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Ohio Cardiovascular and Diabetes Health Collaborative



In partnership with:



Overview of Undiagnosed/ Masked Hypertension

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Objectives



- Provide an overview of the prevalence and impact of Masked Hypertension (MH) on cardiovascular outcomes.
- Summarize the risk factors and diagnostic evaluation for MH.
- Recognize treatment implications in patients with MH.

Significance of Out of Office Blood Pressure Readings



- The primary reason is to identify patients not on antihypertensive medication with:
 - White Coat Hypertension (WCH) with elevated office blood pressure (BP) who may not require drug treatment
 - Masked Hypertension (MH) with normal office readings who should be considered for drug treatment
- In addition, for patients on antihypertensive medications, to identify:
 - White Coat Effect (WCE) – where office BPs are significantly higher than out of office readings
 - Masked Uncontrolled Hypertension (MUCH) – where office readings indicate adequate BP control but out of office readings are elevated

White Coat Hypertension (WCH) and Masked Hypertension (MH)



- The prevalence of WCH and MH is between 10-30% each depending on the study.
- The risk of cardiovascular morbidity and mortality for MH is about the same as adults with sustained hypertension, indicating a benefit to treatment.
- While there appears to be an increased risk of cardiovascular morbidity with MH, we do not know if there is a benefit to treating these individuals.

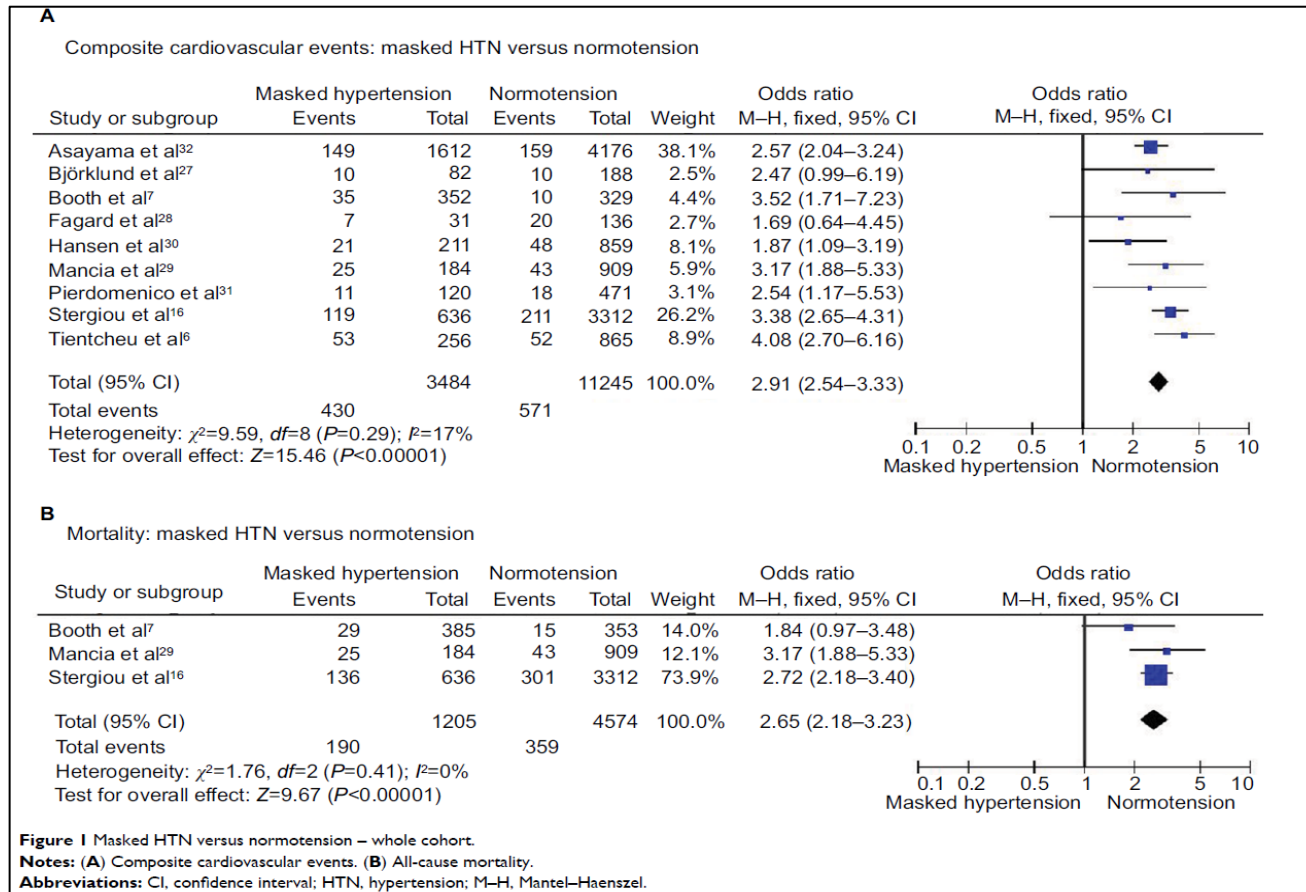
Up to 30% of patients in our practices are either over or under-treated for hypertension.

