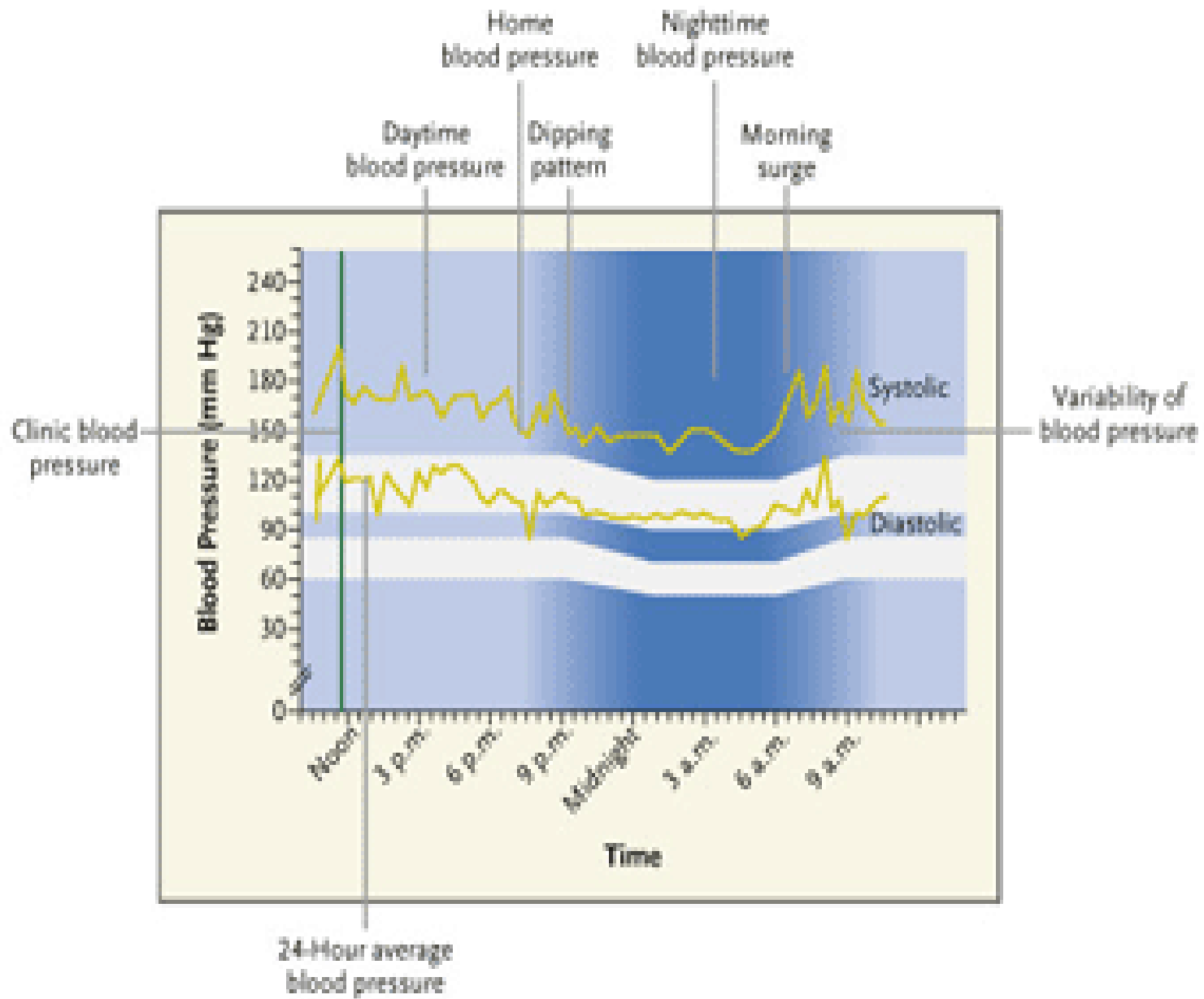


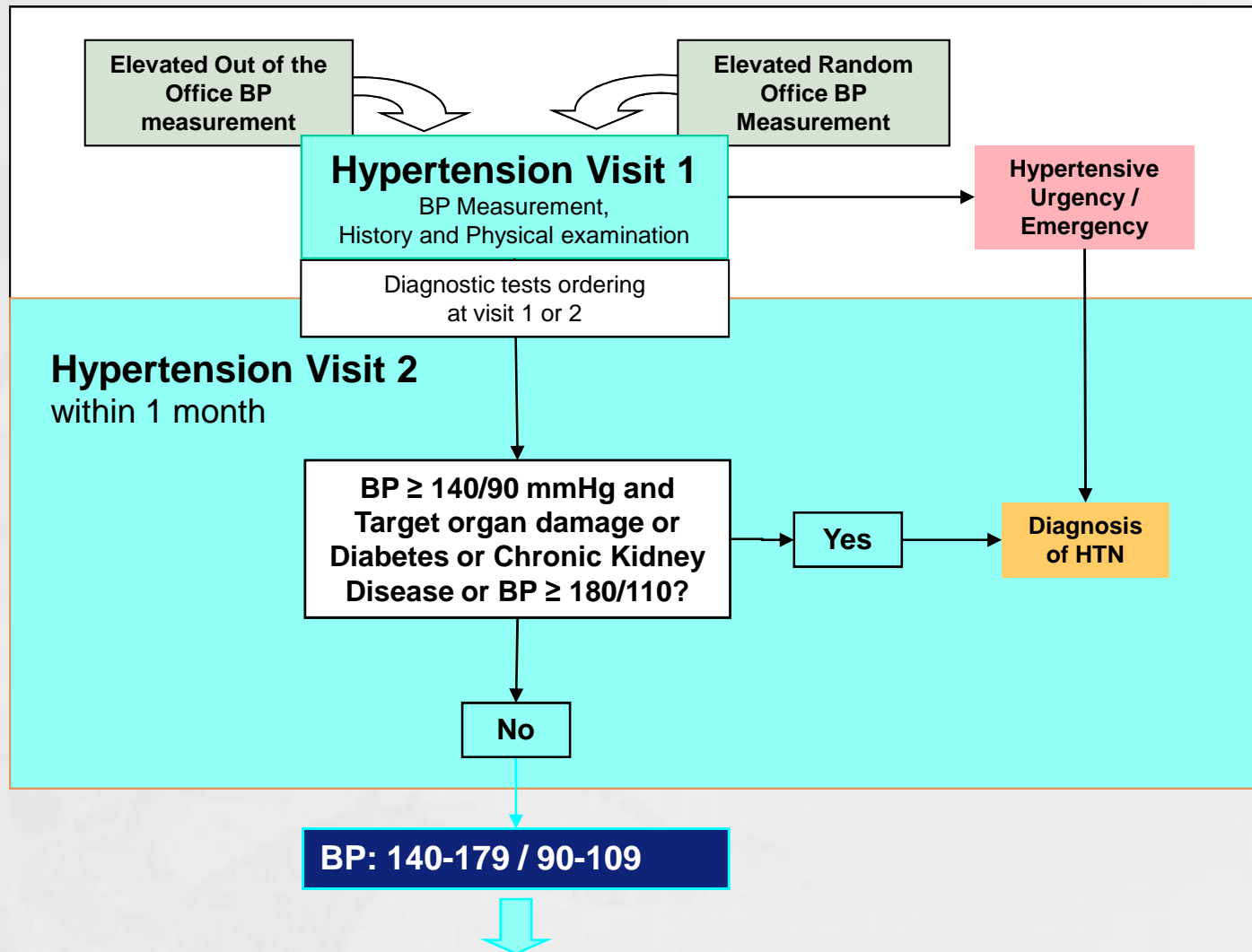
# HOME AND AMBULATORY BLOOD PRESSURE MONITORING



