

VENERDI' I MARZO

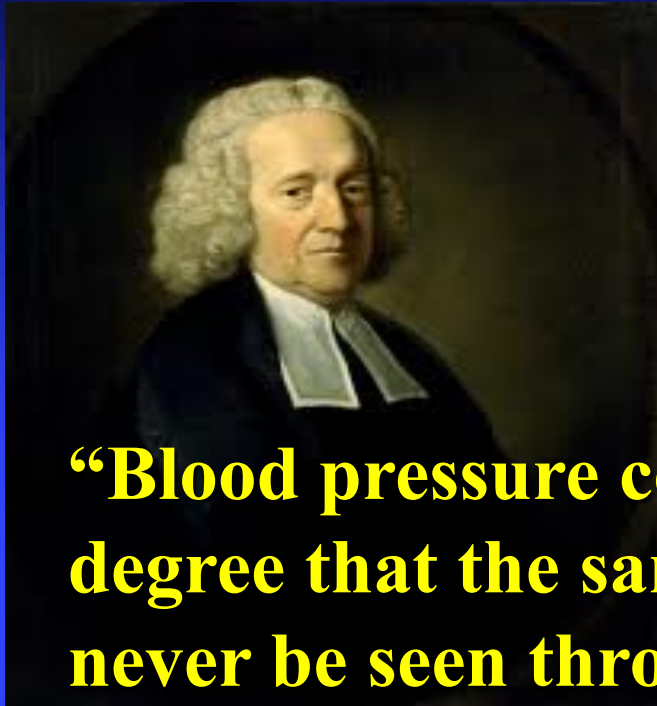
# QUANTO CONTA LA VARIABILITÀ DELLA PRESSIONE ARTERIOSA?

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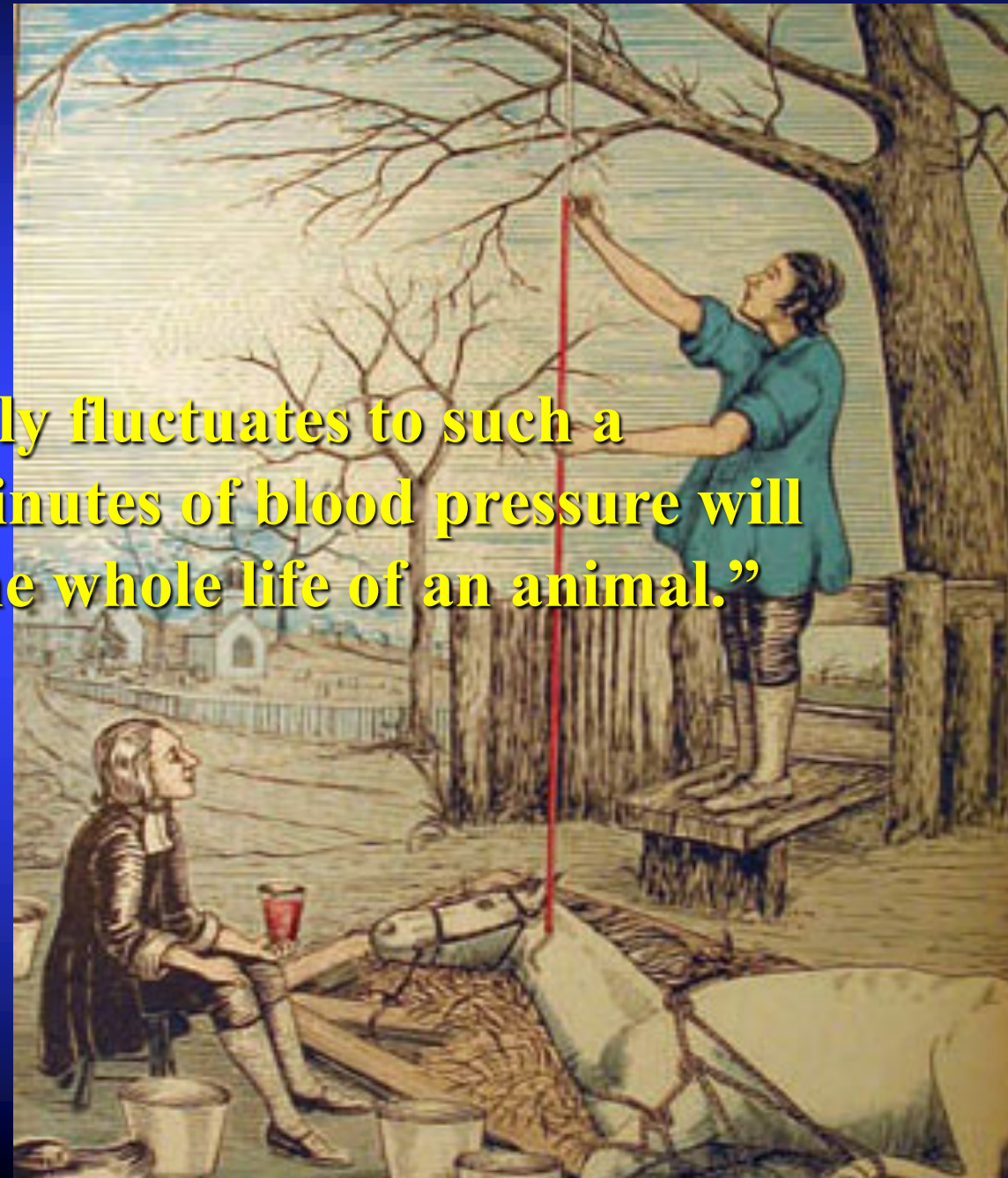


