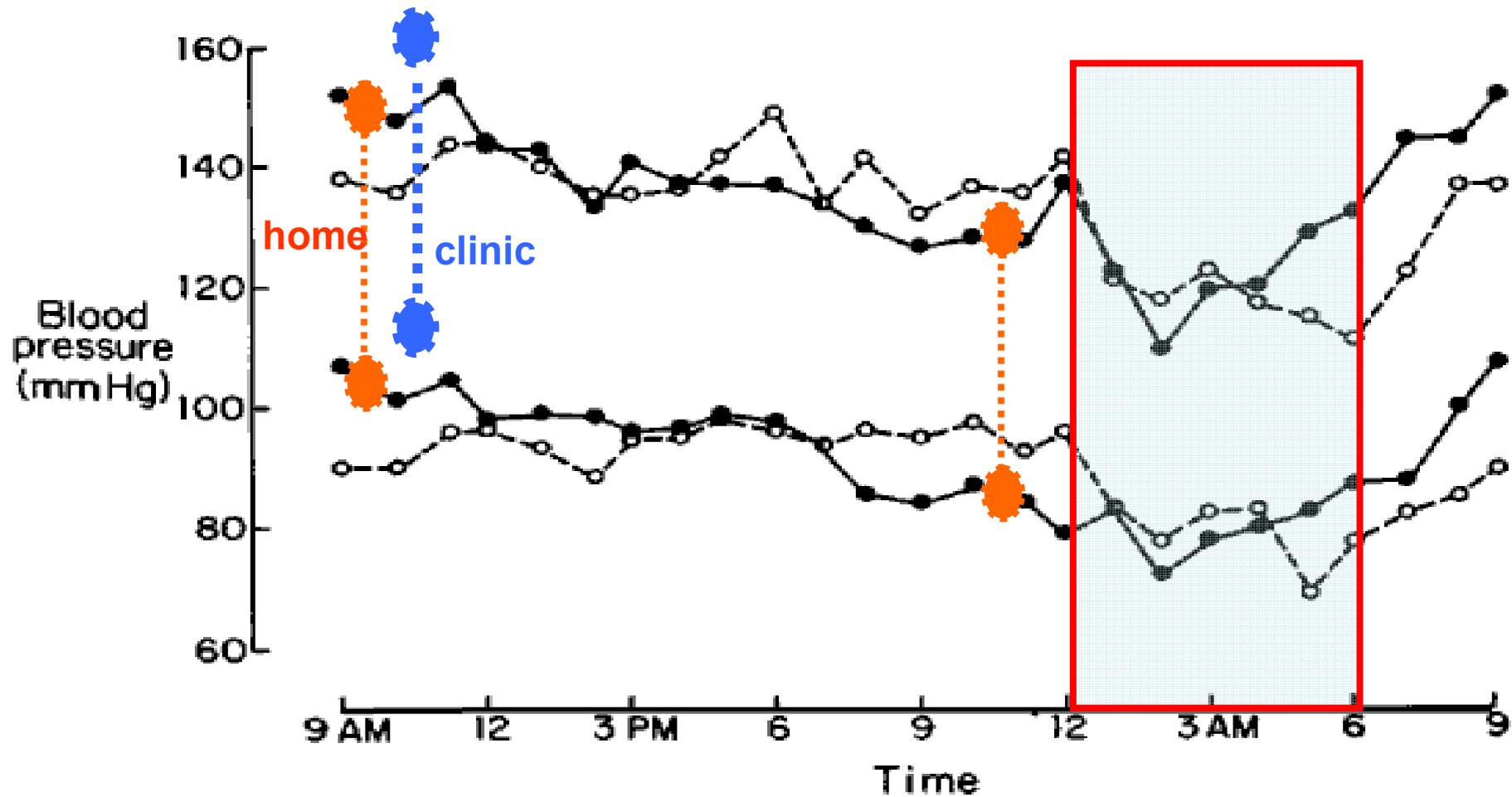


Masked and Morning Hypertension

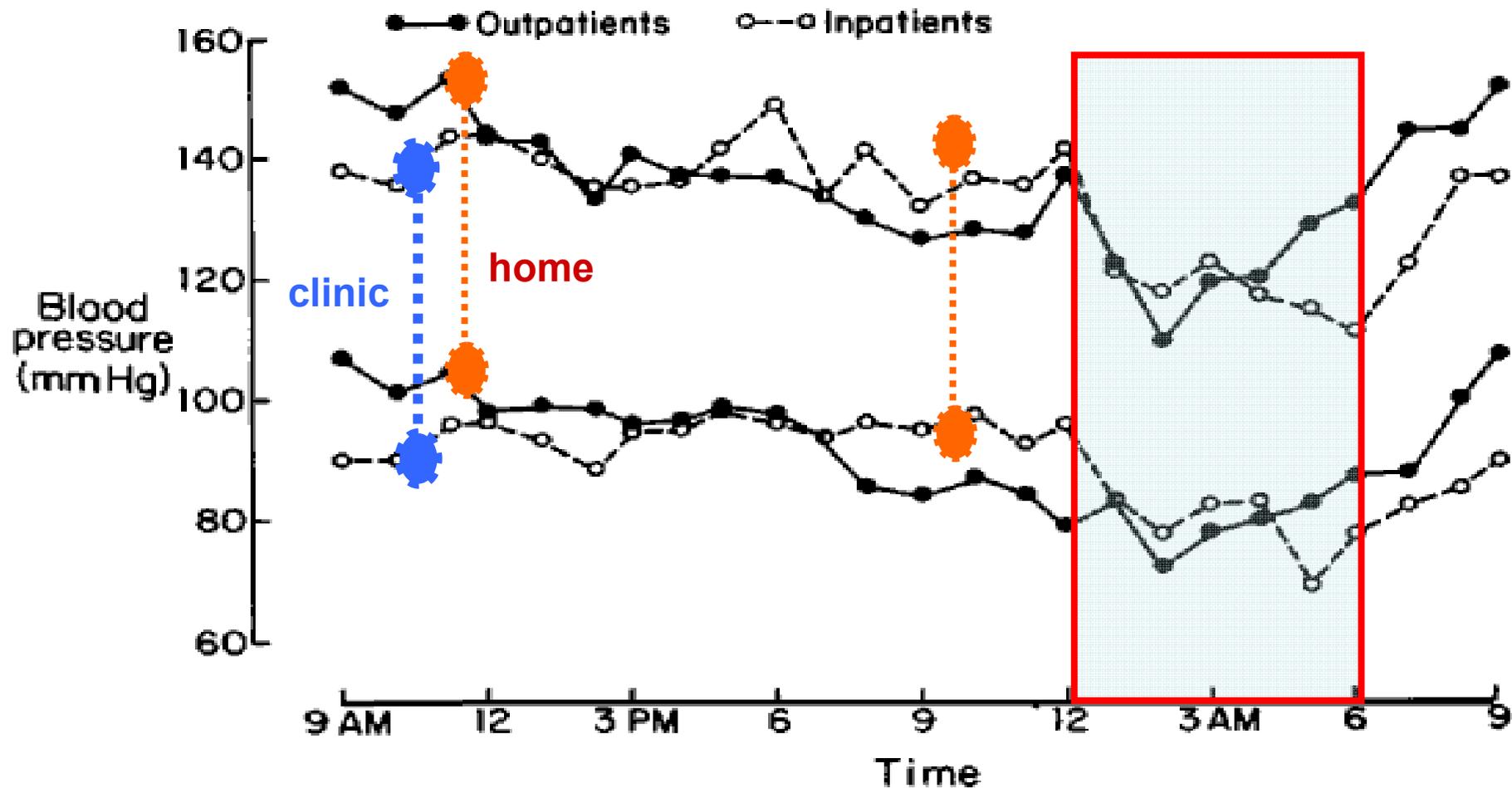
관동의대 제일병원 내과 박정배