Characteristics of Masked Hypertension

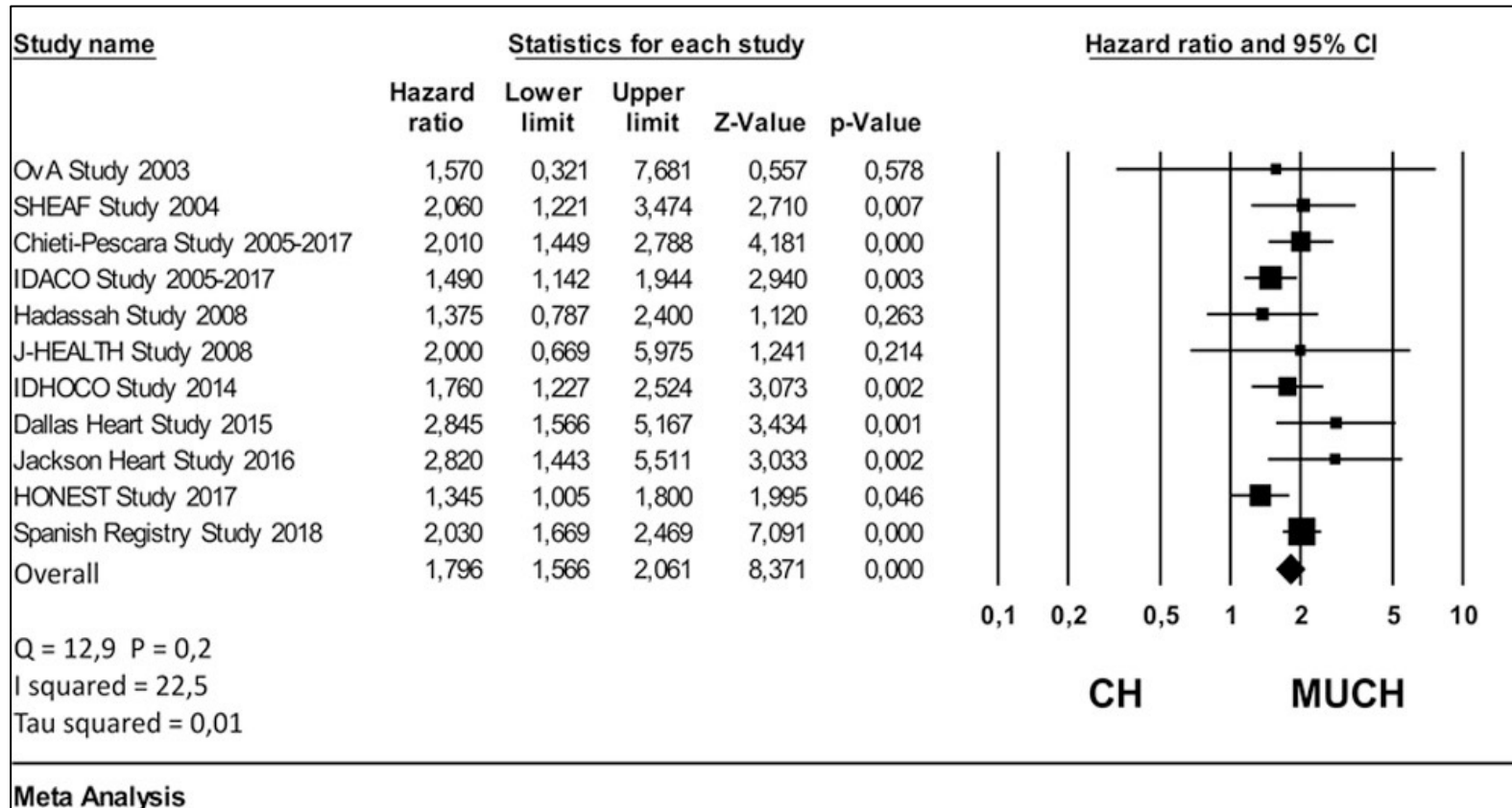


- MH prevalence averages ~ 13% and up to 30% in some surveys.
- Prevalence increases with higher (normal) office readings.
- Increased prevalence of MH also seen in older persons, males, Blacks, and those with obesity, diabetes, chronic kidney disease (CKD), and sleep apnea.
- Large longitudinal cohort studies show ***cardiovascular disease (CVD) risk similar to that of sustained hypertension.***
- Overlap between MH identified by home blood pressure monitoring (HBPM) and ambulatory blood pressure monitoring (ABPM) only 60-75% though both show same CVD risk compared to never-treated hypertensives (NTH) and sustained hypertension (HTN).
- Randomized controlled trial (RCT) data evaluating benefit of treatment is not yet available.
- Profiles of risk for treated patients showing MUCH parallel that of MH respectively.