# First measure of Arterial Pressure, Hales 1727



**“Blood pressure continuously fluctuates to such a degree that the same two minutes of blood pressure will never be seen throughout the whole life of an animal.”**

**Stephen Hales  
(1677-1761)**



NUM. 50

10 DICEMBRE 1896

ANNO XLVII

# Gazzetta Medica di Torino

## SOMMARIO

**Comunicazioni originali:** Scipione Riva-Rocci, Un nuovo sfigmomanometro.

**Accademie e Società:** Reale Accademia di medicina di Torino (Sedute 12 e 23 novembre 1896).

**Note cliniche e terapeutiche:** Un caso di tic facciale in un orologiaio. — L'orticaria delle vie respiratorie. — Un caso di spasmo furioso guarito coll'elettricità. — Il kaffir al cervello e al carbonato di guanicole.

**Bollettino della mortalità di Torino** (5<sup>a</sup> decade del mese di novembre).

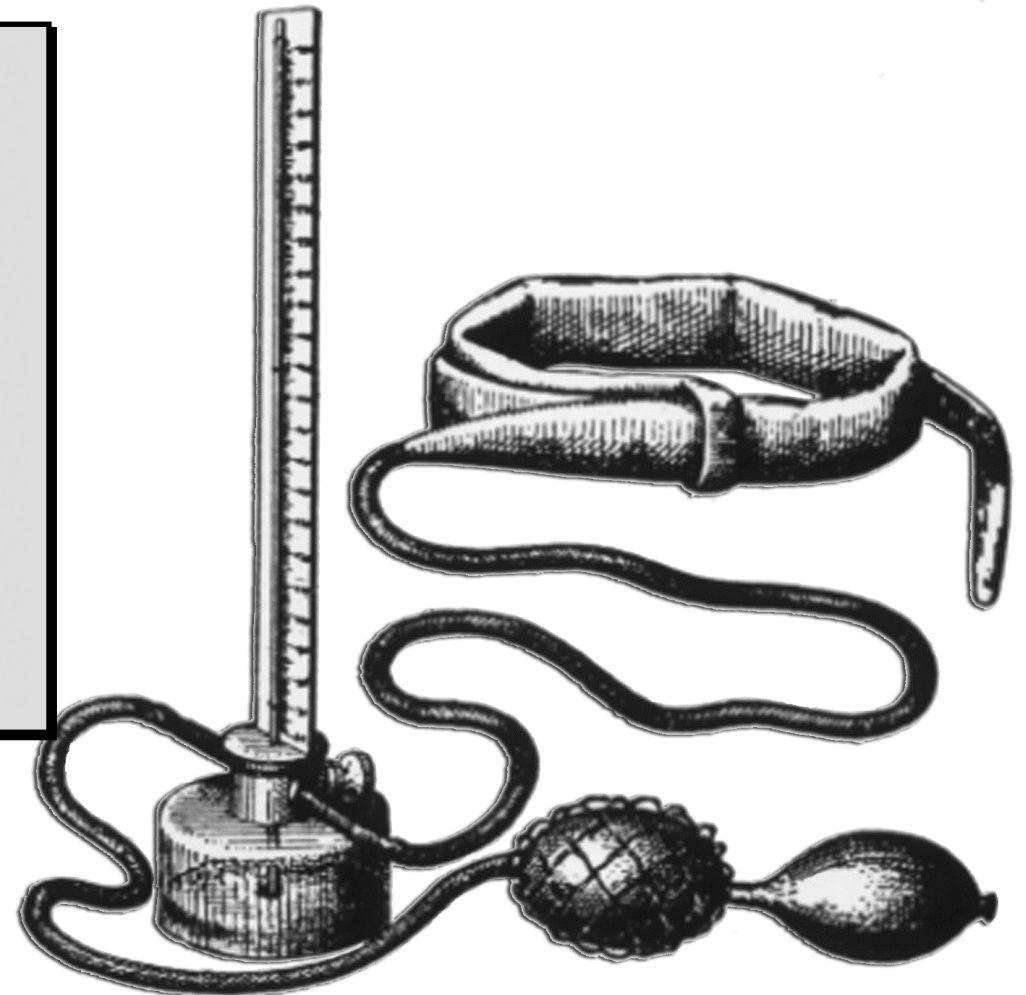
## COMUNICAZIONI ORIGINALI

SCUOLA MEDICA PREPAREDUTICA DI TORINO (PROF. C. FORLANINI)

### UN NUOVO SFIGMOMANOMETRO

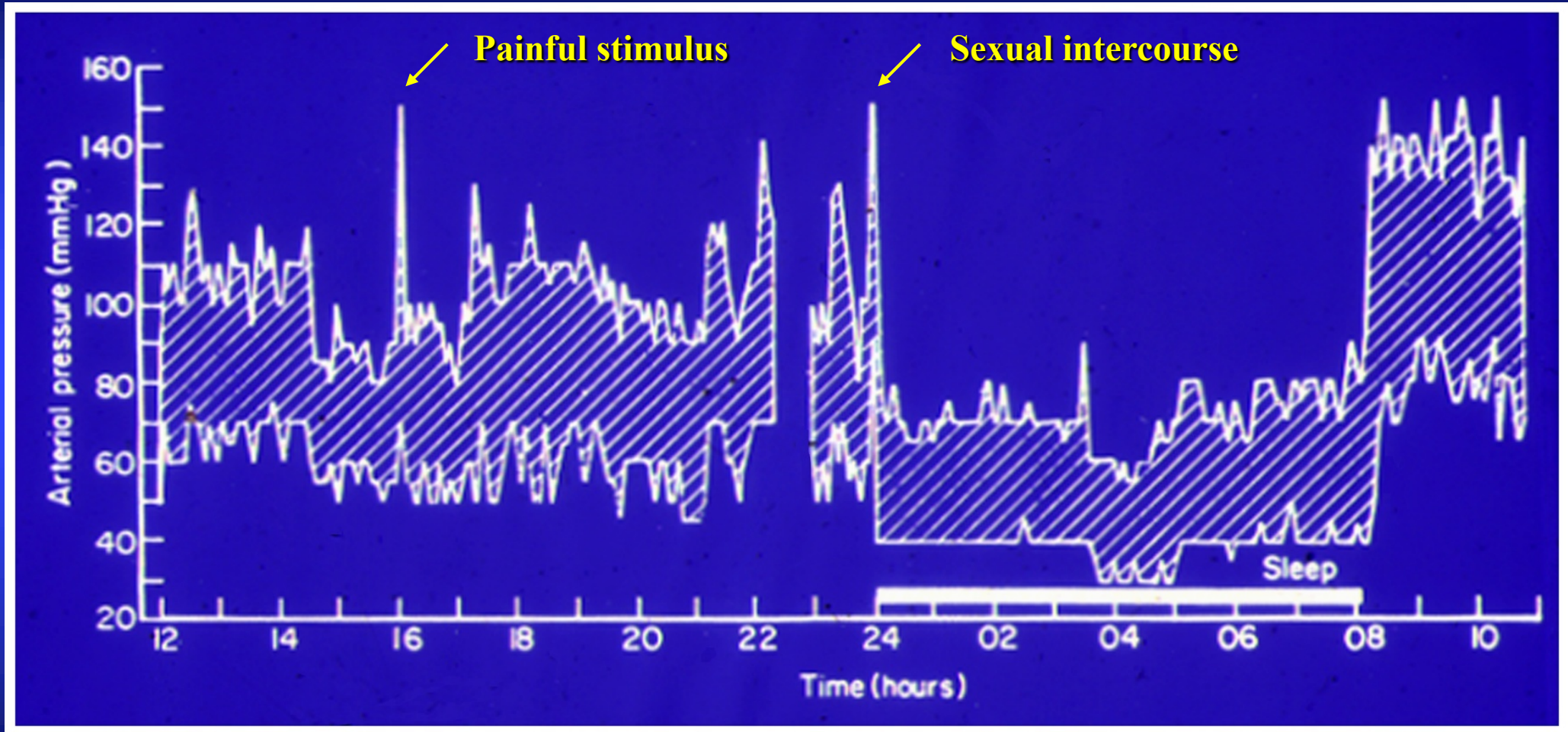
Nota del Dott. SCIPIONE RIVA-ROCCI

Aiuto alla Clinica Med. Prep. — Uscenza di Patologia Medica nella R. Univ. di Torino.