2007 4 19 춘계순환기학회, 부산 Bexco

ABPM 과 Home BP 를 이용한 고혈압의 증명

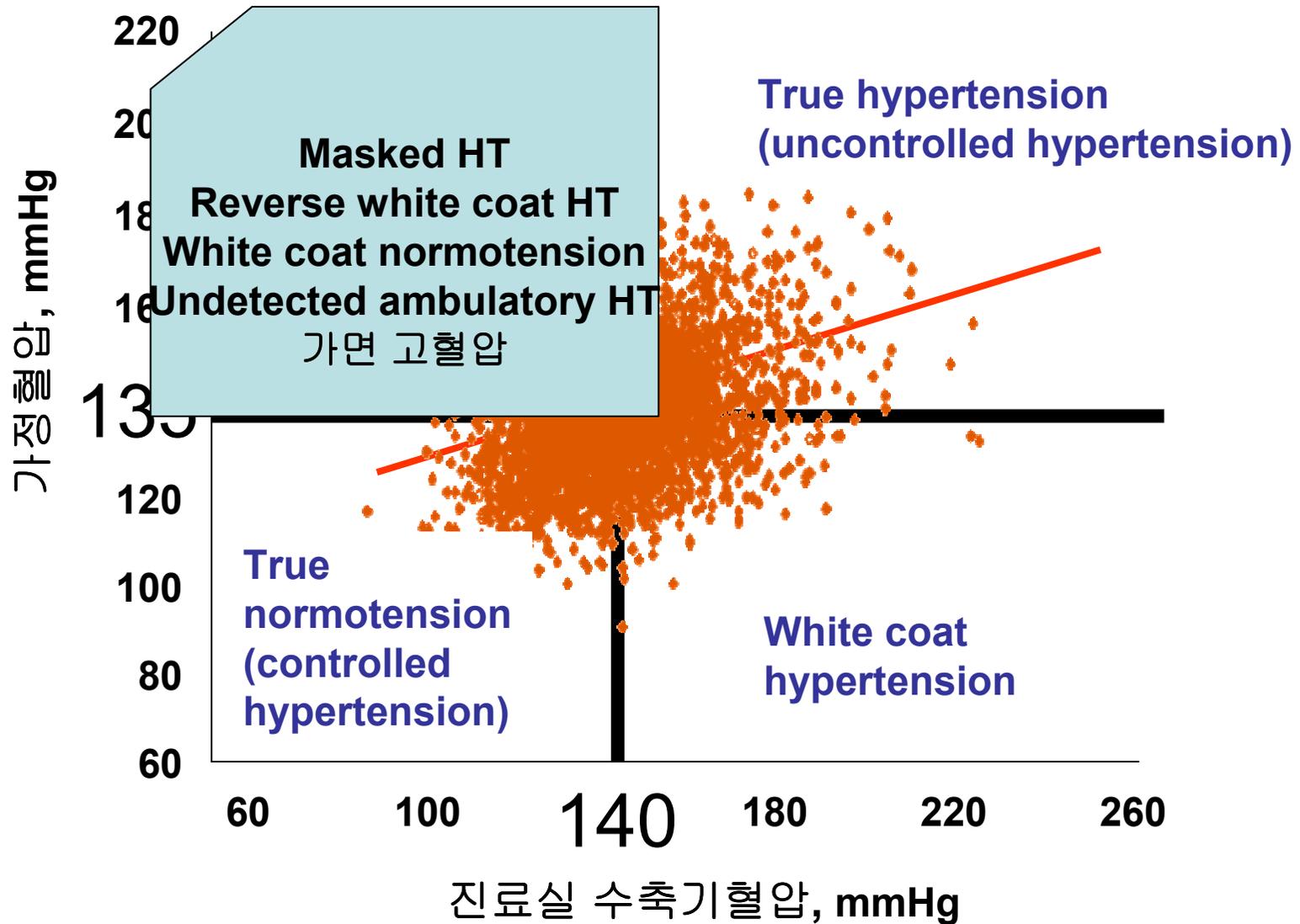


Masked Hypertension