CVD and Mortality with MH vs. Normotension



Comparison of Outcomes in MUCH vs. Controlled Hypertension

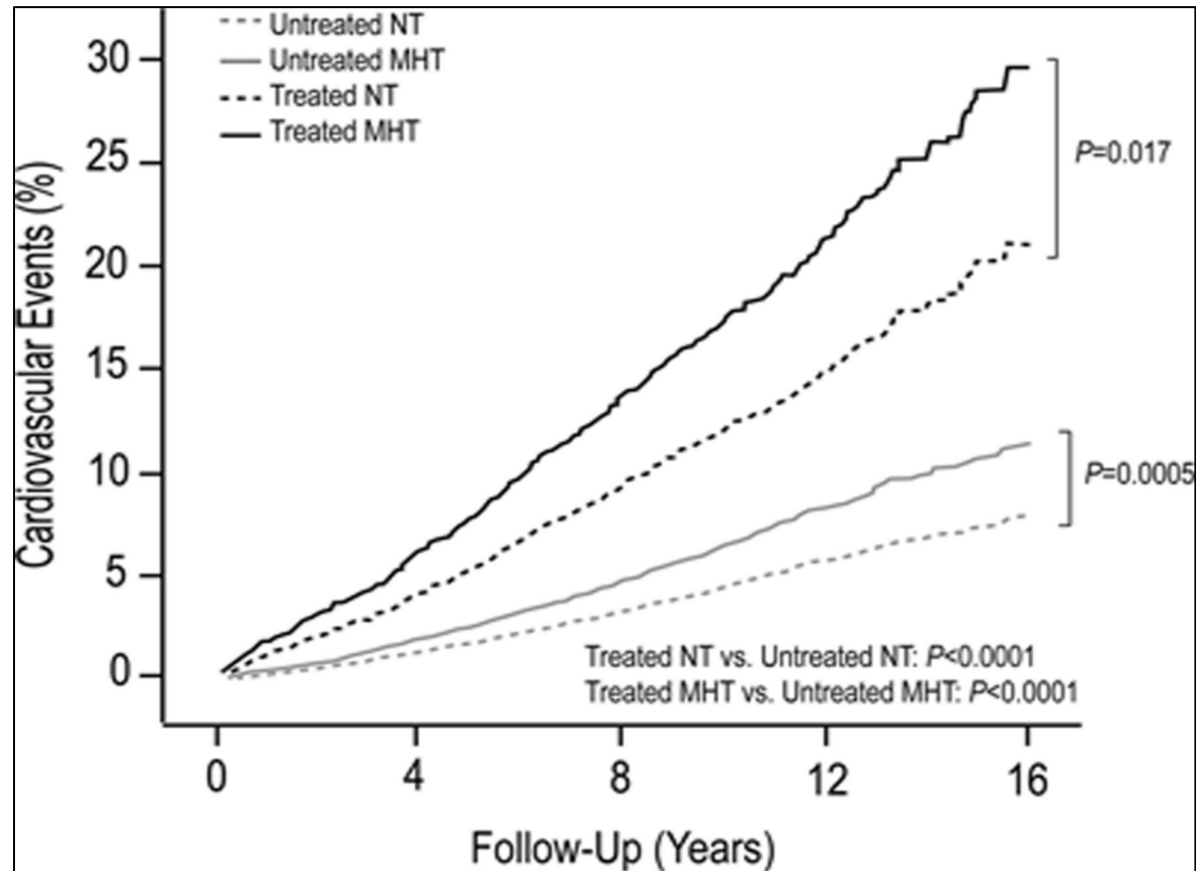


Cohort, Sex, and Age-Standardized Incidence of Cardiovascular Events Meta-analysis from International Database on Ambulatory Blood Pressure in Relation to Cardiovascular Outcomes (IDACO)



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- Untreated and treated normotensive (NT) and masked hypertensive (MHT) nondiabetic subjects
- Significant higher incidence of cardiovascular events in:
 - Treated patients with MUCH versus treated patients with BP controlled
 - Patients with MHT versus untreated normotensive patients
- Fully adjusted hazard ratios (HR) for treated versus untreated MHTs are as follows: HR, 2.27 (95% confidence interval, 1.6–3.2; $P < 0.0001$)



Masked Hypertension by Ambulatory Blood Pressure Monitoring and Home Blood Pressure Monitoring

- ABPM is more sensitive than HBPM in detecting MH
 - ABPM missed the detection of MH between 9-21% as detected by HBPM
 - HBPM missed the detection of MH 48-61% as detected by ABPM