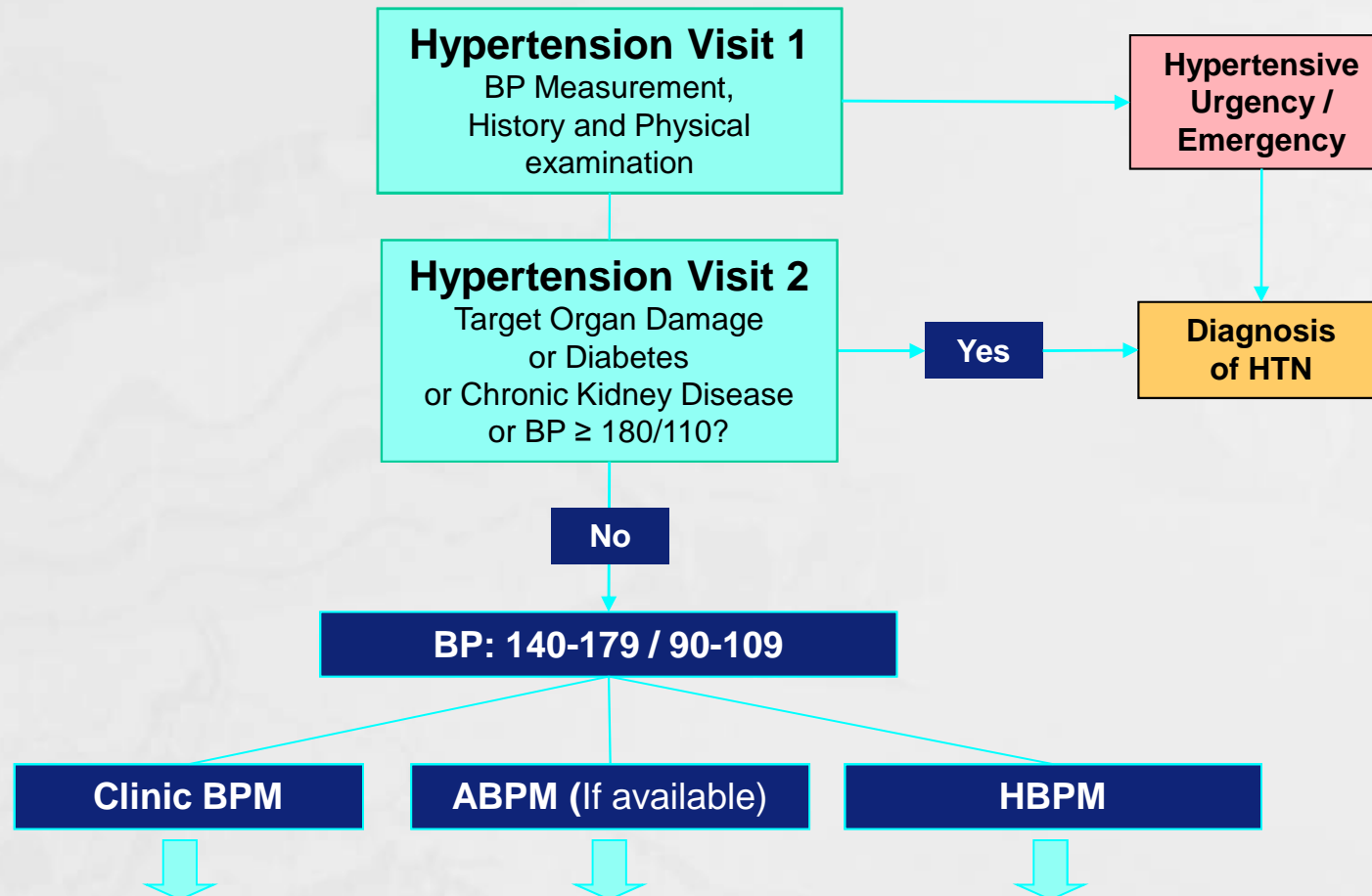
# Uses of ABPM and Home BPM

- Diagnosis of Hypertension
- Diagnosis of White Coat Hypertension
- Diagnosis of Masked Hypertension
- Assessment of prognostically important asleep and early morning blood pressures
- Monitoring efficacy of treatment

