

Managing Hypertension: Because its 2016 ... with apologies to Justin!

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Faculty/Presenter Disclosure

- **Faculty:** [Marshall Godwin]
- **Relationships with commercial interests:**
 - **Grants/Research Support:** Only research agency funding – CIHR, Heart Stroke, etc.
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 - **Other:** Employee of Memorial University

Part 1: Measurement and Diagnosis

- Use Automated Office Blood Pressure (AOBP) Devices to diagnosis and follow patients with hypertension
- 2015 CHEP addresses benefit of AOBP over MOBP
- Mentions AOBP in their diagnostic algorithm but they don't follow through to the obvious conclusion
- Perhaps the 2016 will incorporate AOBP more substantially



Don't use this, if you can help it

Why Use AOBP rather than MOBP?

- Uses oscillometric input rather than auditory.
- Accurate Algorithm
- Almost completely gets rid of white coat effect.
- Correlates well with ABPM
- No need for the 5 minute rest or most of the other caveats.



Auscultatory OBPM is inaccurate

- In the real world, the accuracy of auscultatory OBPM can be adversely affected by provider, patient and device factors such as:
 - too rapid deflation of the cuff
 - digit preference with rounding off of readings to 0 or 5
 - also, mercury sphygmomanometers are being phased out and aneroid devices are less likely to remain calibrated
- Consequence: Routine auscultatory OBPMs are 9/6 mm Hg higher than standardized research BPs (primarily using oscillometric devices)

The Evidence

	Manual (MOBP) Auscultatory	Automated (AOBP) Oscillometric
Correlation with Daytime ABPM	0.1	0.6

Table 1: Mean systolic and diastolic BPs

Average of the blood pressures measured at the last three office visits	150.8 (SD 10.26) / 82.9 (SD 8.44)
BpTRU initial reading	150.0 (SD 21.33) / 83.3 (SD 12.00)
BpTRU Average	140.0 (SD 17.71) / 79.8 (SD 10.46)
24 hour daytime average	141.5 (SD 13.25) / 79.7 (SD 7.79)

The sweet-point for sensitivity, specificity and predictive values for AOBP compared to daytime ABPM is 135/85
When using AOBP, definition of 'high blood pressure' is at 135/85
When using MOBP definition of 'high blood pressure' is at 140/90

So all automated devices have a cut-point for elevated at 135/85 -- Home, Daytime ABPM, and AOBP.

Using AOBP in the Office (BpTRU)

- Feed flat on floor, back resting, arm on desk, right sized cuff
- 6 readings ...The first one you watch
- If all well you leave the room and it does 5 more
- 1 minute apart is as accurate as 2 minutes apart.



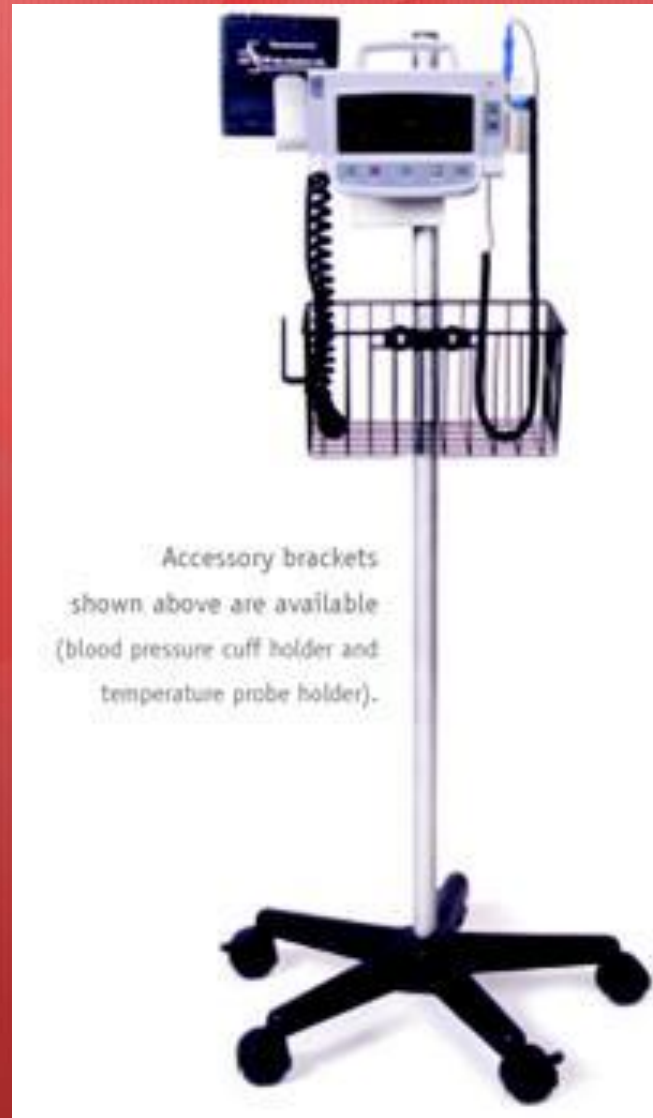
Use of Standardized Measurement Techniques is Recommended when Assessing Blood Pressure

