hypertension and stable angina pectoris but without prior HF, MI or coronary artery bypass surgery, *either a beta blocker or a calcium channel blocker can be used as initial therapy*.

Beta blocker vs CCB in Treatment of CAD

The TIBET Trial

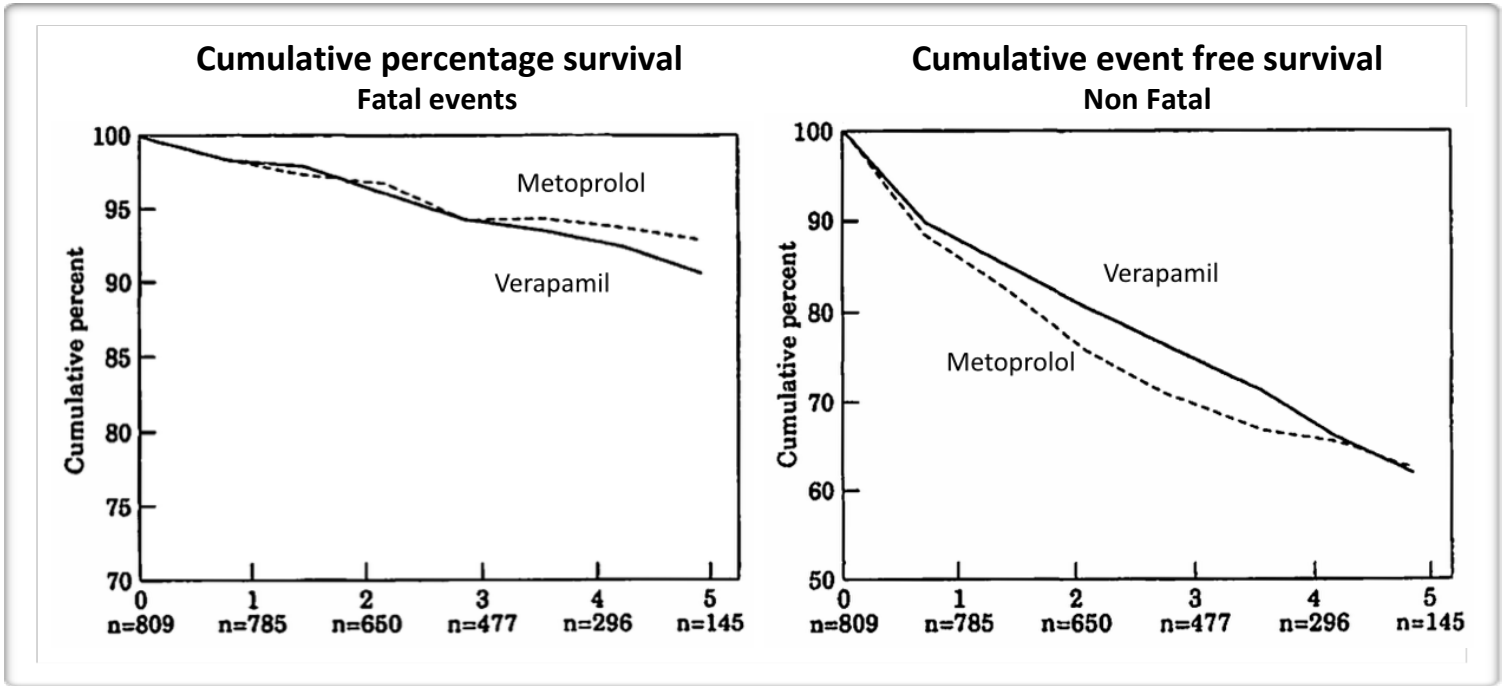
Events =MI, CV death, HF, ACS
Hard events + ischemic ST changes on 24 h ECG



Total Ischaemic Burden European Trial (TIBET): Effects of atenolol (N=226), nifedipine SR (N=232) or combination (N=224) on outcome in chronic stable angina. Dargie et al. EHJ 1996;17:104-112

Beta blocker vs. CCB in treatment of CAD

The APSIS Trial



The curves were not extended beyond 5 years as few patients were followed thereafter

APSIS: metoprolol vs verapamil in stable angina pectoris
No difference: CV events (30.8% v 29.3%) CV mortality 4.7% vs 4.7%), Non-fatal CV events 26.1 v 24.3%

Hjemdahl P. et al. Favourable long term prognosis in stable angina pectoris: an extended follow up of the angina prognosis study in Stockholm (APSIS); Heart 2006;92:177-182