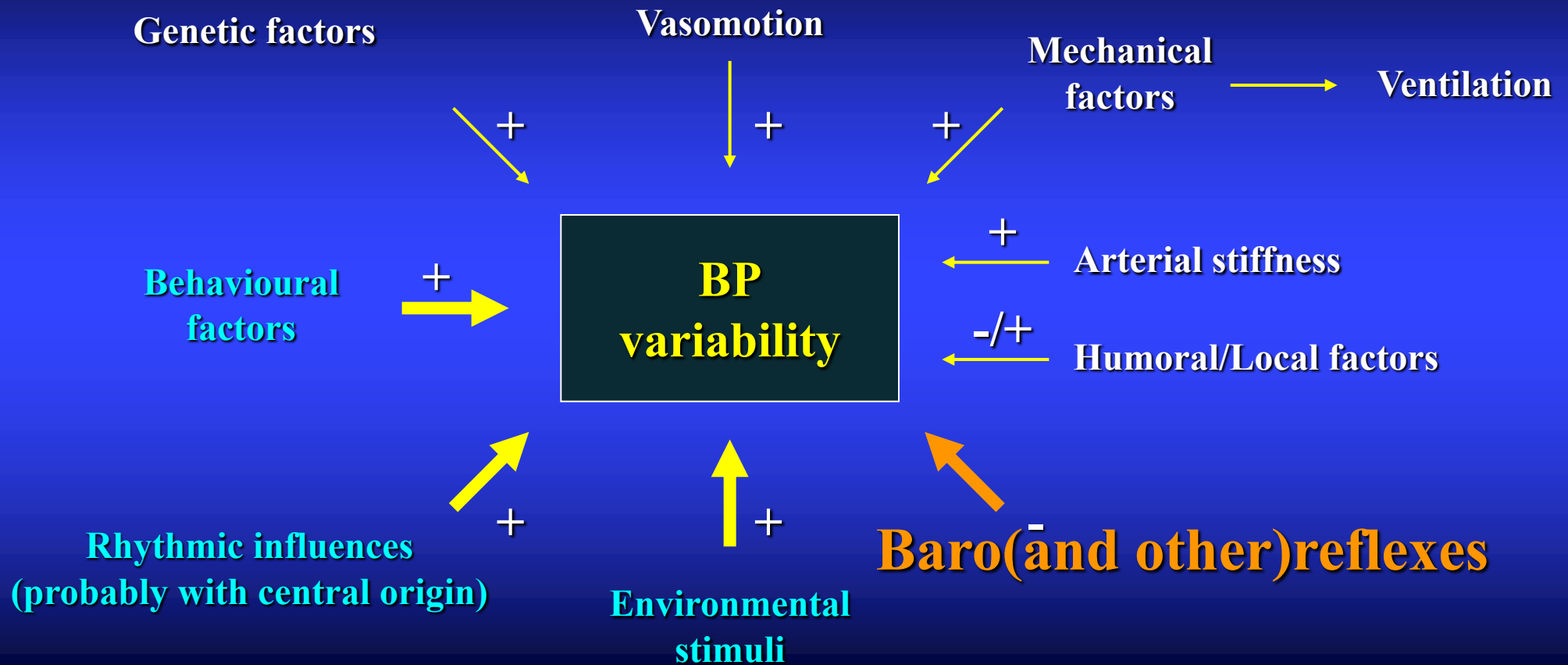


«.....le condizioni mentali o emotive del paziente hanno un effetto considerevole, sia pure transitorio, sulla pressione arteriosa..... E' sufficiente parlare al paziente, invitarlo a leggere, o guardarlo negli occhi, o un rumore improvviso, una carrozza che passa nella strada, una voce forte anche lontana, per fare aumentare la pressione arteriosa, aumento non necessariamente della stessa entità in tutti i casi....»