- When using automated office oscillometric devices such as the BpTRU, the patient should be seated in a quiet room alone.
- With the device set to take measures at 1 minute intervals, an initial measurement is taken by a health professional to verify that the device is registering a measurement.
- The patient is left alone after the first measurement and the device automatically takes subsequent readings.



BpTRU
\$800-\$1000

<http://www.manthamed.com/office-blood-pressure-monitor.php>



MicroLife
WatchBP Office
\$300-\$400

<http://www.microlife.com/products/hypertension/professional/>



BP measurement methods

Office Automated (unattended, AOBP)

Oscillometric (electronic)



<http://www.dableeducational.org/sphygmomanometers.html>

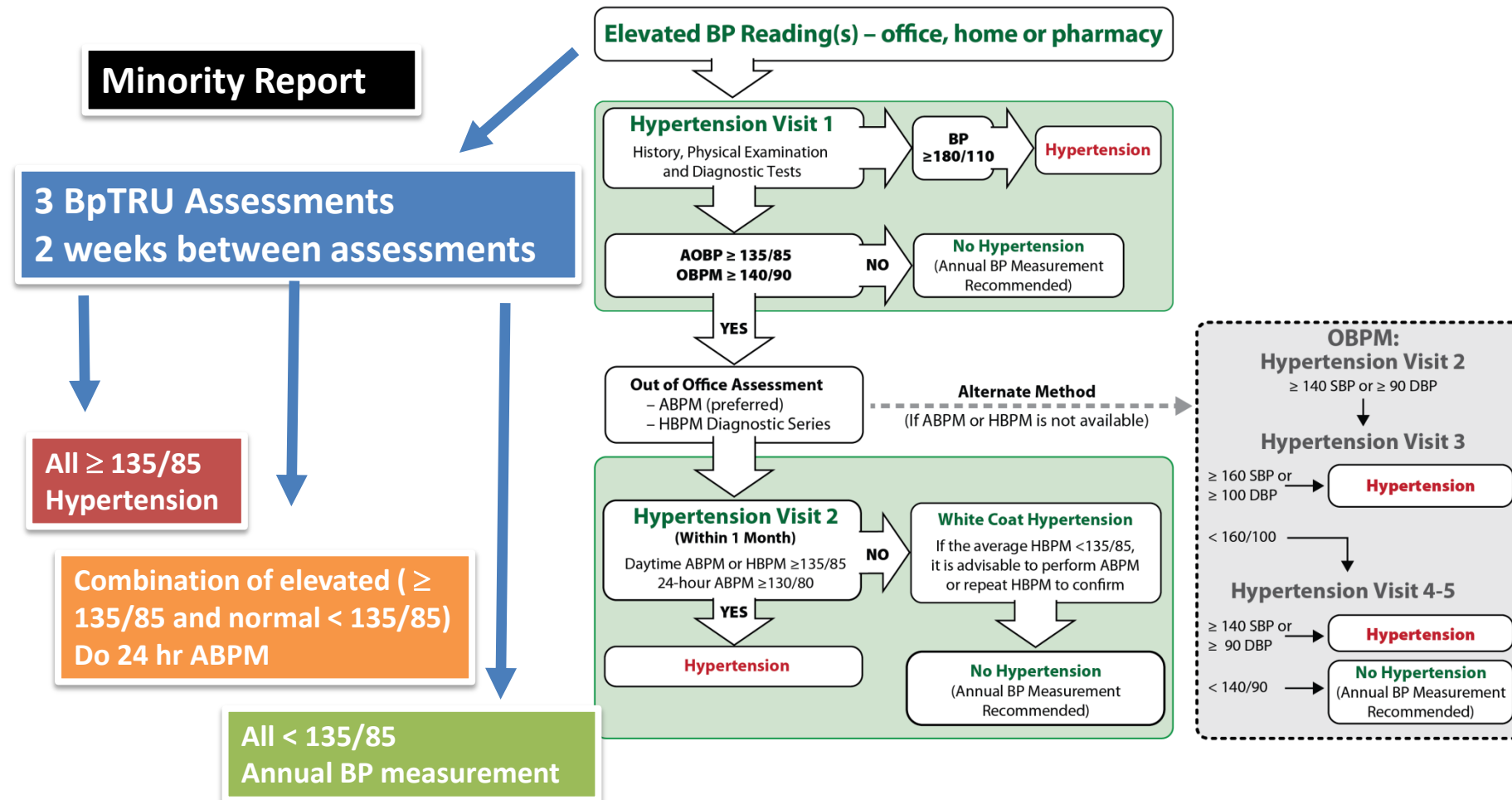
<http://www.bhsoc.org/bp-monitors/bp-monitors/>