Four potential group by ABPM and Home BP

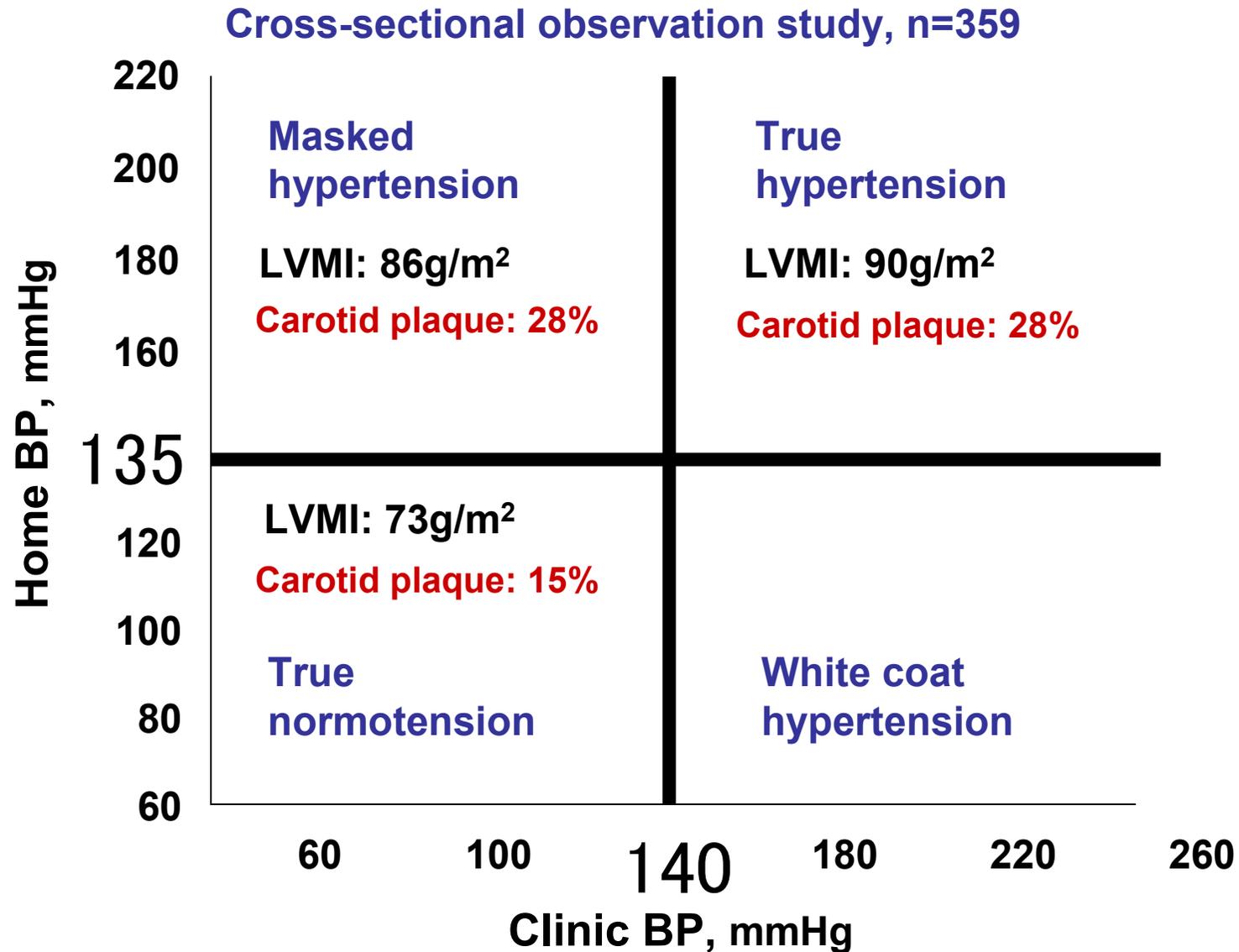
Masked, white coat, and uncontrolled hypertension?