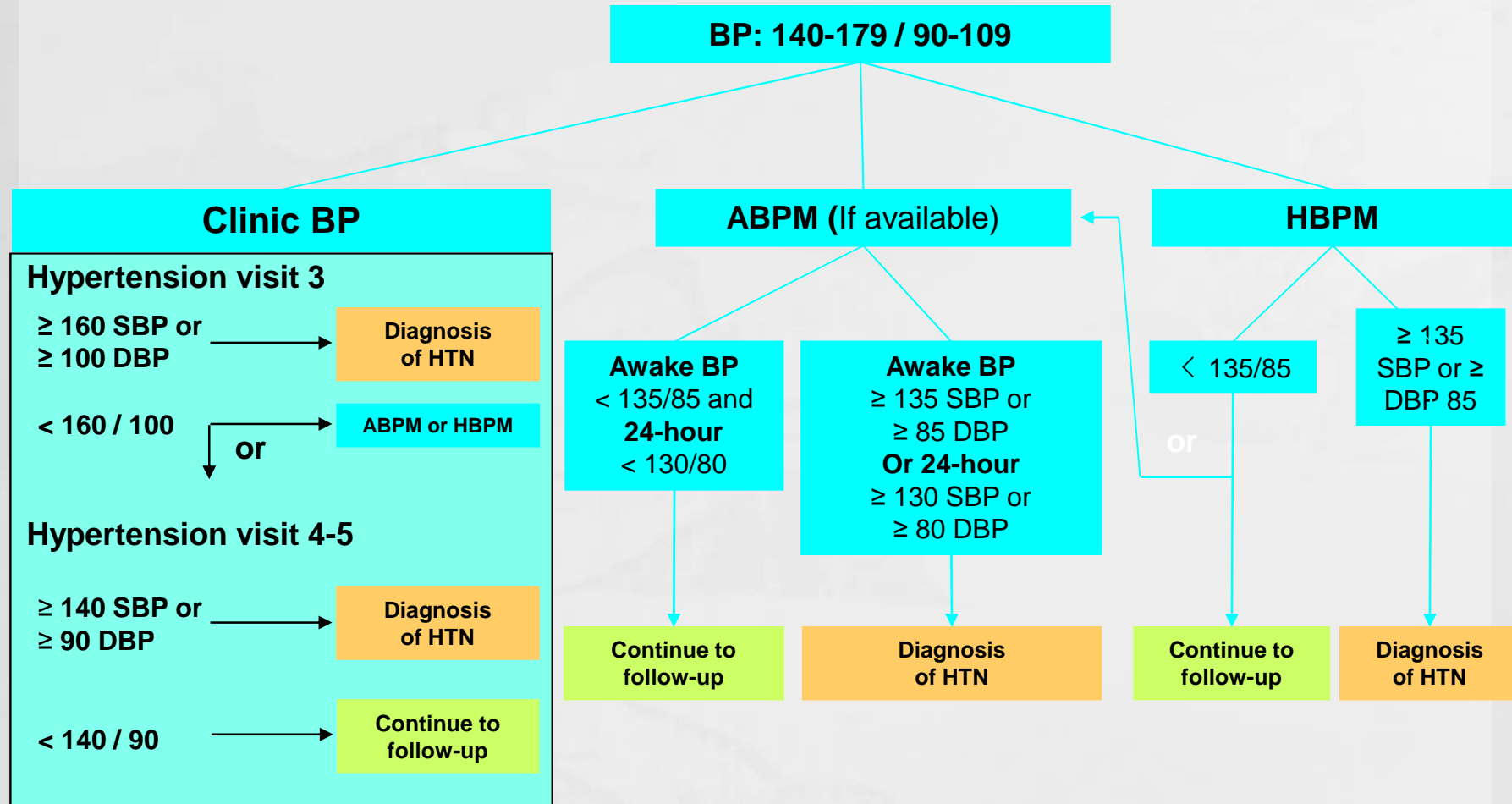
# Diagnostic algorithm for high Blood Pressure including Office, ABPM and Home Blood Pressure Measurement