The CHEP Diagnostic Algorithm

- We'll review what the algorithm says
- I'll tell you what I do ... call it a Minority Report (but it actually is what most of the people developing the CHEP guidelines do as far as I can tell.)



II. Criteria for the diagnosis of hypertension and recommendations for follow-up: overview



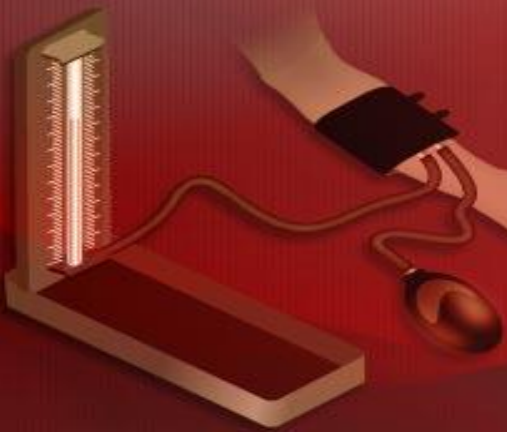
Measurement using electronic (oscillometric) upper arm devices is preferred over auscultation
 ABPM: Ambulatory Blood Pressure Measurement
 AOBP: Automated Office Blood Pressure
 HBPM: Home Blood Pressure measurement
 OBPM: Office Blood Pressure measurement