Issues on Masked Hypertension Phenomenon

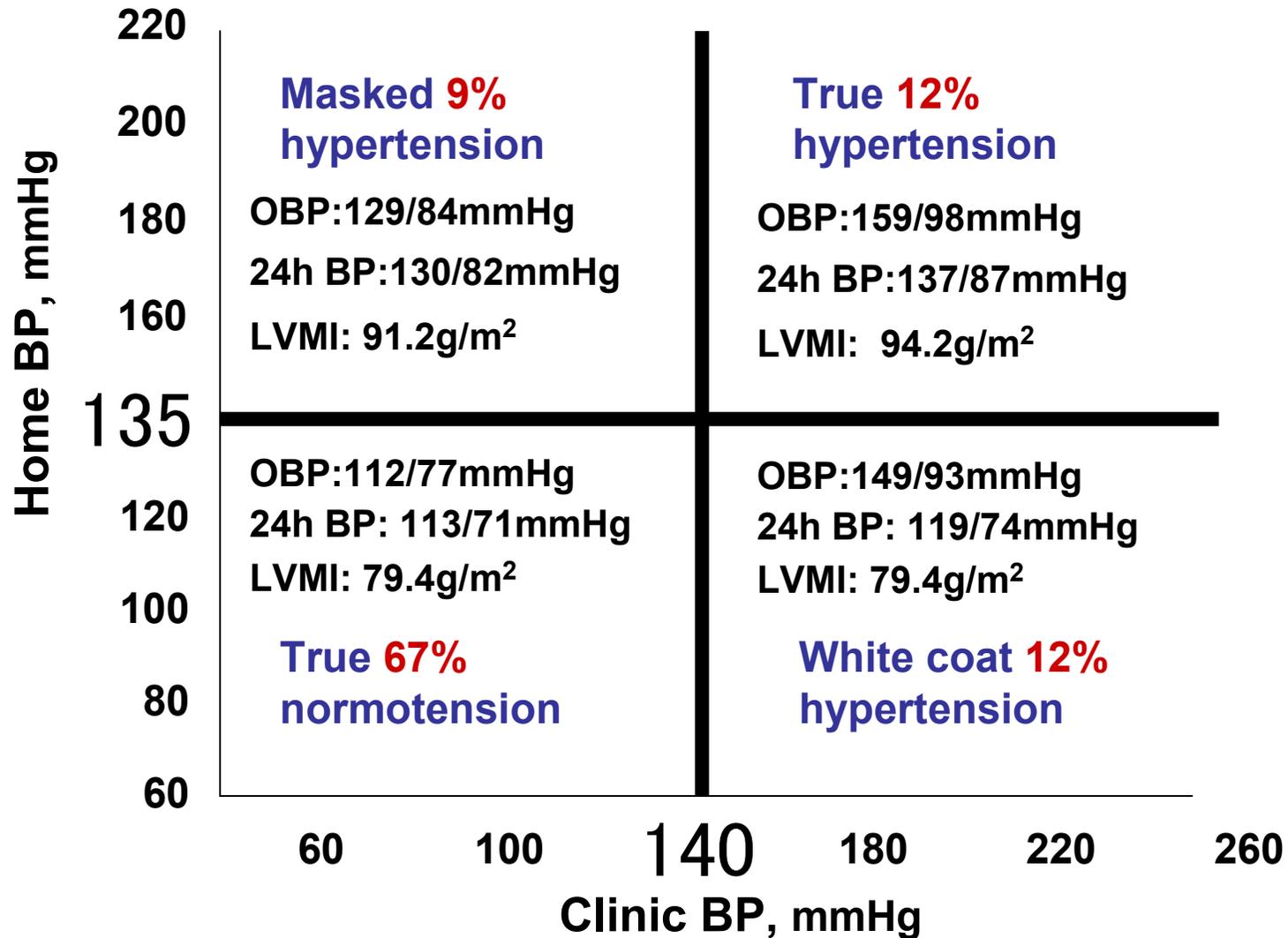
- 1) Credibility; reproducibility ?**
- 2) More extensive TOD?**
- 3) At increased risk of CV morbidity?**

Masked HT-more extensive TOD?



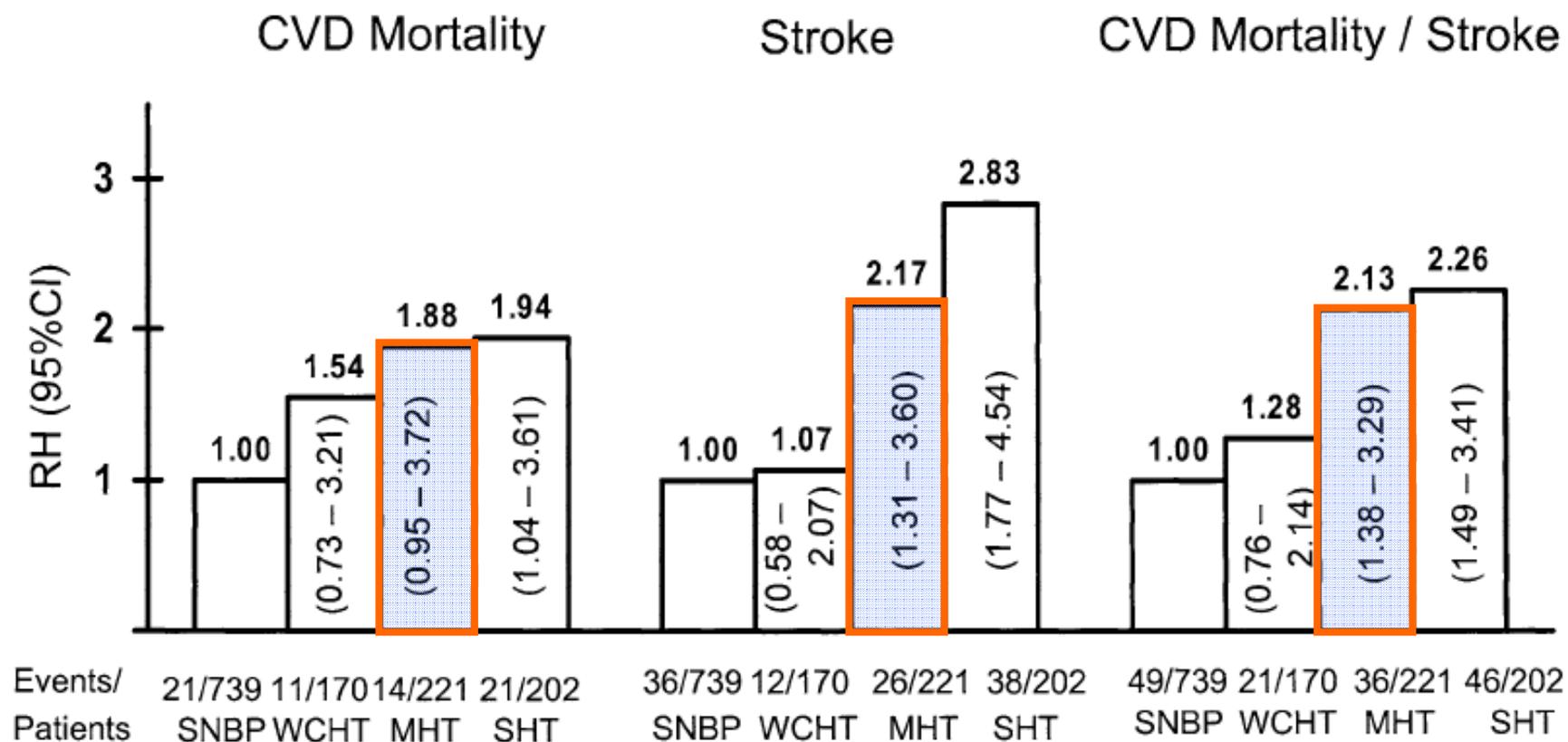
Masked HT-more extensive TOD?