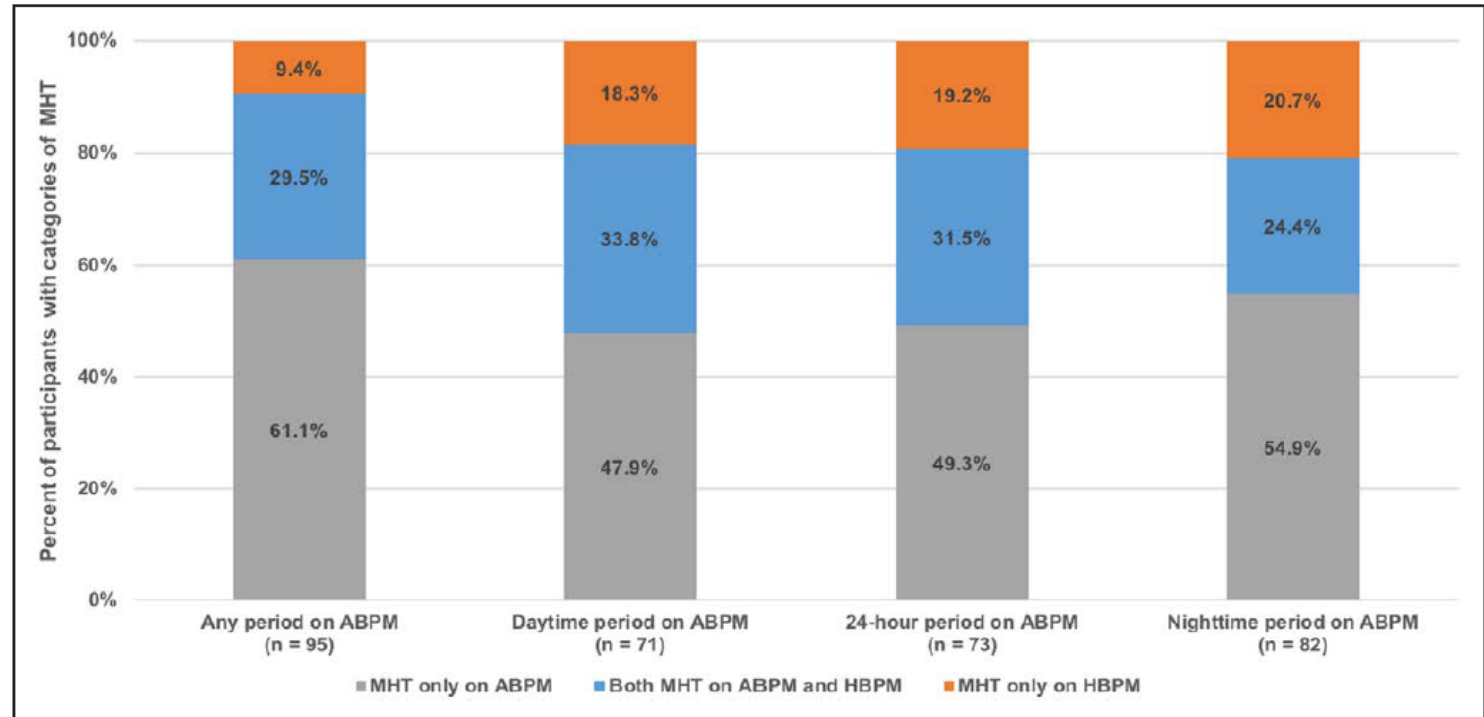