Missing White Coat Hypertension

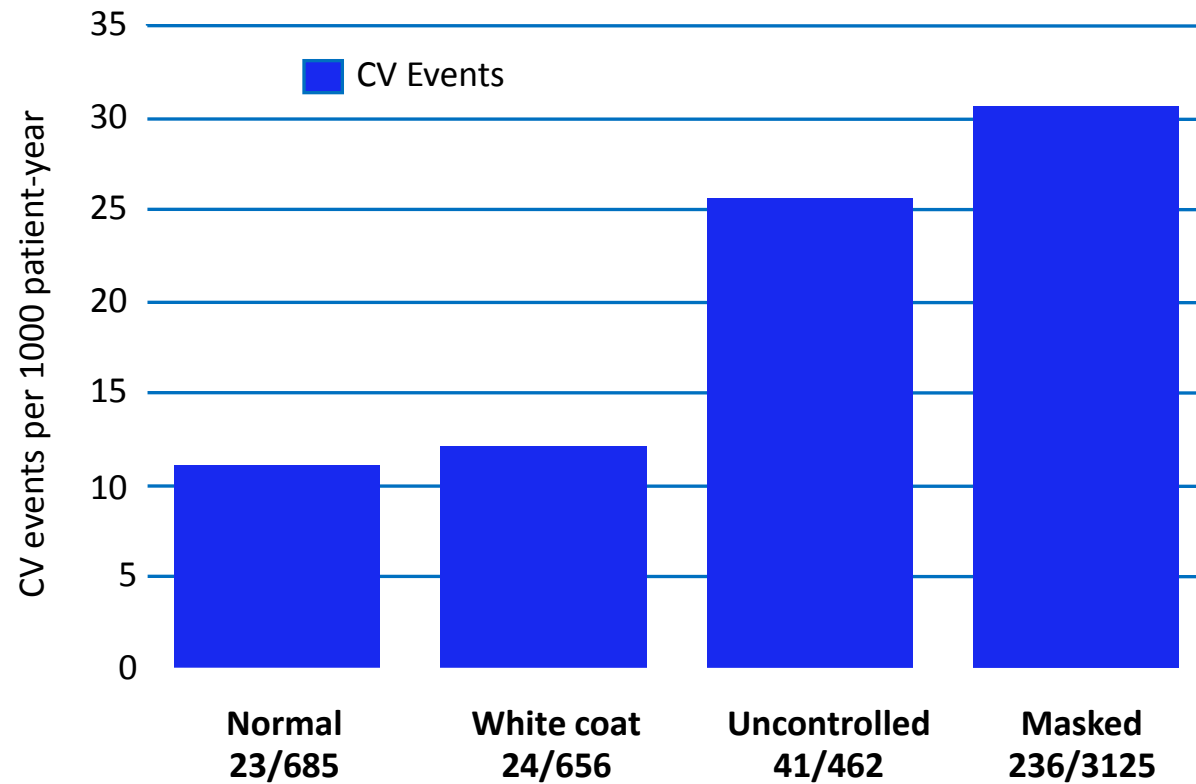
- Important because it results in over-treatment
- We label and treat people not needing treatment
- AOBP practically eliminates White Coat Effect

Missing Masked Hypertension

- Important because it results in under-treatment
- We miss the diagnosis and don't treat when treatment is needed.
- Single MOBP measurement --- Masked Hypertension 20%
- Three AOBP assessments ... Masked Hypertension 4%



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



Masked hypertension: risk factors

- high normal clinic BPs
- older adults
- males
- higher BMI
- smoker
- excess alcohol consumption
- diabetes
- peripheral arterial disease
- orthostatic hypotension
- LVH

What to do besides measuring BP

- Assess potential aggravating factors... things that might be causing the BP to be elevated
- Look for pre-existing end-organ damage
- Do a Global Cardiovascular Risk Assessment



Assess potential aggravating factors... things that might be causing the BP to be elevated

- NSAIDs, Steroids, OCP
- Decongestants
- Antidepressants (MAOI, SSRI, SNRI)
- Salt
- Excess alcohol use
- Stress / Life Circumstances / Anxiety
- Thyroid
- Other
 - Cocaine
 - Cyclosporin
 - Licorice
 - Erythropoietin



Look for pre-existing end-organ damage

- Coronary Artery Disease ... History, EKG
- Cerebrovascular Disease ... History, carotid bruit
- Peripheral vascular Disease ... history, physical, ABI, addominal bruit
- Chronic Kidney Disease History, Renal function, albuminuria (if diabetic)
- Retinopathy .. History, physical, ophthalmologist
- LVH/dysfunction ... EKG, CXR, Echo
- Other ... electrolytes, CBC

Do a Global Cardiovascular Risk Assessment

- Over 80% of hypertensive Canadians have other cardiovascular risks
 - Abdominal Obesity
 - Dyslipidemia
 - Diabetes or Impaired fasting glucose
 - Sedentary Lifestyle
 - Unhealthy eating
 - Smoking
 - Stress