PAMELA study : 3,200 Italians



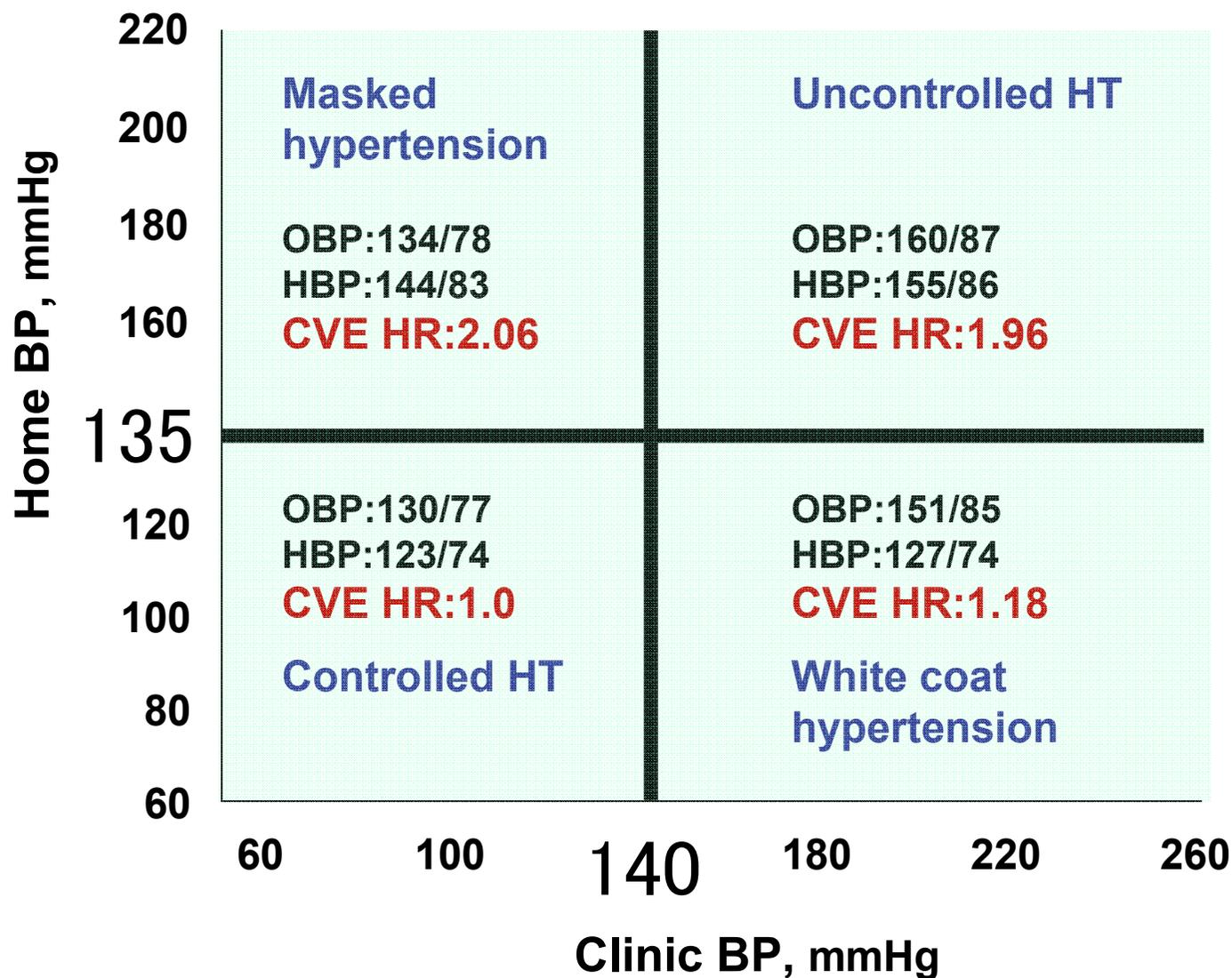
Masked Hypertension: At increased risk of CV morbidity

10 year follow-up from the Ohasama Study: ABPM



CV Prognosis of “Masked Hypertension” Detected by BP Self-measurement in Elderly Treated Hypertensive Patients

Cohort 4939, age 70±6.5, F/U 3.2 years



What factors might lead to masked hypertension?