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## **“Normal” Values**

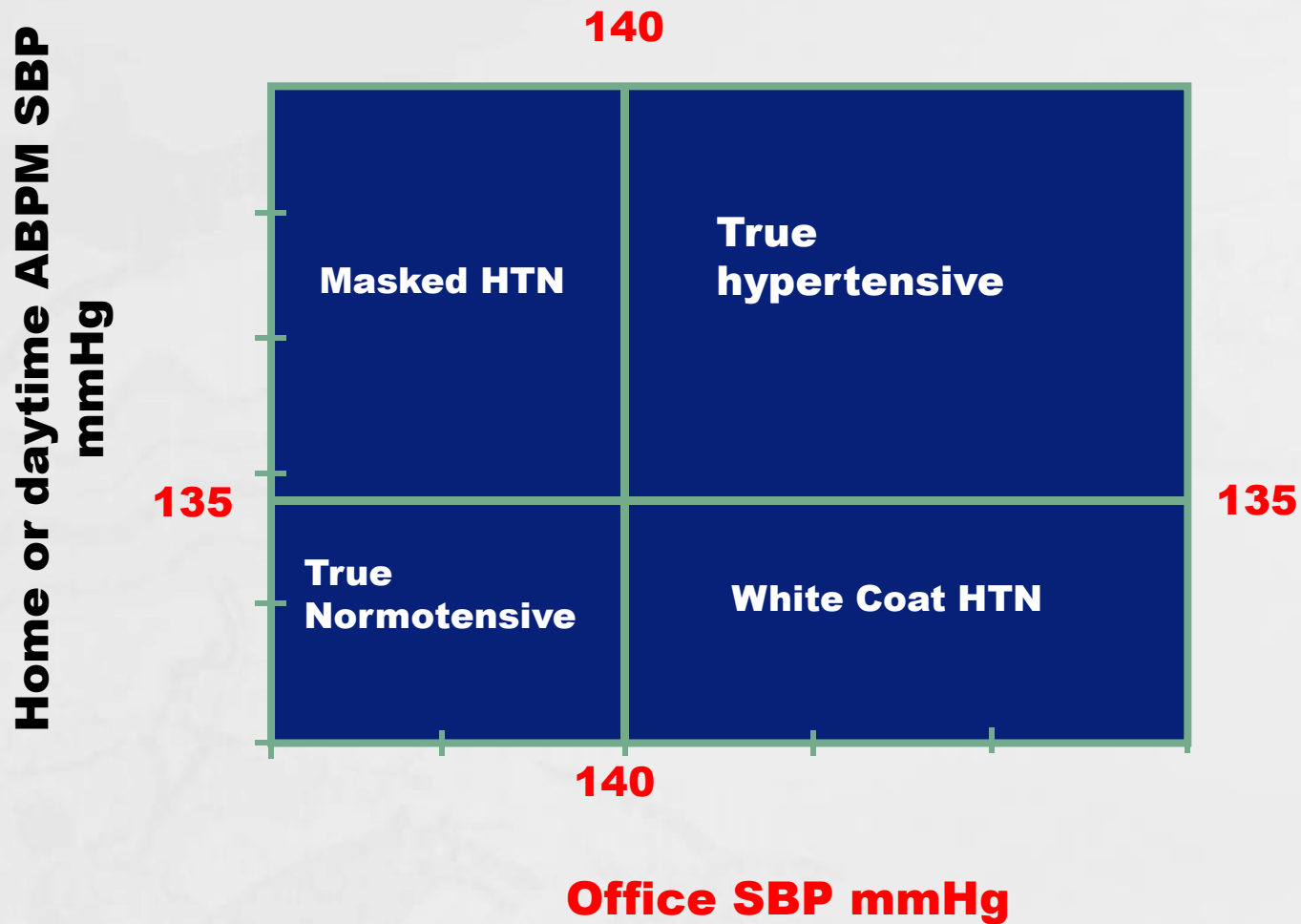
Office BP < 140 / 90 (< 130/80 for DM, CKD, TOD)

ABPM awake average < 135/85 (125/75 for DM, CKD, TOD)

ABPM asleep average < 120/70

Home BPM average < 135/85 (125/75 for DM, CKD, TOD)