CCB vs. Non-CCB in treatment of CAD

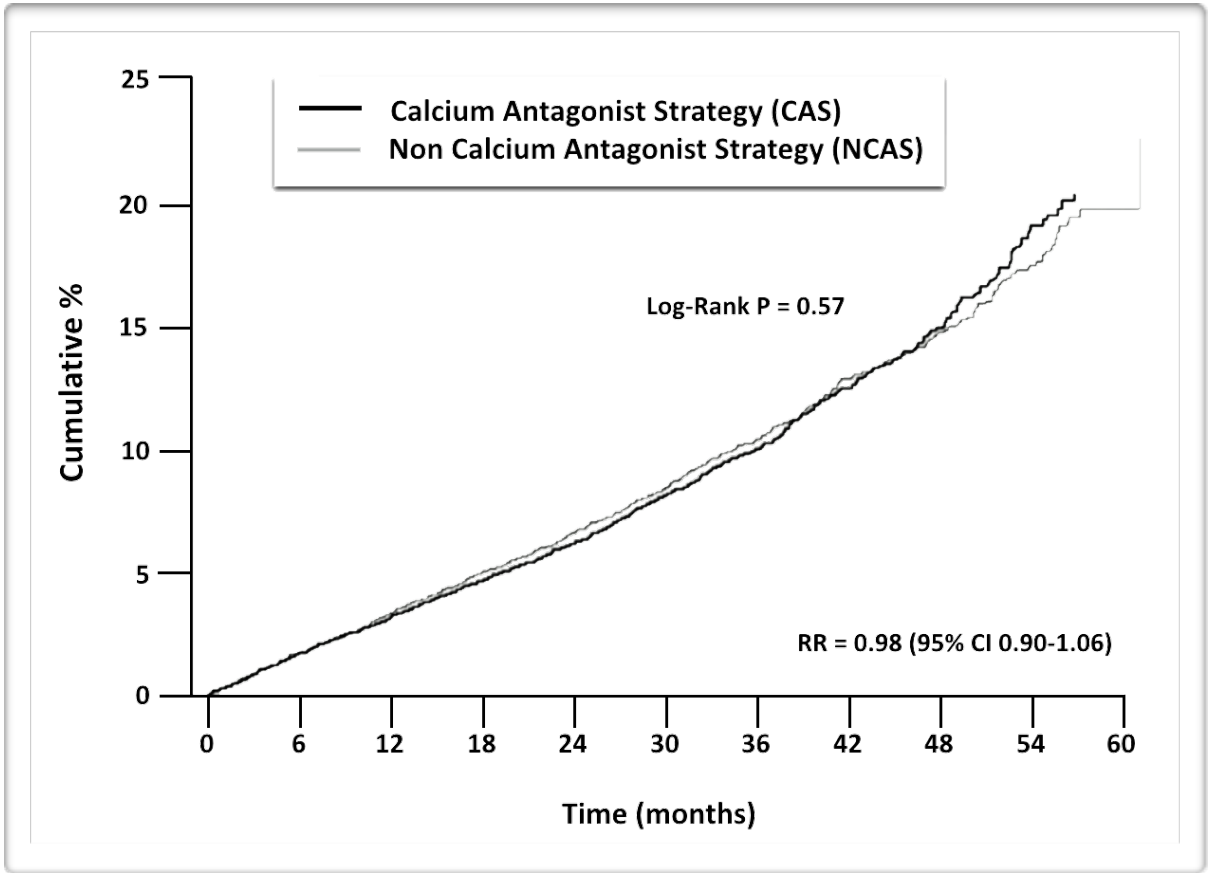
The INVEST trial

As required to achieve blood pressure control:

CCB strategy:
Verapamil sustained release + Trandolapril + HCTZ

Non-CCB strategy:
Atenolol + HCTZ, + Trandolapril

- 22,000 HT patients with CAD
- Primary Outcome:
  Alive, Free of MI or Stroke
- Total FU: 61,807 pt-y, mean FU 2.7y,
- Annual event rate = 3.6%