First, the clinic pr. could be relatively low in relation to the ambulatory pr.

⇒ Truly normotensives: daytime ambulatory pr. > clinic pr.

Hypertensives: clinic pr. > daytime ambulatory pr.

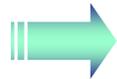
ex) smoker- higher daytime ABP

Second, factors that selectively raise the ambulatory pr.

ex) more physically active subjects

Prevalence of masked hypertension

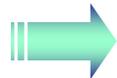
Selenta C, et al. How often do office blood pressure measurements fail to identify true hypertension? An exploration of white-coat normotension. *Arch Fam Med*. 2000;9:533.



23%

Male, past smoker, older, more alcohol

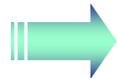
Belkic KL, et al. Hypertension at the workplace: an occult disease? The need for work site surveillance. *Adv Psychosom Med*. 2001;22:116.



13.5%

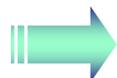
Population based study

Imai Y, et al. Ambulatory blood pressure monitoring in evaluating the prevalence of hypertension in adults in Ohasama, a rural Japanese community. *Hypertens Res*. 1996;19:207.



10.2% >133/78 & 3.2% >144/85 of amb BP

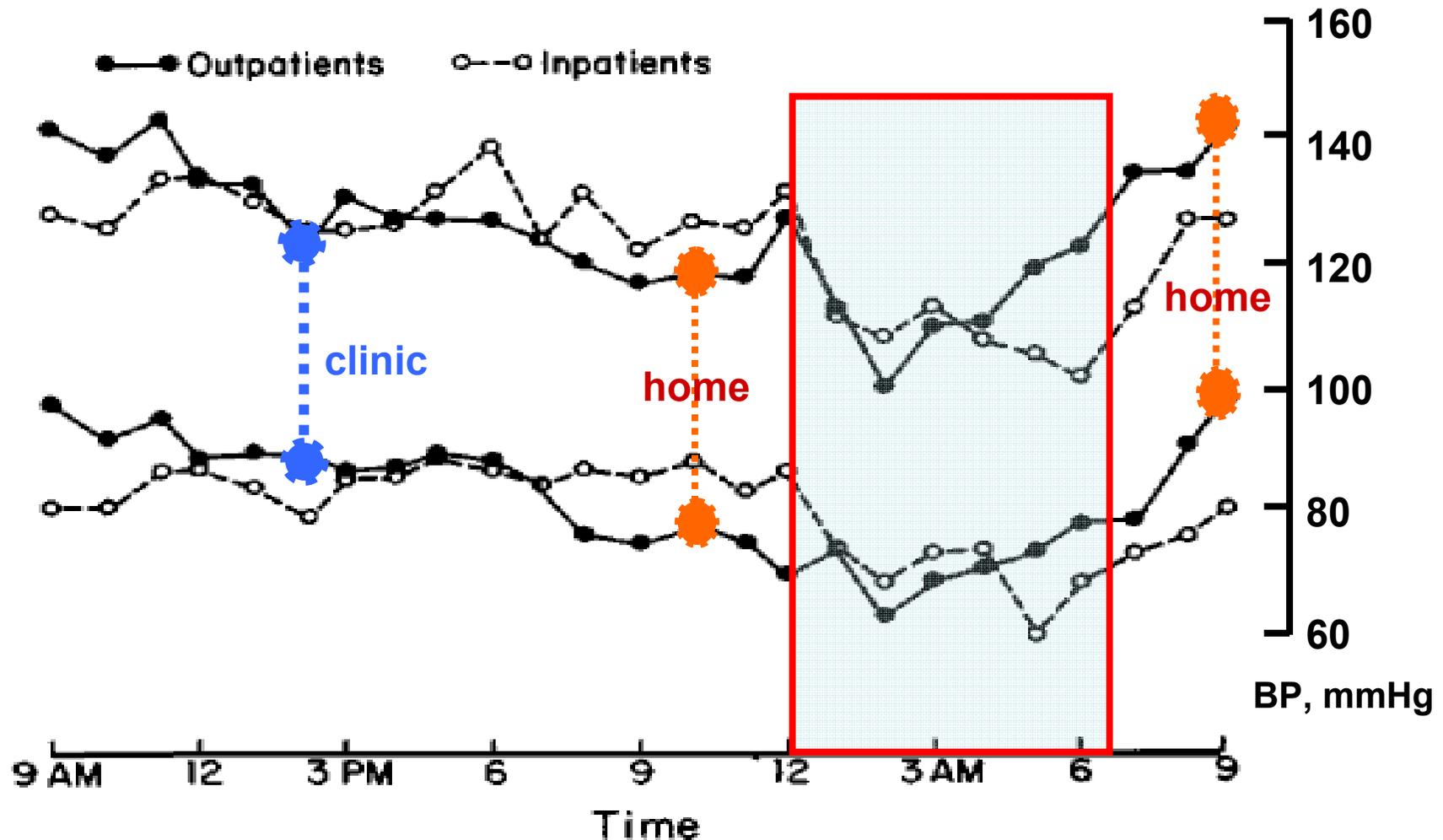
Sega R, et al. Alterations of cardiac structure in patients with isolated office, ambulatory, or home hypertension: data from the general population (PAMELA Study). *Circulation*. 2001; 104:1385.



9%

Morning Hypertension

Elevation of BP (ie, above 135/85 mm Hg) during the first 2 hours after waking, but not in the evening (the last 2 hours before going to bed).