Modifiable Risks

Do a Global Cardiovascular Risk Assessment

- Age ≥ 55 years
- Male
- Family history of premature cardiovascular disease (age <55 in men and < 65 in women)(

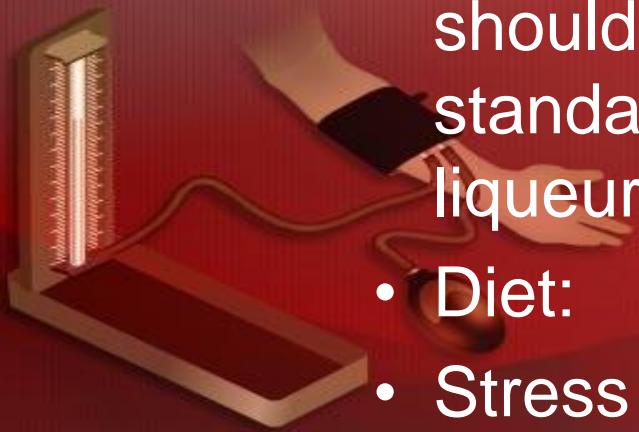


**Non-
modifiable
Risks**



Part 2: Management

- Lifestyle Should Always be part of the Management Plan
 - Accumulation of 30-60 minutes moderate intensity dynamic exercise at least 4 days per week. (walking, running, cycling, swimming)
 - Maintenance of a healthy body weight (body mass index of 18.5 to 24.9, and waist circumference < 102 cm for men and < 88 cm for women)
 - Limit alcohol consumption to ≤ 2 drinks per day, and consumption should not exceed 14 standard drinks per week for men and 9 standard drinks per week for women (bottle of beer, 1.5 oz liqueur, 5 oz wine = one standard drink)
 - Diet: Reduce salt intake, DASH Diet, Lots of fruits and veggies.
 - Stress management



Efficacy vs Effectiveness

- If you do X, then Y will happen = efficacy
- If you
 - Exercise, lose weight, eat less salt, drink less alcohol
- Then your BP will be lower

Efficacy X likelihood of adherence = effectiveness

Efficacy X likelihood of long-term adherence = long-term effectiveness

What proportion of people make significant lifestyle changes resulting in controlling or improving of BP and maintain that lifestyle change for more than a year?

CHEP Says

- Antihypertensive therapy should be prescribed for average \bar{r} measurements of ≥ 100 mm Hg (Grade A) or average S^r measurements of ≥ 160 mm Hg (Grade A) in patients without macrovascular target organ damage or other cardiovascular risk factors. ✓
- Antihypertensive therapy should be strongly considered if DBP readings average ≥ 90 mm Hg in the presence of macrovascular target organ damage or other independent cardiovascular risk factors (Grade A). ?
- Antihypertensive therapy should be considered if SBP readings average ≥ 140 mm Hg in the presence of macrovascular target organ damage (Grade C for 140-160 mm Hg, Grade A for > 160 mm Hg). ?
- Antihypertensive therapy should be considered in all patients meeting indications 1-3 in this report, regardless of age (Grade B). Caution should be exercised in elderly patients who are frail. ✓
- In the very elderly (≥ 80 years) patients who do not have diabetes or target organ damage, the SBP threshold for initiating drug therapy is ≥ 160 mm Hg (Grade C) (revised recommendation). ✓

Minority Report Approach

- If Hypertension is diagnosed based on CHEP (or Minority Report) Criteria
- Treat
 - First try Lifestyle only for 3-6 Months followed by medications if not effective (Regardless of BP, other Risk Factors, or Target Organ damage)
 - Speed and Intensity of treatment based on BP level, Risk Factors, Target Organ Damage
 - Target ... $<140/90$ ($<135/85$ on BpTRU)
- If the patient is age 80 or over and doesn't have target organ involvement or diabetes when hypertension diagnosed, ... take your time. Overzealous treatment probably more harmful than the elevated blood pressure. Target <160 systolic

Choice of Therapy for Adults with Hypertension Without Compelling Indications for Specific Agents