*Riva-Rocci S. Gazzetta Medica di Torino 1897*

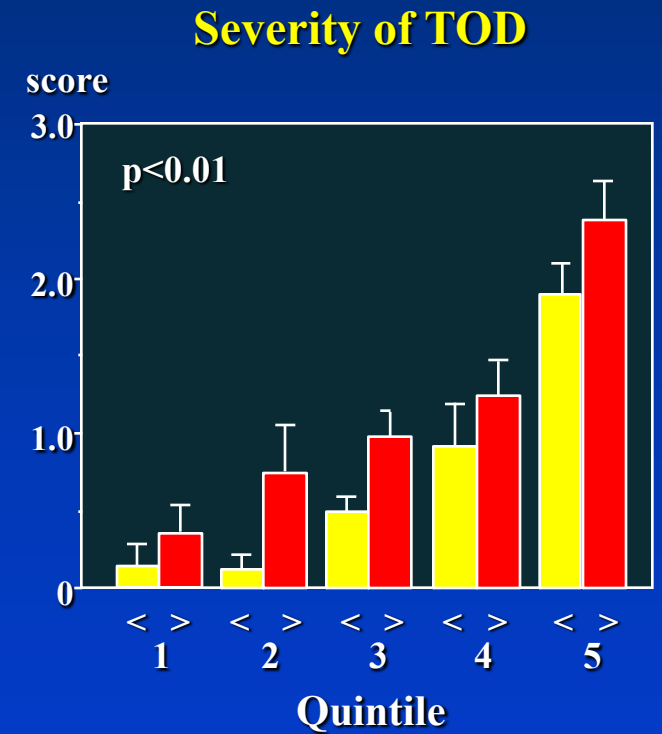
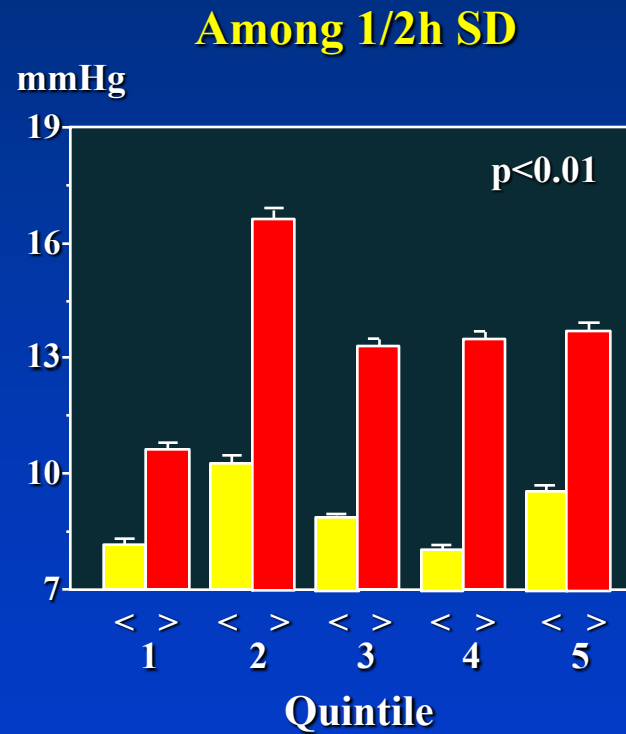
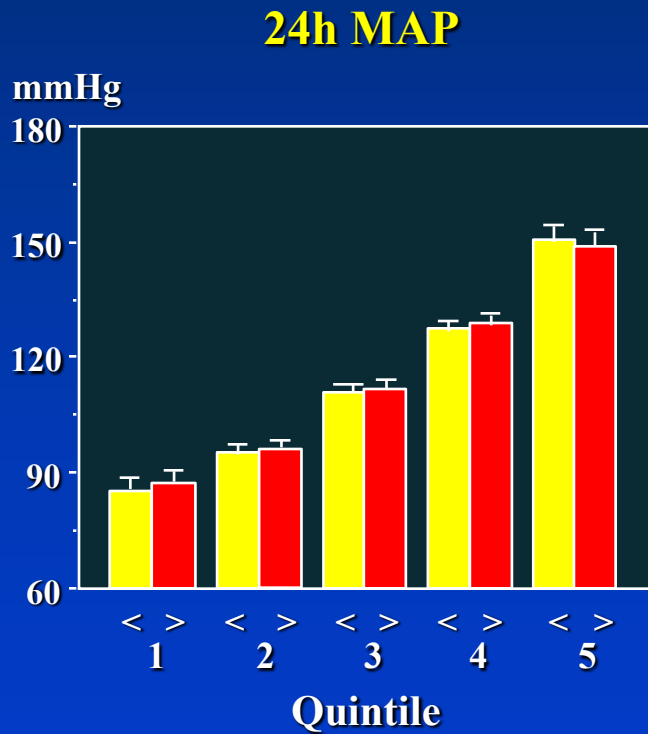