Pepine JC et al. JAMA 2003 290(21):2805-16

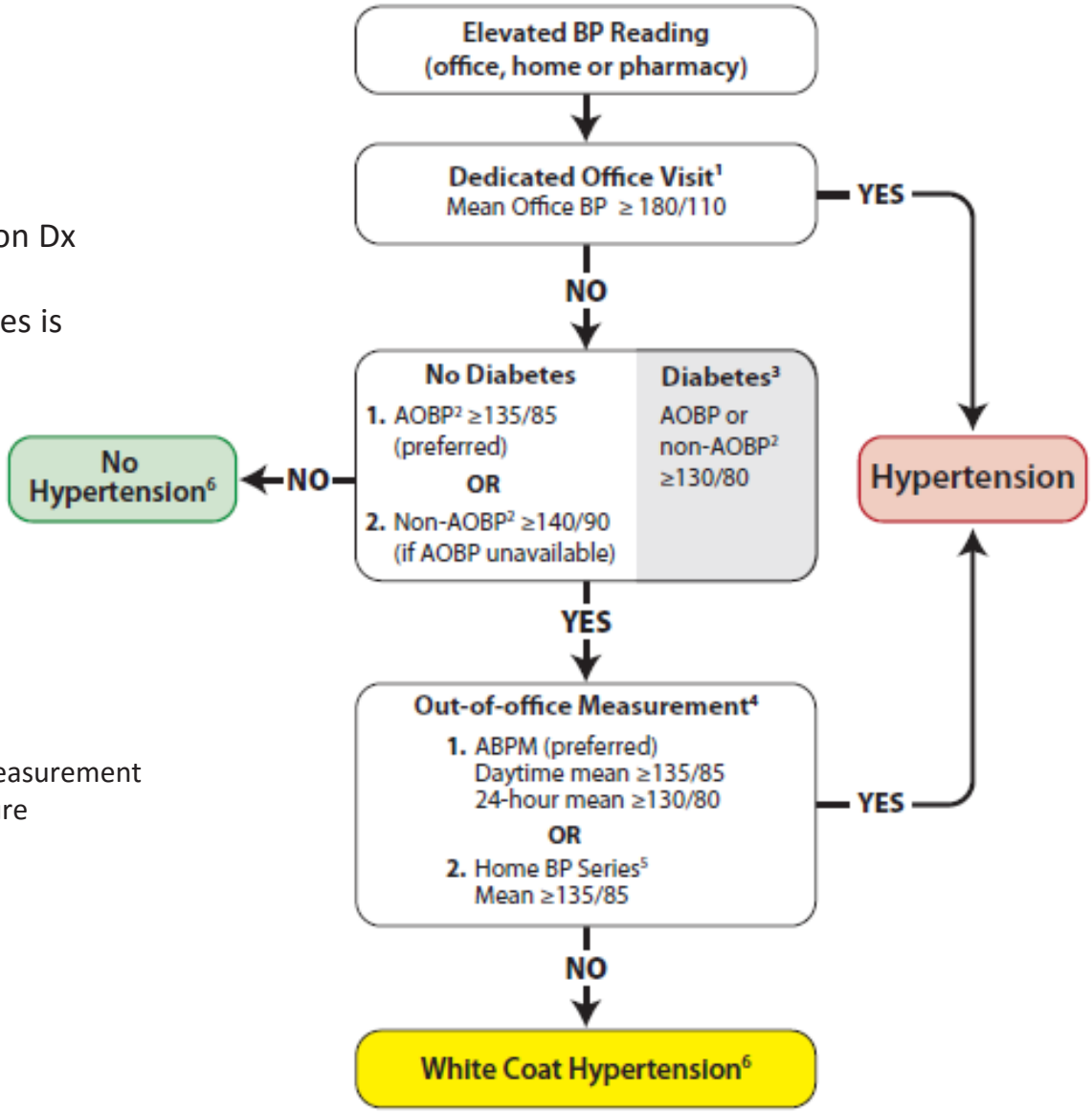
CHEP 2016 Guidelines

What's still important?

- The diagnosis of hypertension should be based on **out-of-office** measurements
- The management of hypertension is all about global cardiovascular risk management and vascular protection
- The most important step in prescription of antihypertensive therapy is achieving patient "buy-in" and adherence

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

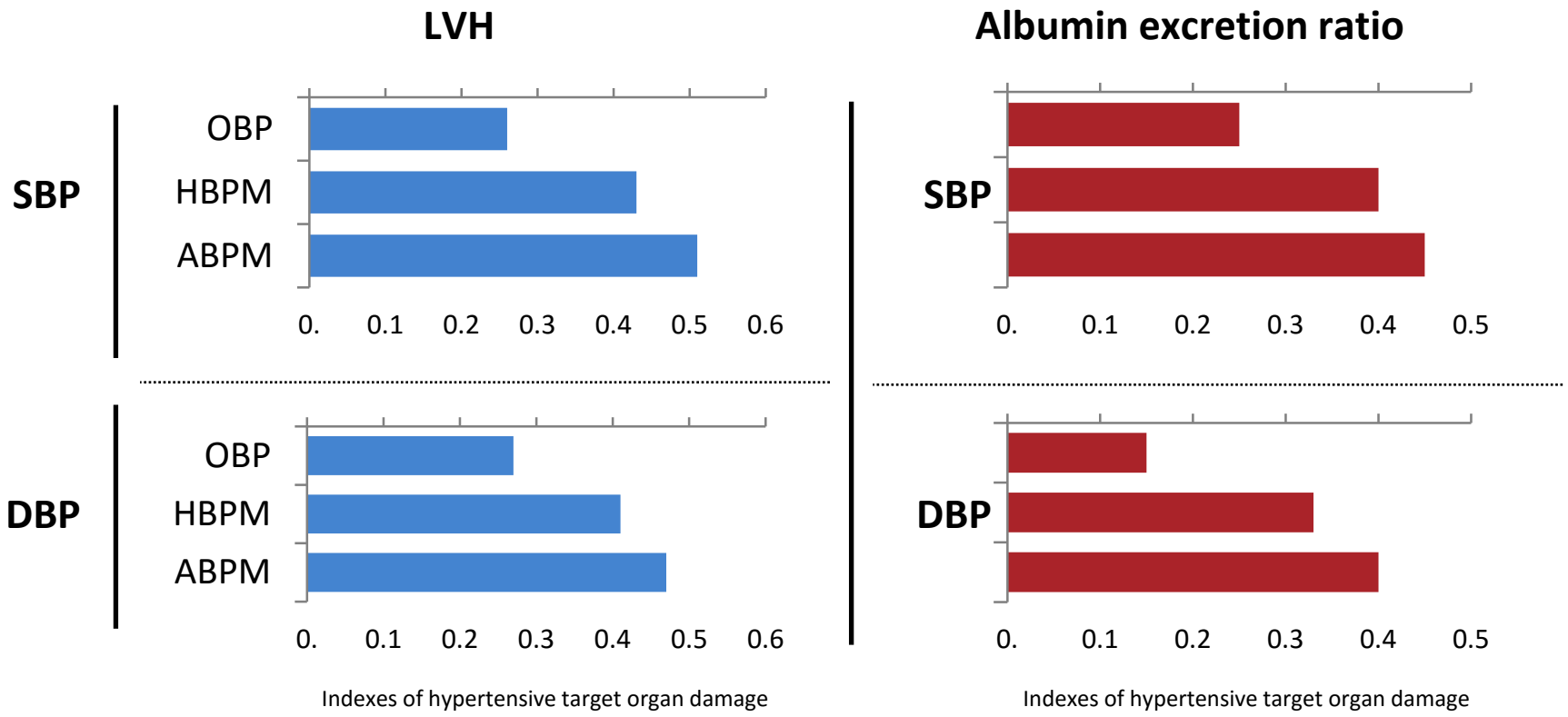


ABPM: Ambulatory Blood Pressure Measurement
AOBP: Automated Office Blood Pressure