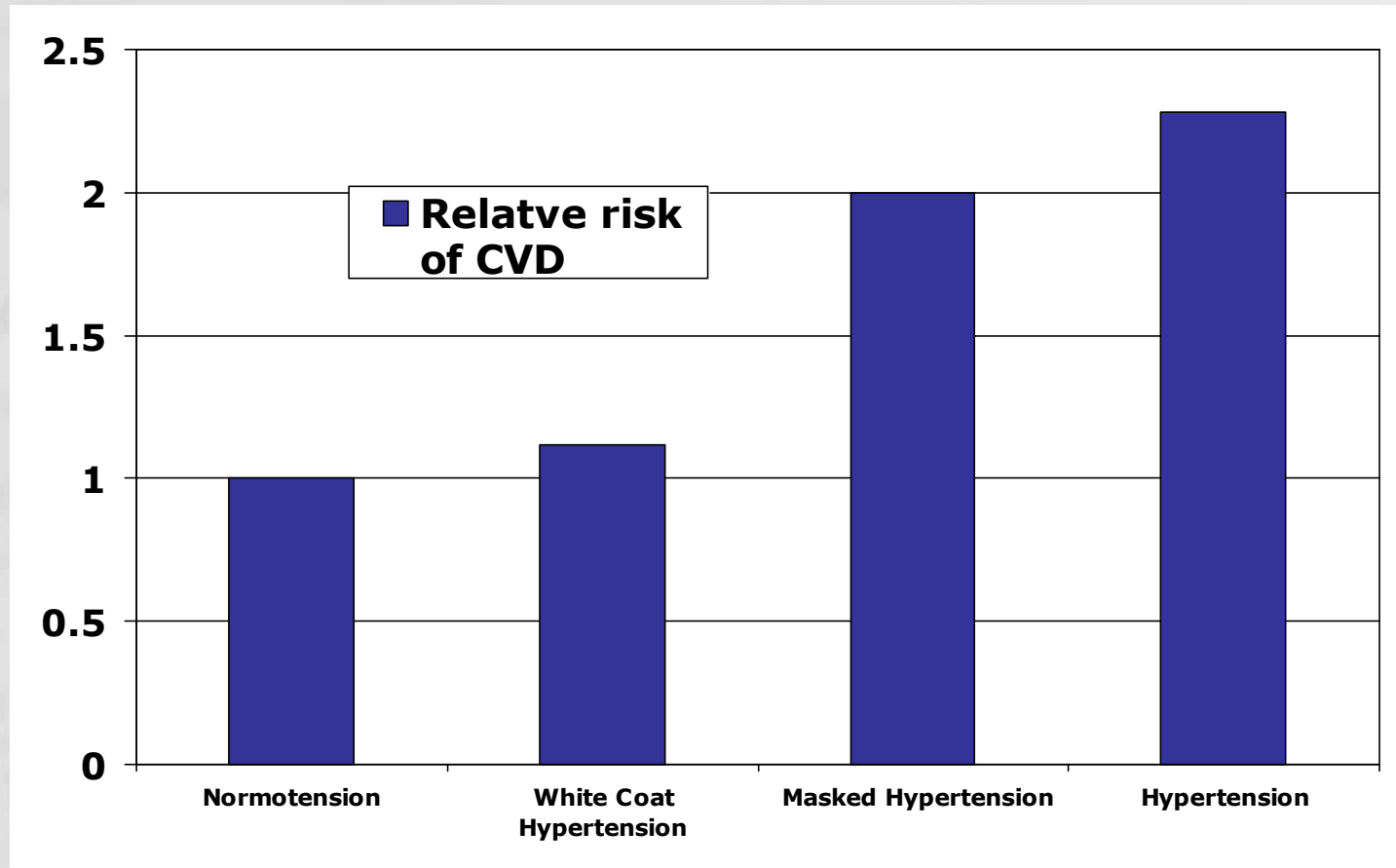
# The concept of masked hypertension



From Pickering, Hypertension 1992

# The prognosis of masked hypertension

Prevalence of masked hypertension is approximately 10% in the general population (prevalence is higher in diabetic patients).



J Hypertension 2007;25:2193-98

# Threshold for Initiation of Treatment and Target Values

<b>Condition</b>	<b>Initiation</b>	<b>Target</b>
	<b>SBP / DBP mmHg</b>	<b>SBP / DBP mmHg</b>
Diastolic $\pm$ systolic hypertension	$\geq 140/90$	$<140/90$
Isolated systolic hypertension	SBP $>160$	$<140$
Home BP measurement (no diabetes, renal disease or proteinuria)	( $\geq 135/85$ )	$<135/85$
Diabetes or chronic kidney disease	$\geq 130/80$	$<130/80$

# Home measurement of blood pressure

**Home BP measurement should be encouraged to increase patient involvement in care**

## **Which patients?**

**For the diagnosis of hypertension**

**Suspected non adherence**

**White coat hypertension or effect**

**Masked hypertension**

**Average BP equal to or over 135/85 mmHg should be considered elevated**

# Benefits of Home Blood Pressure Monitoring

- Rapid confirmation of the diagnosis of hypertension
- Better prediction of cardiovascular prognosis
- Diagnosis of white coat and masked hypertension
- Reduced medication use in white coat effect
- Improved adherence to drug therapy
- Better blood pressure