# Factors Involved in 24h BP Variability



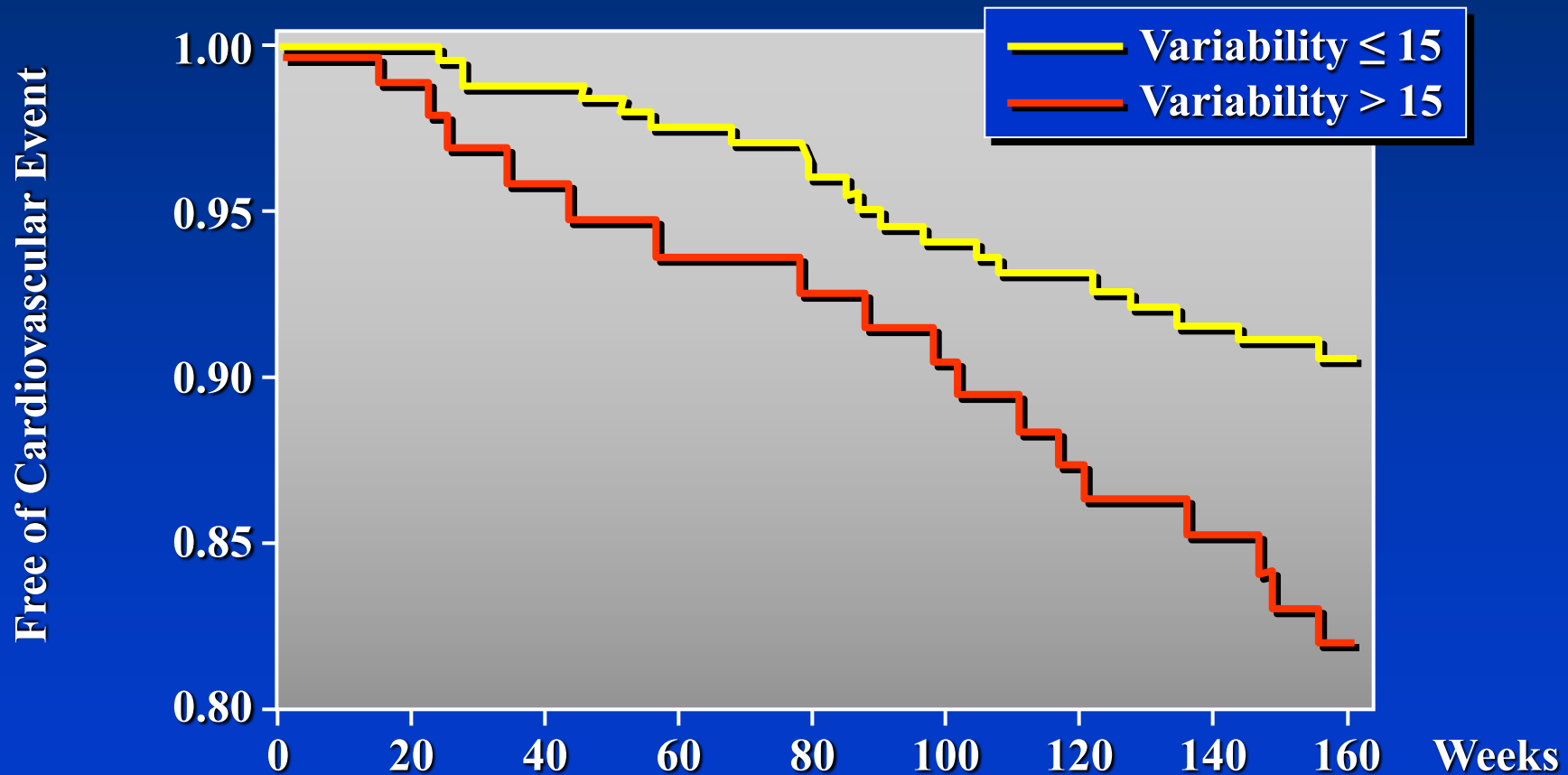
Tipo di variabilità pressoria	Determinanti
<b>Variabilità a brevissimo termine</b> (battito-battito)	<ul style="list-style-type: none"><li>- ↑ attivazione simpatica</li><li>- ↓ riflessi baro e chemocettivi/cardiopolmonari</li><li>- Fattori umorali, reologici, ambientali, comportamentali, emozionali</li><li>- Età, attività/sonno</li><li>- Ventilazione</li></ul>
<b>Variabilità a breve termine</b> (nelle 24h)	<ul style="list-style-type: none"><li>- ↑ attivazione simpatica</li><li>- ↓ riflessi baro e chemocettivi/cardiopolmonari</li><li>- Fattori umorali, reologici, ambientali, comportamentali, emozionali</li><li>- Età, attività/sonno</li><li>- Improprio dosaggio/titolazione della terapia antiipertensiva</li><li>- ↑ rigidità arteriosa</li></ul>