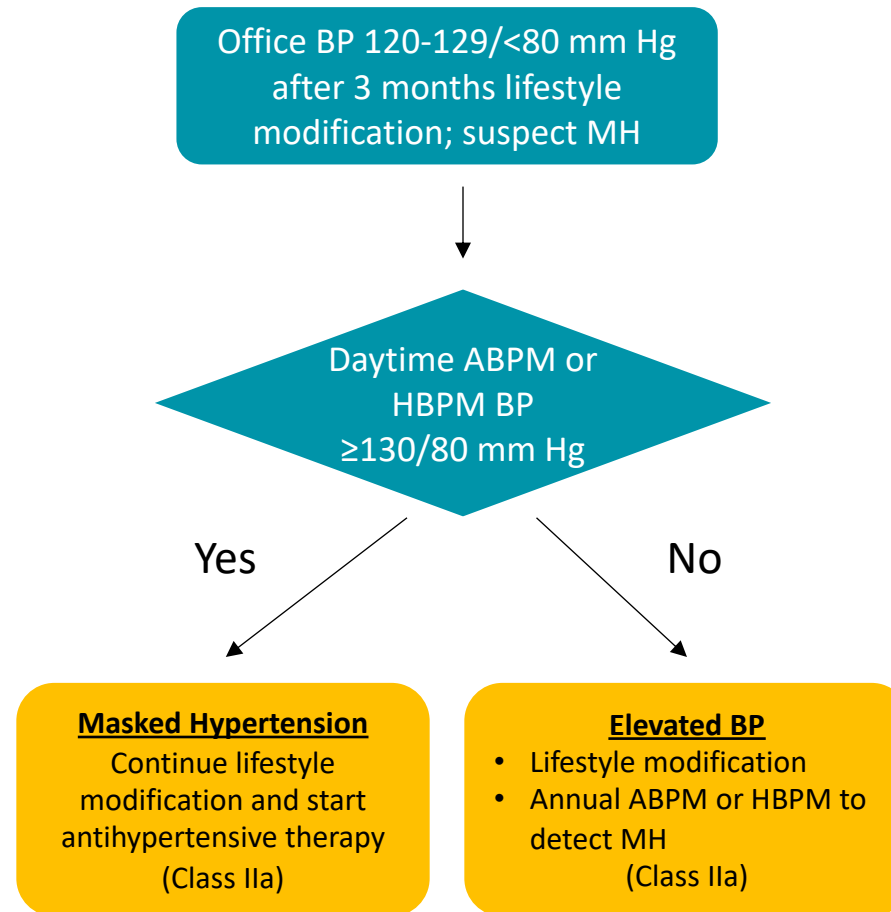