# Not all patients are suited to home measurement

- Undue anxiety in response to high blood pressure readings
- Physical or mental disability prevents accurate technique or recording
- Arm not suited to blood pressure cuff (e.g. conical shaped arm)
- Irregular pulse or arrhythmias prevent accurate readings
- Lack of interest

**The vast majority of patients can be trained to measure blood pressure**

## Suggested Protocol for Home Measurement of Blood Pressure for the diagnosis of hypertension

Home blood pressure values should be based on:

- duplicate measures,
- morning and evening,
- for an initial 7-day period.

Singular and first day home BP values should not be considered.

Daytime average BP equal to or over 135/85 mmHg should be considered elevated

# Home Measurement of BP: Patient Education

## How to?

### Use devices:

- appropriate for the individual
- appropriate cuff size
- validated device
  
- **Adequate patient training in:**
  - measuring their BP
  - interpreting these readings

### Regular verification

- measuring techniques

Values

**$\geq 135 / 85$  mmHg**

should be

considered elevated

**Home measurement can help  
to improve patient adherence**

# Suggested Protocol for Home Measurement of Blood Pressure

## How?

Home blood pressure values for assessing white coat hypertension or sustained hypertension should be based on:

- Duplicate measures,
- Morning and evening,
- For an initial 7-day period.
  
- Single readings and
- First day home BP values should not be considered.

For patients treated for hypertension

- Morning measurement should be done before medication taking

# Home Measurement of BP: Patient Education

## **Assist patients select a model with the correct size of cuff**

Measure and record the patients mid arm circumference so they can match it to cuff size

## **Recommend devices validated by British Hypertension Society**

**Ask patients to carefully follow the instructions with device and to record only those blood pressure readings where they have followed recommended procedure**

## **Advise patients that average readings equal to or over 135/85 mmHg are high**

a lower threshold is appropriate for those with diabetes or chronic kidney disease

Values equal to or over **135 / 85 mmHg** should be considered elevated for those without diabetes or chronic kidney disease

**Home measurement can help to improve patient adherence**

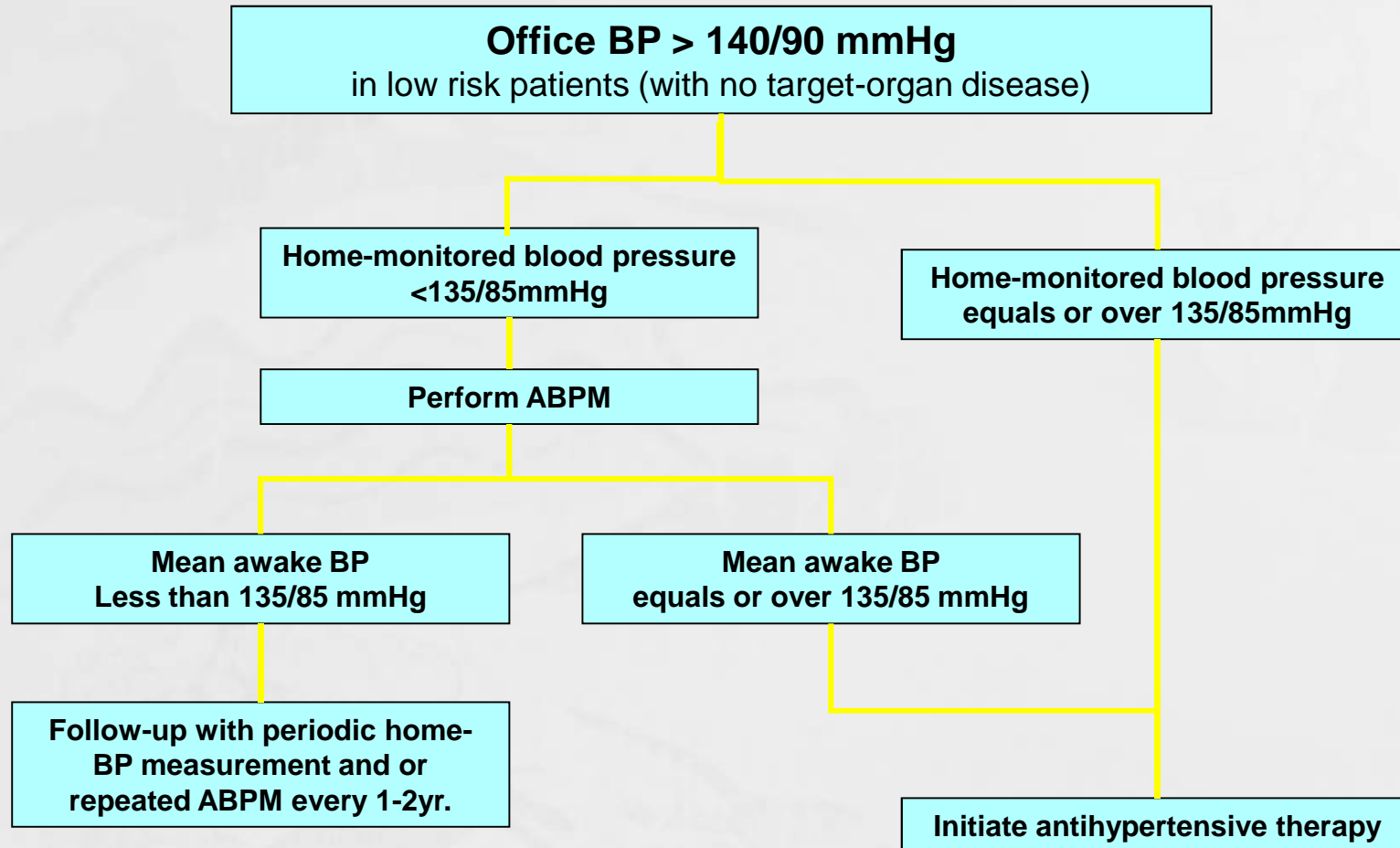
# Which monitor to recommend to patients?