**TOD Severity in 24h MAP Quintiles Subdivided into Two Subgroups according to MAP Variability (between hhs SD) Above / Below (> / <) Group Average (i.a. measurements)**



n = 108

# Kaplan-Meier Survival Analysis for Fatal and Nonfatal Cardiovascular Morbid Events in Patients with Increased (> 15 mmHg) and Normal ( $\leq 15$ mmHg) Blood Pressure Variability



*Sander D. et al, Circulation 2000; 102: 1536-1541*



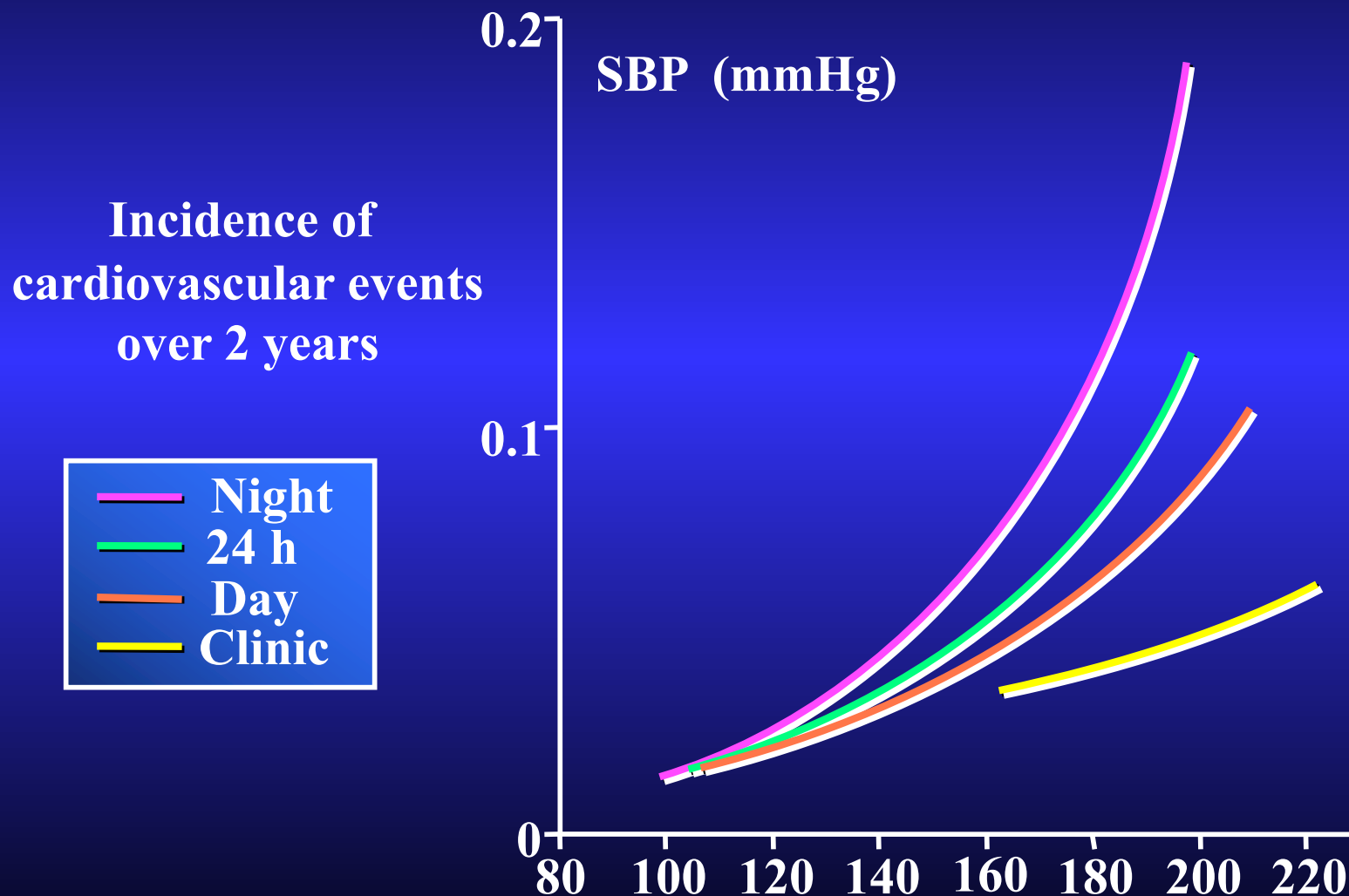
# Rilevanza clinica della variabilità pressoria nelle 24 ore