Out-of-Office BP Measurements

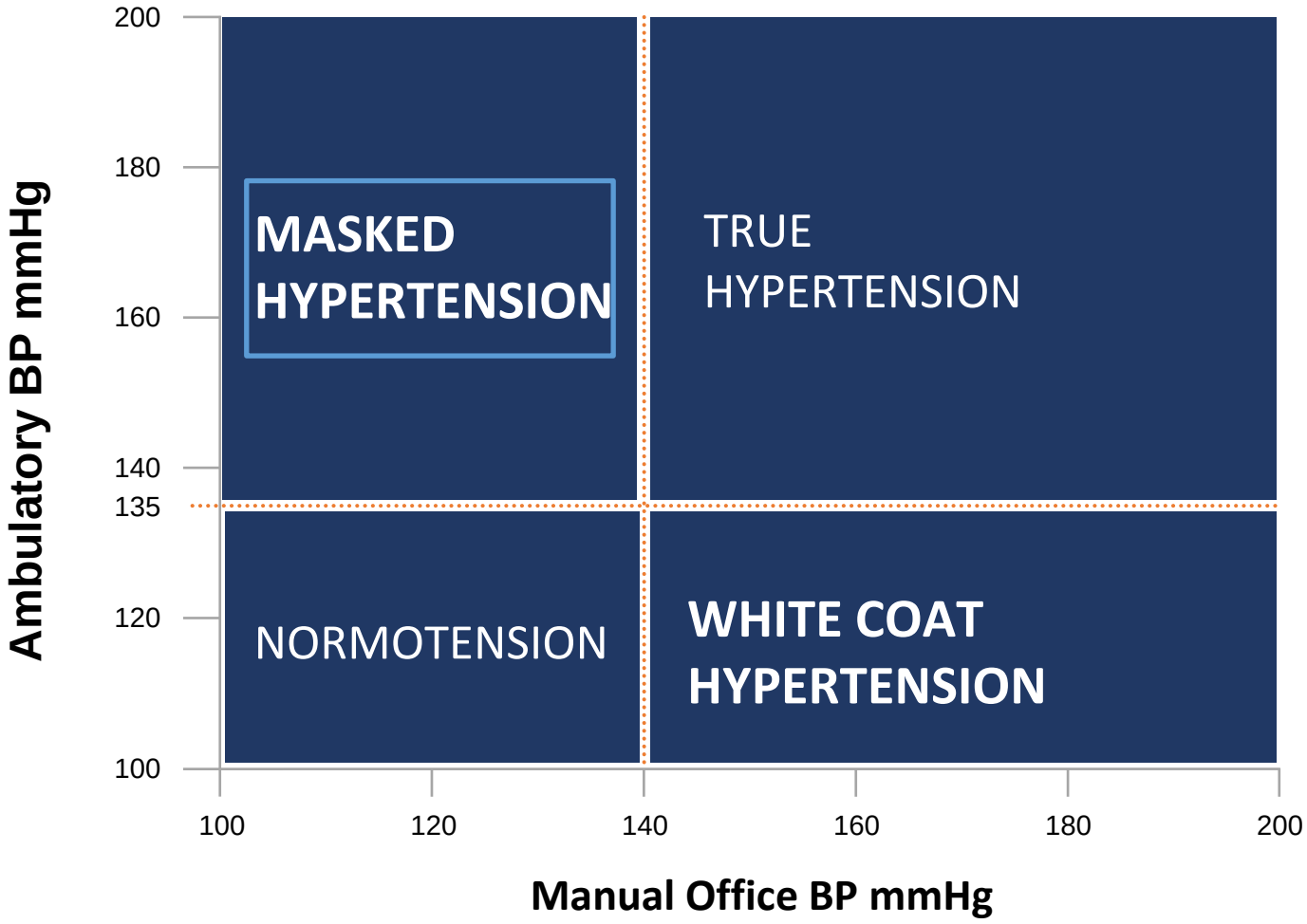
- ABPM has better predictive ability than OBPM and is the recommended out-of-office measurement method.
- HBPM has better predictive ability than OBPM and is recommended if ABPM is not tolerated, not readily available or due to patient preference.
- Identifies white coat hypertension and masked hypertension.

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



Adapted from CHEP. www.hypertension.ca. Derived from Pickering *et al. Hypertension* 2002: 40: 795-796.