BP DIFFERENCES OVER THE COURSE OF THE DAY

➤ **The changes over 24 hours appear to be rather closely related to the cycle of wakefulness and activity.**

➤ **The diurnal BP rhythm is closely paralleled by the incidence of most types of CV events, which peak during the hours between 6 AM and noon.**

➤ **Whether or not the morning or evening BP is higher may depend on where the study was done: at least 4 Japanese studies have reported that evening BP tends to be lower (by 3–10 mm Hg), whereas 3 Western studies found the opposite.**

➤ **Morning HT:**

patients with hypertension (treated>), men, more alcohol, elderly

MORNING VS EVENING BPs AND RISK I

morning pressure is more closely related to TOD

- office and home BPs, predicted albuminuria and LVM at least equally to ABPM. LVMI correlated slightly more strongly with morning home BPs than evening BPs ($r=0.46/.43$; $P<.001$ and $r=0.41/.37$; $P<.001$, respectively).
- hypertension w/ morning BP peak (defined as an increase of at least 50/22 mm Hg in the first 2 hours after waking vs. average nighttime level) had a greater carotid IMT despite similar daytime and nighttime average BPs
- patients with hypertension and nondiabetic CKD for 3yr F/U, home morning BP was a better predictor of the decline in GFR than evening BP ($r=0.64$ vs 0.56).

MORNING VS EVENING BPs AND RISK II

morning pr. predicts CV outcomes better than others

Ohasama study :

- **morning and evening BP predicted strokes equally well in the general population, but morning readings were superior in patients taking antihypertensive medications.**
- **average ABP during the first 2 hours after waking is an independent predictor of risk**

MORNING HYPERTENSION or MORNING SURGE?

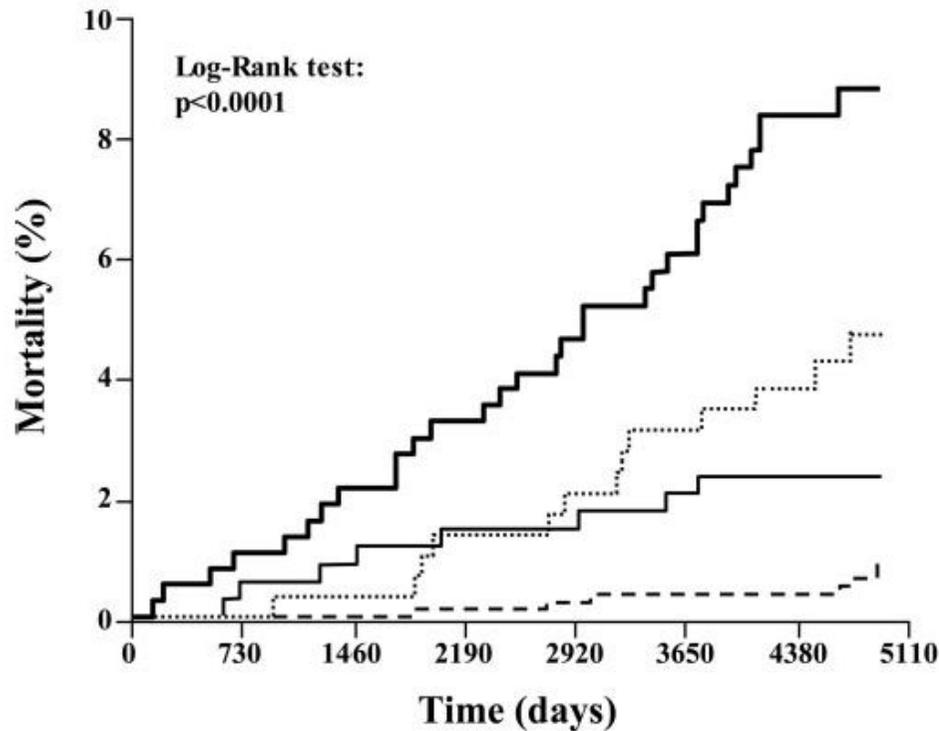
- **patients with the greatest morning surge (average BP in 2 hours after waking- lowest BP during sleep) were at the highest risk of stroke, independently of the average 24-hour level.**
- **morning pressure emerged as the strongest predictor of strokes that included the office, average daytime, nighttime, and evening BP.**
- **morning surge and morning hypertension both predicted risk equally well, but not independently of the other.**

Implications for management and treatment

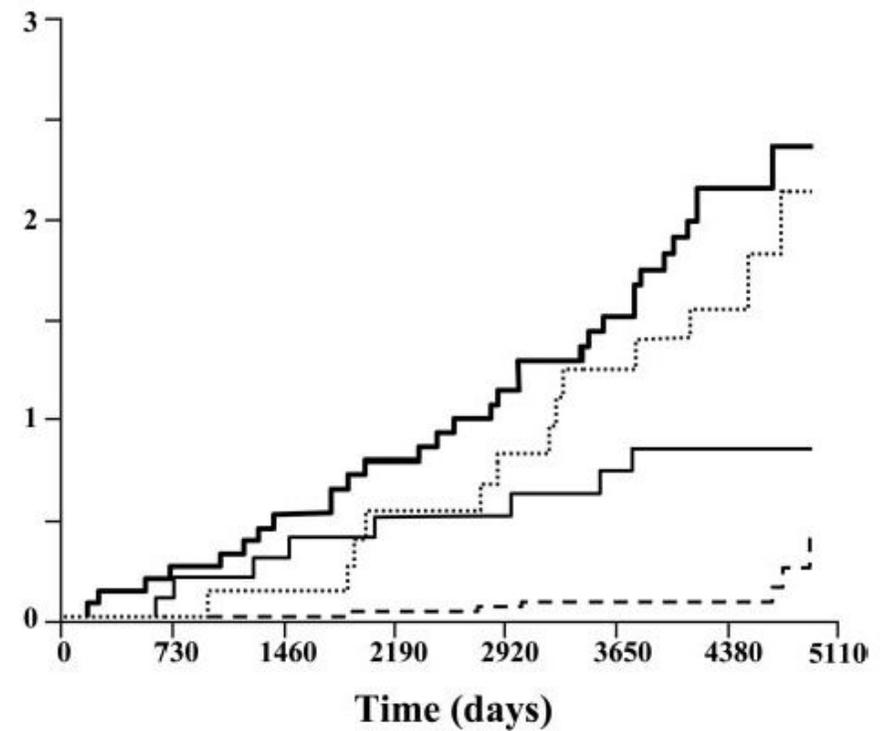
- **Ambulatory BP gives a better prognosis than clinic BP.**
- **Ambulatory BPM to rule out masked hypertension in individuals with FHx of hypertension or other risk factors such as central obesity.**
- **Home BP should be measured both in the morning and the evening, because morning BP may predict risk better.**
- **Whether antihypertensive treatment should focus on lowering the masked hypertension or morning pressure?**
Morning BP : guanabenz > placebo, carvedilol > metoprolol