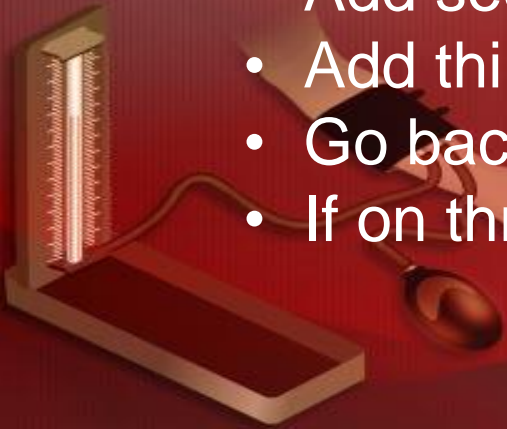
- Initial therapy should be monotherapy with a thiazide/thiazide-like diuretic (Grade A), a β -blocker (in patients younger than 60 years, Grade B), an ACE inhibitor (in nonblack patients, Grade B), a long-acting calcium channel blocker (CCB) (Grade B); or an ARB (Grade B).
- Additional antihypertensive drugs should be used if target BP levels are not achieved with standard-dose monotherapy (Grade B). Add-on drugs should be chosen from first-line choices.
- Can start with two drugs if sBP > 20 above target or dBP > 10 above target



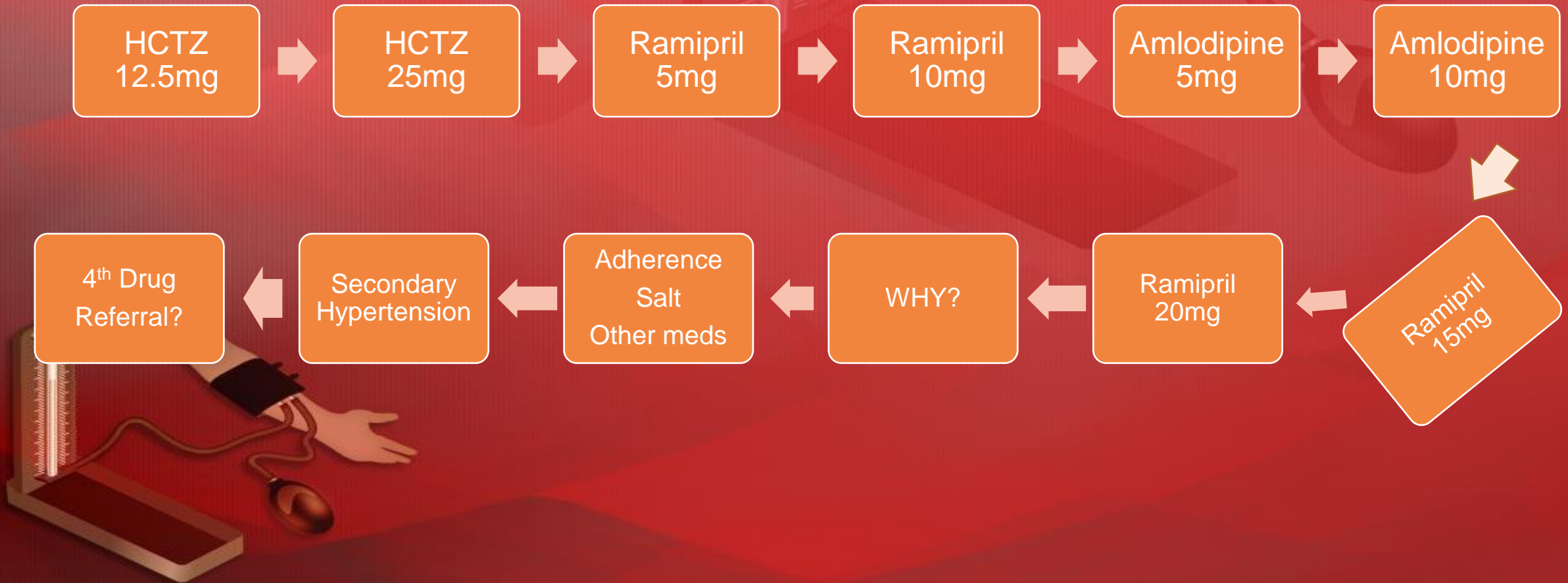
My approach to this... following CHEP recommendations