Criteria for the Diagnosis of Masked Hypertension

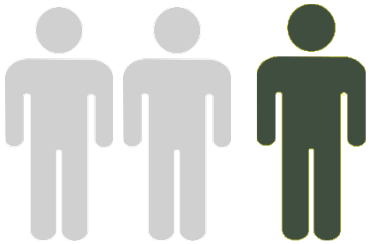
	BP (mm Hg)
Office BP	< 140/90
Awake Ambulatory	≥135/85
24-hour Ambulatory BP	≥ 130/80

Prevalence of Masked Hypertension

about
10%
in the general population

about
30%
in treated hypertensive patients*

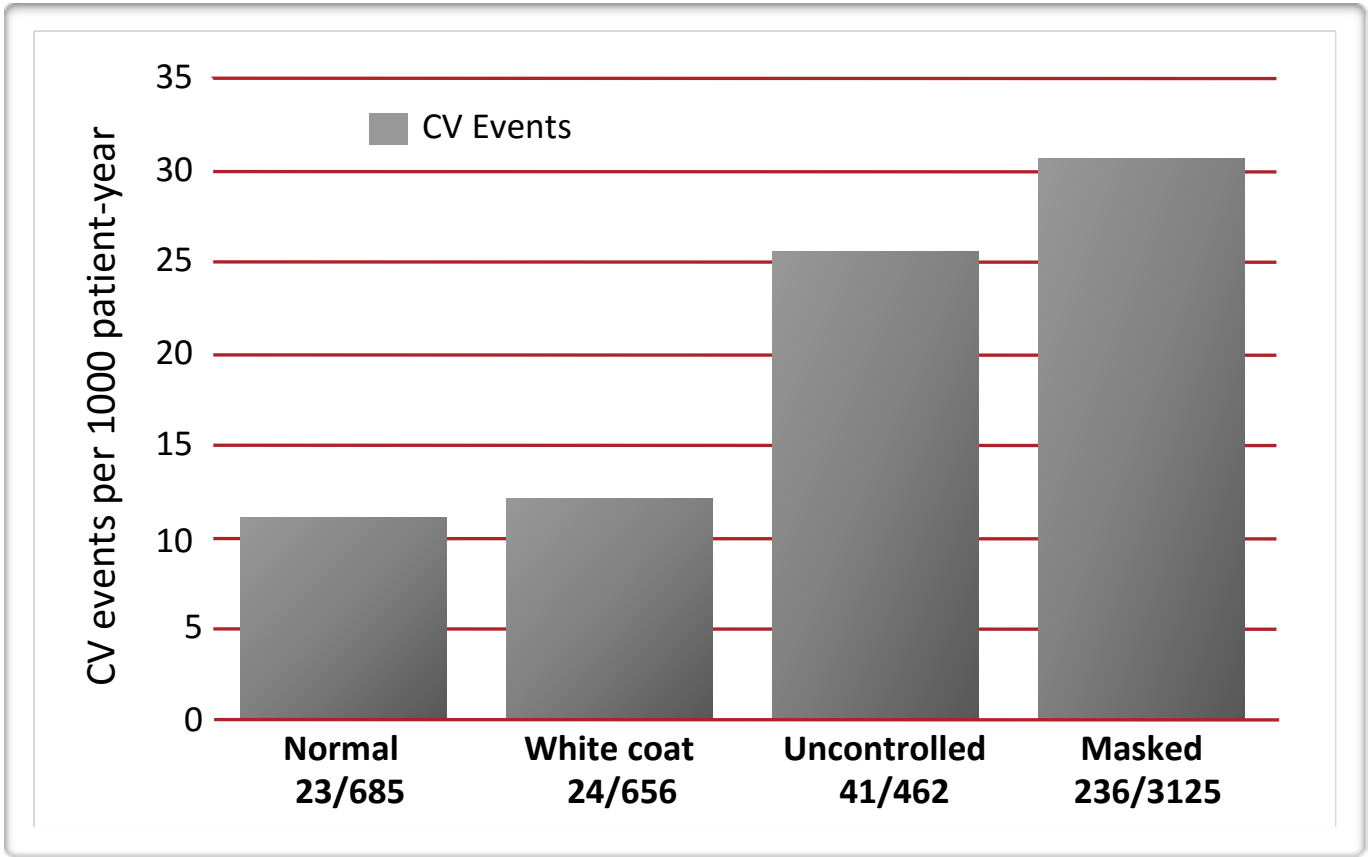
higher
in patients with
diabetes
and
chronic kidney
disease patients