Incidence of CV fatal events in subjects of the PAMELA population sample (n2051) followed for 148 months

Unadjusted data

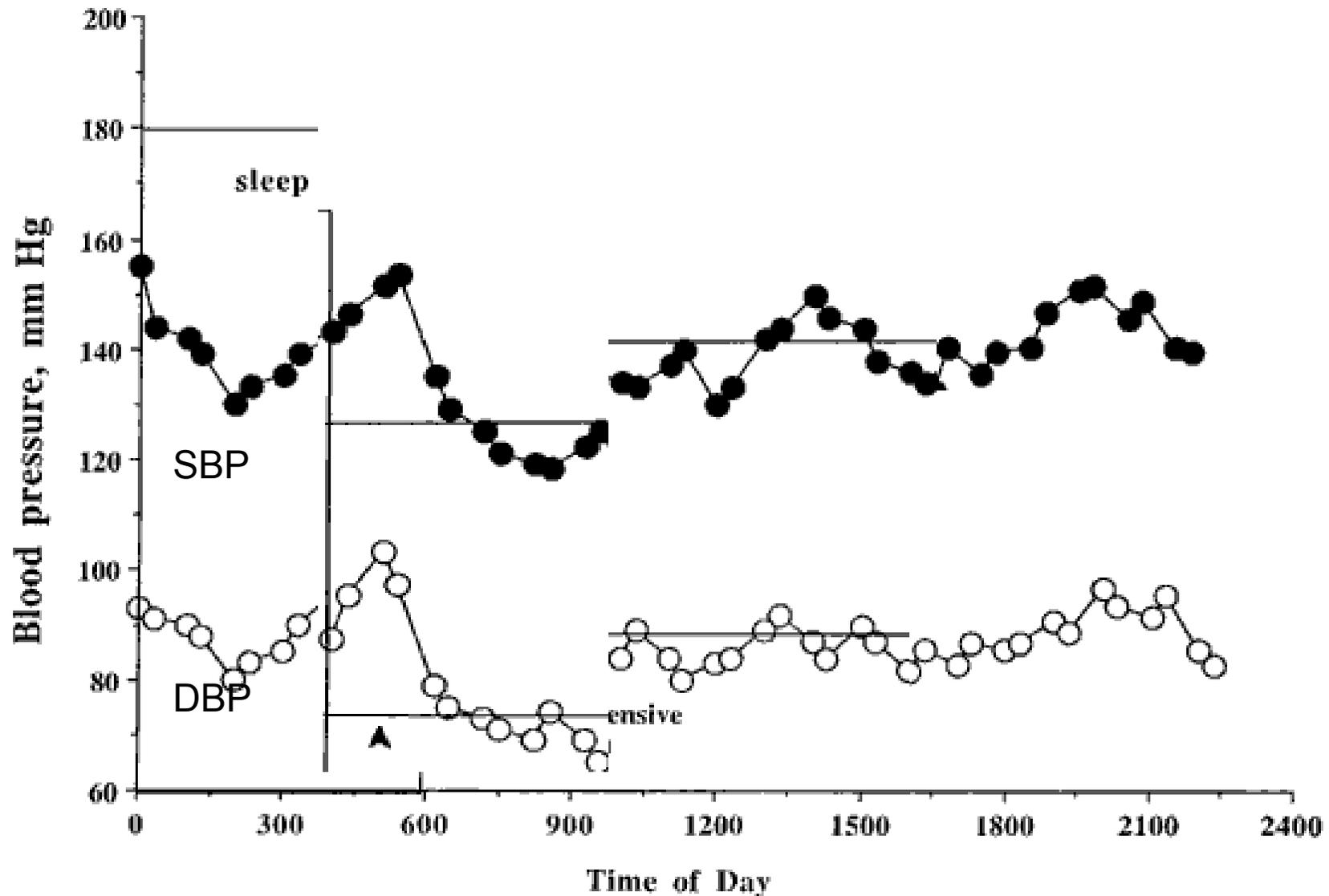


Data adjusted for age / gender



Clinic, Home, ABP

ABPM After antihypertensive medication



혈압 측정방법에 따른 고혈압의 기준점

	수축기 혈압 (mmHg)	확장기 혈압 (mmHg)
진료실 혈압	≥ 140	≥ 90
24시간 활동중 혈압		
일일 평균혈압	≥ 125	≥ 80
주간 평균혈압	≥ 135	≥ 85
야간 평균혈압	≥ 120	≥ 75
가정혈압	≥ 135	≥ 85