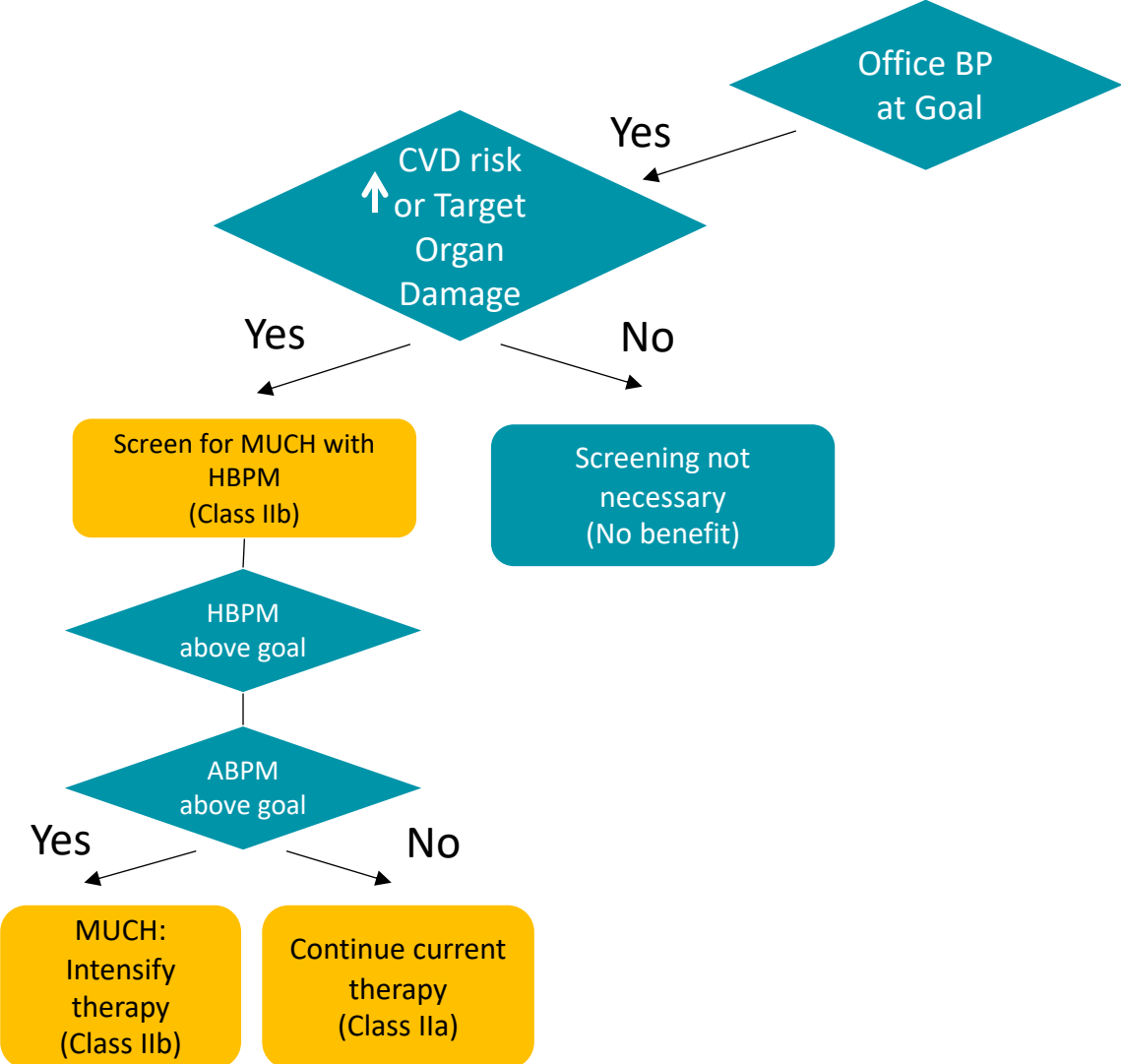
Figure. Distribution of participants into categories based on the absence or presence of masked hypertension (MHT) on ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM).

Detection of MH in Patients not on Drug Therapy



ABPM = ambulatory BP monitoring; HBPM = home BP monitoring

Detection of Masked Uncontrolled Hypertension in Patients on Drug Therapy



Summary/Conclusions

- MH prevalence averages ~ 13% and up to 30% in some surveys
- Prevalence of MH increases with higher (normal) office readings
- Increased prevalence of MH also seen in older persons, males, Blacks, and those with obesity, diabetes, CKD, and sleep apnea
- Large longitudinal cohort studies show **CVD risk similar to that of sustained hypertension**
- Overlap between MH identified by HBPM and ABPM only 60-75% though both show same CVD risk compared to NTH and sustained HTN
- **Likely due to capability for nocturnal BP measurements, ABPM more sensitive than HBPM for detecting MH**
- RCT data evaluating benefit of treatment is not yet available
- Profiles of risk for treated patients showing MUCH parallel that of MH respectively