One out of three treated hypertensive patients has masked hypertension

**Andalib A et al. Int Med J 2012; 42:260-6*

The prognosis of *white coat* and *masked* hypertension



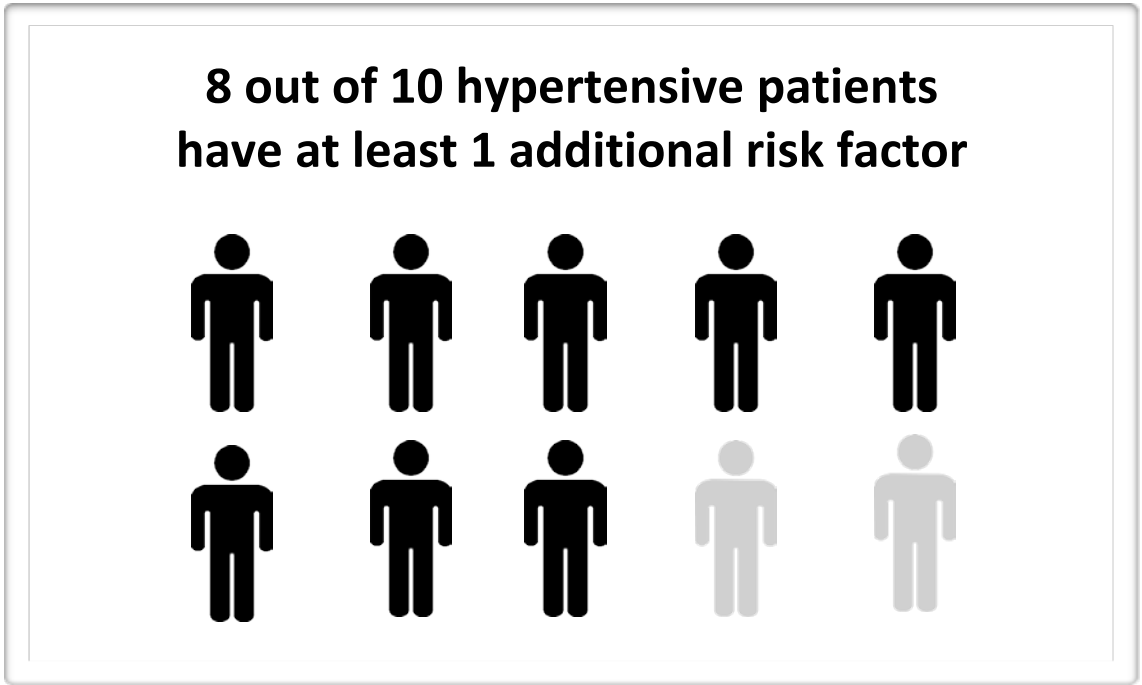
Okhubo et al. *J. Am. Coll. Cardiol.* 2005;46;508-515

CHEP 2016 Guidelines

What's still important?

- The diagnosis of hypertension should be based on **out-of-office** measurements
- The management of hypertension is all about global cardiovascular risk management and vascular protection
- The most important step in prescription of antihypertensive therapy is achieving patient "buy-in" and adherence

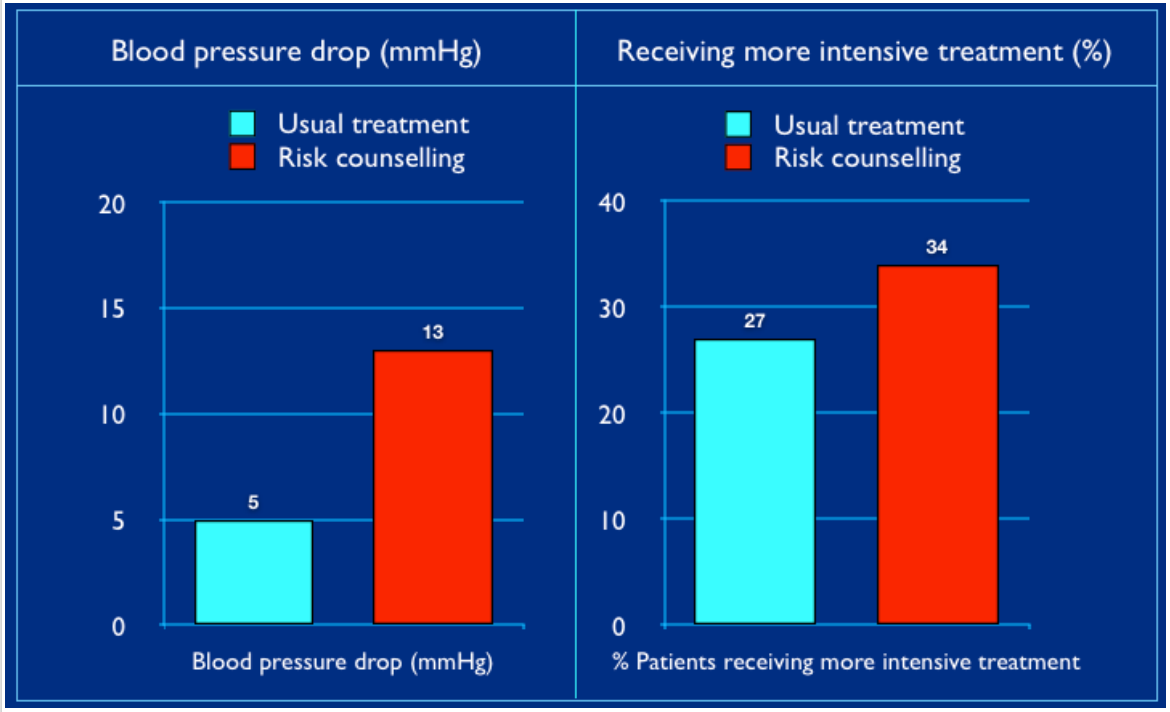
Cardiovascular Risk Factors in Hypertensive Patients



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 coronary risk with patients on blood pressure treatment

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.*

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

ASCOT-LLA Lancet 2003;361:1149-58

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

New 2015

- **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.

Cochrane network meta-analysis 2014
Kate Cahill et al

CHEP 2016 Guidelines

What's still important?

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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

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

CHEP 2016 Guidelines

What's new?