Thiazide	ACE/ARB		CCB (dihydropyridine)	BB
Hydrochlorothiazide Chlorthalidone indapamide	Ramipril Lisinopril Perindopril Many Others	Candesartan Losartan Valsartan Others	Amlodipine Nifedipine Felodipine	Metoprolol Many Others

- Start with One (usually HCTZ) and move to mid-range dose
- Add second and move to mid-range dose
- Add third and move to mid-range dose
- Go back and increase each to max or near-max dose in steps
- If on three at max/near max dose and still not controlled then WHY?



Example: 50 year old Caucasian man with BpTRU average 155/98 after three readings. Overweight, likes salt, works at a desk, doesn't work out. Non-smoker. Some stress. Tries to deal with lifestyle issues and after 6 months has lost 4 pounds, walks 2-3 times a week. BpTRU still 150/94.



SUPPLEMENTAL TABLE S10. POSSIBLE REASONS FOR POOR RESPONSE TO ANTIHYPERTENSIVE THERAPY

Poor adherence	Dietary
	Physical activity
	Medication
Associated conditions	Obesity
	Tobacco use
	Excessive alcohol consumption
	Sleep apnea
	Chronic pain
Drug interactions	Nonsteroidal anti-inflammatory drugs (including cyclo-oxygenase-2 inhibitors)
	Oral contraceptives
	Corticosteroids and anabolic steroids
	Sympathomimetics and decongestants
	Cocaine
	Amphetamines
	Erythropoietin
	Cyclosporine, tacrolimus
	Licorice
	Over-the-counter dietary supplements (e.g. ephedra, ma huang, bitter orange)
	Monoamine oxidase inhibitors, certain selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors
Suboptimal treatment regimens	Dosage too low
	Inappropriate combinations of antihypertensive agents
Volume overload	Excessive salt intake
	Renal sodium retention (pseudotolerance)
Secondary hypertension	Renal insufficiency
	Renovascular disease
	Primary hyperaldosteronism
	Thyroid disease
	Pheochromocytoma and other rare endocrine causes
	Obstructive sleep apnea

Caveats

- Avoid Beta Blockers in people over 60 unless also needed for IHD
- Don't use ACEI and ARB together.
- Don't use ACEI in black patients.
- Short acting Nifedipine should not be used.
- Try not to drop diastolic BP below 60 in people with CAD
- ACE and BB as initial Rx in people with CAD or CHF
- Use ARB if ACE not tolerated.
- Non-diabetic kidney disease target $<140/90$ ($<135/85$ for AOBP)
- Diabetics target is $<130/80$
- Diabetics should be on an ACE or ARB then CCB rather than thiazide

SUPPLEMENTAL TABLE S12. STRATEGIES TO IMPROVE PATIENT ADHERENCE

Assist your patient by

- Tailoring pill-taking to fit patients' daily habits (Grade D)
- Simplifying medication regimens to once-daily dosing (Grade D)
- Replacing multiple pill antihypertensive combinations with single pill combinations (Grade C)
- Using unit-of-use packaging (of several medications to be taken together) (Grade D)
- Using a multidisciplinary team approach to improve adherence to an antihypertensive prescription (Grade B)

Assist your patient in getting more involved in their treatment by

- Encouraging greater patient responsibility/autonomy in monitoring their blood pressure and adjusting their prescriptions (Grade C)
- Educating patients and their families about their disease and treatment regimens (Grade C)

Improve your management in the office and beyond by

- Assessing adherence to pharmacological and nonpharmacological therapy at every visit (Grade D)
- Encouraging adherence with therapy by out-of-office contact (either by phone or mail), particularly during the first three months of therapy (Grade D)
- Coordinating with pharmacists and work-site health care givers to improve monitoring of adherence with pharmacological and lifestyle modification prescriptions (Grade D)
- Utilizing electronic medication compliance aids (Grade D)

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