British Hypertension Society maintains an updated list of validated home BP monitors

**[http://www.bhsoc.org/bp\\_monitors/automatic.stm](http://www.bhsoc.org/bp_monitors/automatic.stm)**

(or Google “British Hypertension Society” and click on “Blood pressure Monitors”)

# Suggested use of ABPM AND Home BPM in the Management of Hypertension



ABPM: Ambulatory Blood Pressure Monitoring BP: Blood Pressure

Adapted from White W, NEJM 348:24, June 12, 2003

## Special Indications for ABPM

### (1) Suspect white coat hypertension

20% of individuals with office hypertension have normal profile on ABPM

These people do not generally require drug therapy (although their risk is slightly higher than true normotensives)

They have a higher risk of progression to established hypertension and need to be followed long-term (may need eg annual ABPM)

## **(2) Masked Hypertension**

Office BP < 140/90 (or 130/80 in DM or CKD) with:

- awake average BP on ABPM  $\geq$  135/85 (125/75 in DM or CKD)

*or*

- or 24 hour average BP on ABPM  $\geq$  130/80 (120/70 in DM or CKD)

Suspect where target organ damage with normal office blood pressures

Untreated associated with adverse prognosis

### **(3) Assess Nocturnal Dip and Morning Surge**

Average asleep blood pressure should be at least 10% lower than average awake blood pressure (“nocturnal dip”)

“Non-dipper” status associated with adverse cardiovascular prognosis (common in states of sympathetic overactivity eg diabetes and CKD)

Highest blood pressures usually in the early morning (6-10am) – highest risk time for MI and stroke. Exaggerated surge ( $> 160/100$ ) is a significant risk factor even when average blood pressure adequately controlled. (NB many “24-hour” antihypertensive meds are wearing off at the time of highest risk)

Both non-dipping and morning surge can be addressed by appropriately timed adjustment to meds

- use drugs known to have long  $\frac{1}{2}$  lives
- evening or bedtime dosing or 1 or more drugs (or even 3am if getting up to PU at that time)

## **(4) Assess Efficacy of Treatment**

Some treated hypertensives have an office “white coat” effect and appear to be resistant to increasing therapy - these individuals may need serial ABPM to monitor the effect of therapy. Home BP monitoring is also useful in these individuals

## **CONCLUSION:**

Ambulatory and Home Blood Pressure Monitoring are now an integral (evidence-based) part of hypertension management and should be widely used.