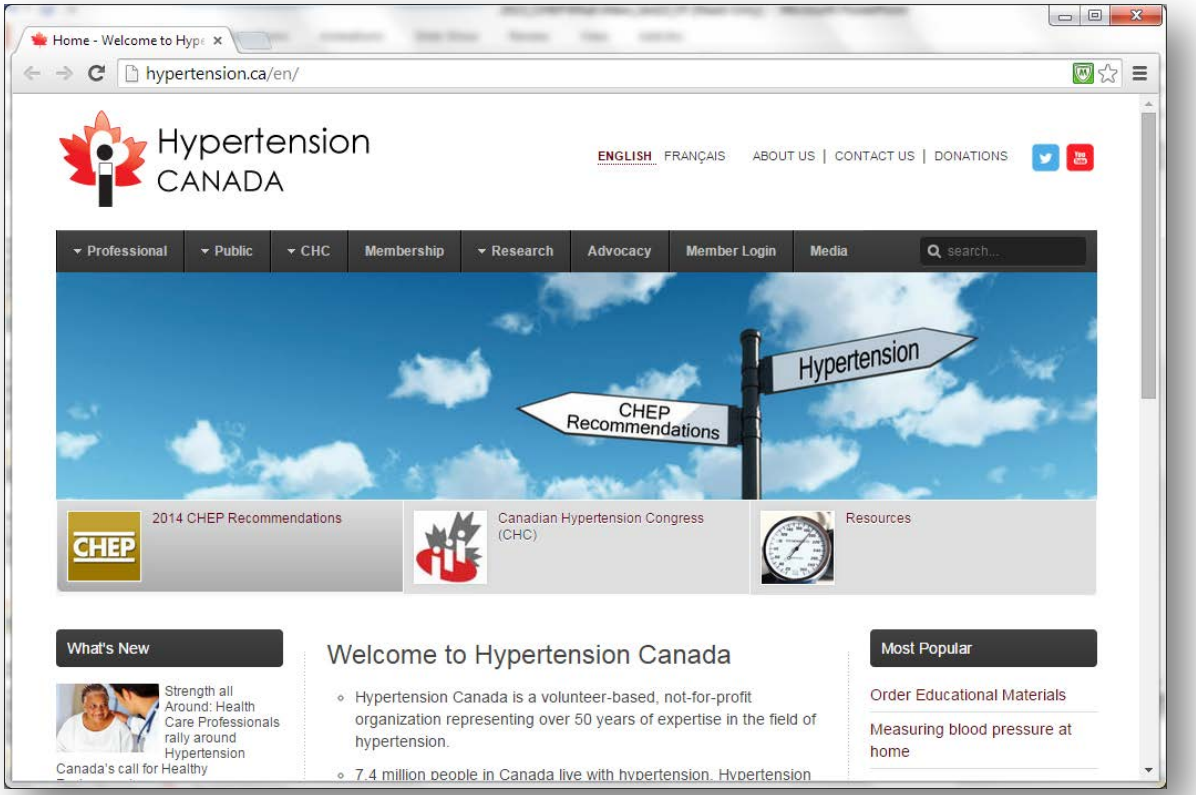
- **New thresholds and targets for high risk patients (SPRINT)**
- ***Assessing*** clinic blood pressures using **automatic electronic** (oscillometric) monitors
- ***Adopting*** healthy behaviours is integral to the management of hypertension (focus on potassium supplementation)
- ***Updating*** the evaluation of patients with suspected secondary forms of hypertension (focus on primary hyperaldosteronism)
- ***Updating*** the treatment of patients with hypertension with concurrent coronary artery disease
- ***New*** recommendations on the diagnosis and management of hypertension in pediatric patients ***(NOT the focus of this presentation)***

CHEP 2016 Recommendations

What's still important?

- The diagnosis of hypertension should be based on **out-of-office** measurements
- The management of hypertension is all about global cardiovascular risk management and vascular protection
- The most important step in prescription of antihypertensive therapy is achieving patient "buy-in" and adherence

hypertension.ca



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- Free access to the latest information and resources

For professionals:

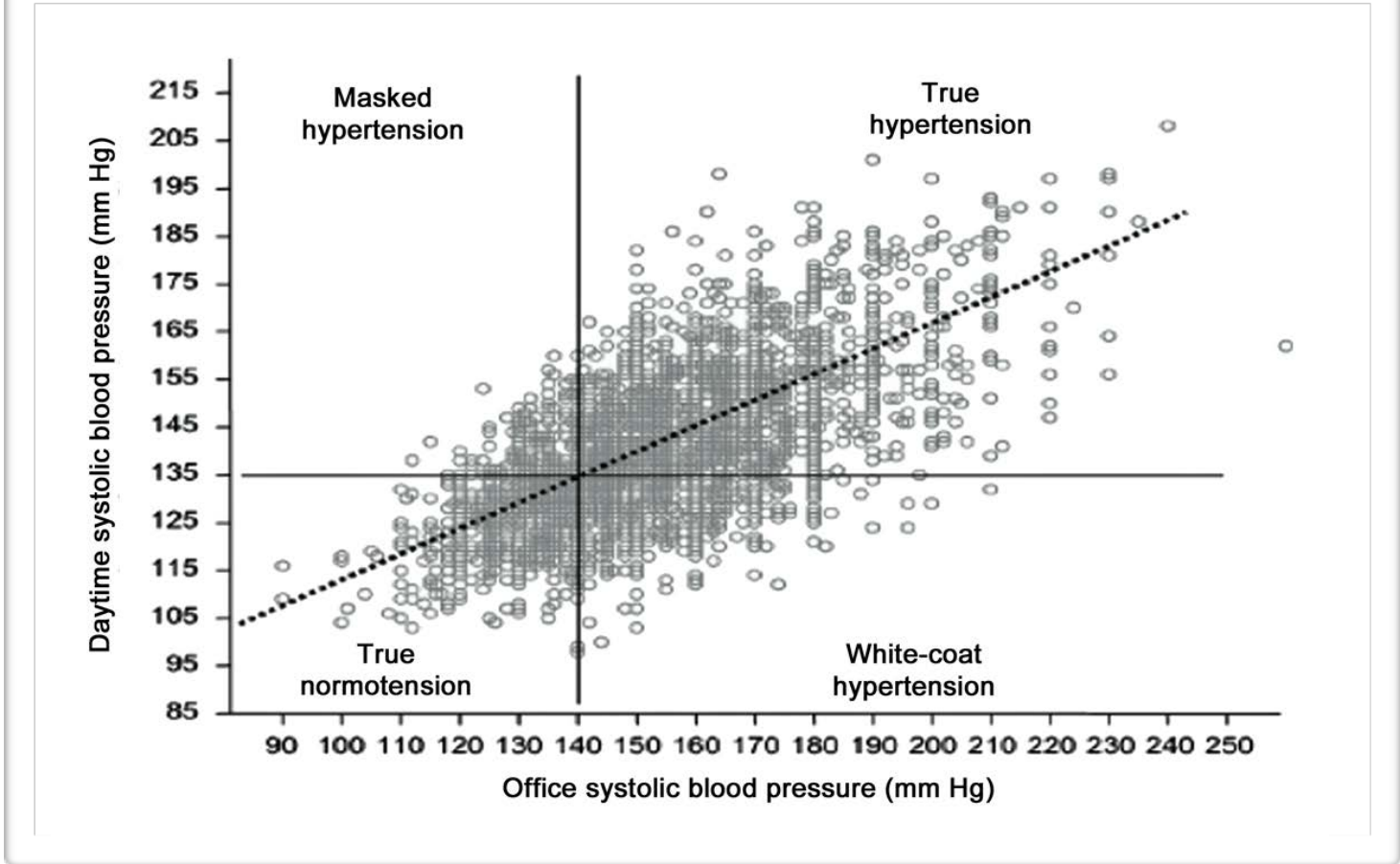
- Accredited 15.5 hour interdisciplinary training program
- Free monthly news updates, featured research and educational resources
- Become a member for special privileges and savings

2016
Hypertension Canada CHEP Guidelines for the Management of Hypertension

What's new in the treatment of hypertension?
What's still really important?

Additional Data Slides

Office BP and ABPM: different evaluation of Blood Pressure



Verdecchia P et al, The clinical significance of white-coat and masked hypertension. Blood Press Monit 2007; 12: 387–389

Correlation of *AOBP* and OBPM with ABPM

Stronger Correlation with ABPM for *AOBP* than for OBPM

Study	*n*	Patient population	Coefficient of correlation (*r*) office BP *vs* awake ambulatory BP	
			Automated office BP	Manual office BP
Beckett and Godwin[26]	481	Community family practice	0.57/0.61	0.15/0.32
Myers *et al.*[27]	309	Ambulatory BP unit	0.62/0.72	0.32/0.48
Myers *et al.*[29]	303	Community family practice (research study)	0.34/0.56	0.10/0.40

Beckett L, Godwin M. BMC Cardiovasc Disord 2005;5:18;Myers MG, et al. J Hypertens 2009; 27: 280-6; Myers MG, et al. BMJ 2011;342:d286

Studies comparing AOBP measurement with Awake ABPM

AOBPs Equivalent to Awake ABPs

Table 2. Studies comparing AOBP measurement with AABP measurement: *Mean overall AOBP was 137/79 mm Hg, and mean overall AABP was 137/79 mm Hg.*

STUDY	NO. OF PATIENTS	POPULATION	AOBP, mm Hg	AABP, mm Hg
Myers et al,[5] 2009	309	ABPM unit	132/75	134/77
Myers et al,[21] 2008	200	ABPM unit	133/72	135/76
	200	ABPM unit	132/76	134/77
Myers et al,[22] 2010	139	ABPM unit	141/82	142/81
Beckett and Godwin,[25] 2005	481	Family practice	140/80	142/80
Myers et al,[26] 2009	62	Hypertension clinic	140/77	141/77
Myers,[27] 2010	254	ABPM unit	133/80	135/81
Godwin et al,[28] 2011	654	Family practice	139/80	141/80
Myers et al,[29] 2011	303	Family practice	135/77	133/74
Andreadis et al,[30] 2011	90	Research unit	140/88	136/87

AABP—awake ambulatory BP, ABPM—24-hour ambulatory BP monitoring, AOBP—automated office BP, BP—blood pressure.

Myers MG, et al. Can Fam Physician 2014;60:127-32; Myers MG. J Clin Hypertens 2014;16:83-6; Myers MG. J Hypertens 2012;30:1894-8; Myers MG, et al. Family Practice 2012;29:376-82; Myers MG, et al. BMJ 2011;342:d286; Myers MG. J Hypertens 2010;28:703-8; Myers MG, et al. J Hypertens 2009;27:280-6; Myers MG, et al. Blood Press Monit 2009;14:108-11; Myers MG, Godwin M. J Clin Hypertens 2007;9:267-70