<b>Studio</b>	<b>disegno</b>	<b>end-point</b>
- Parati, 1987	cross-sect	TOD score
- Palatini, 1992	cross-sect	TOD score
- Liu, 2003	cross-sect	danno cardioren
- Frattola, 1993	longitud	LVM (eco)
- Sander, 2000	longitud	eventi CV
- Kikuya, 2000	longitud	mortalità CV
- Pringle, 2003	longitud	ictus
- Mena, 2005	longitud	eventi CV
- Mancia, 2007	longitud	mortalità CV
- Parati, 2009	longitud	eventi CV

# Misure della variabilità pressoria nelle 24 ore

- dev.standard/ coeff. di var/ ARV/residBPV/weightedBPV
- Picchi pressori (rapidità di aumento ?)
- Differenza giorno / notte
- aumento pressorio mattutino
- analisi spettrale

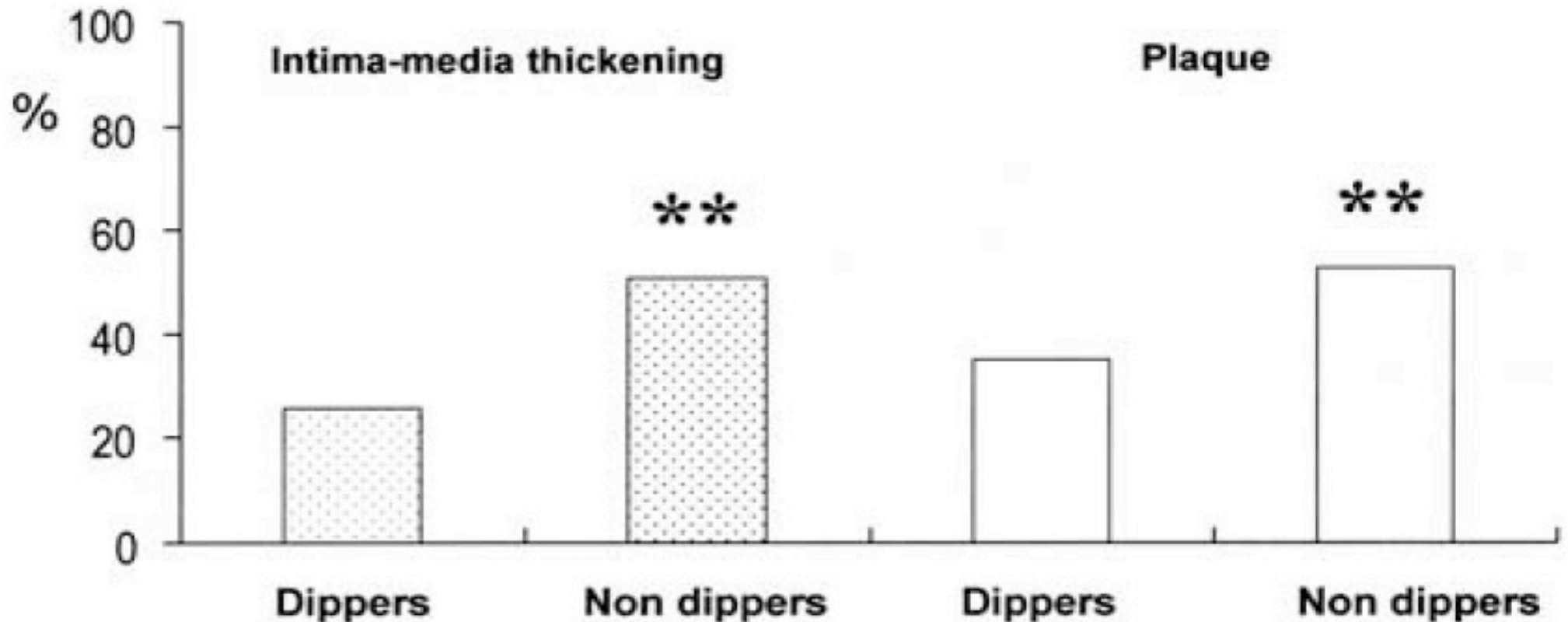
# Clinic, 24 h, daytime and night-time SBP at entry as predictors of cardiovascular event incidence over 2 years in the placebo group



# Night time blood pressure and cardiovascular structure in a middle-aged general population in northern Italy: the Vobarno Study

M Salvetti, ML Muiesan, D Rizzoni, G Bettoni, C Monteduro, C Corbellini, S Viola and E Agabiti-Rosei

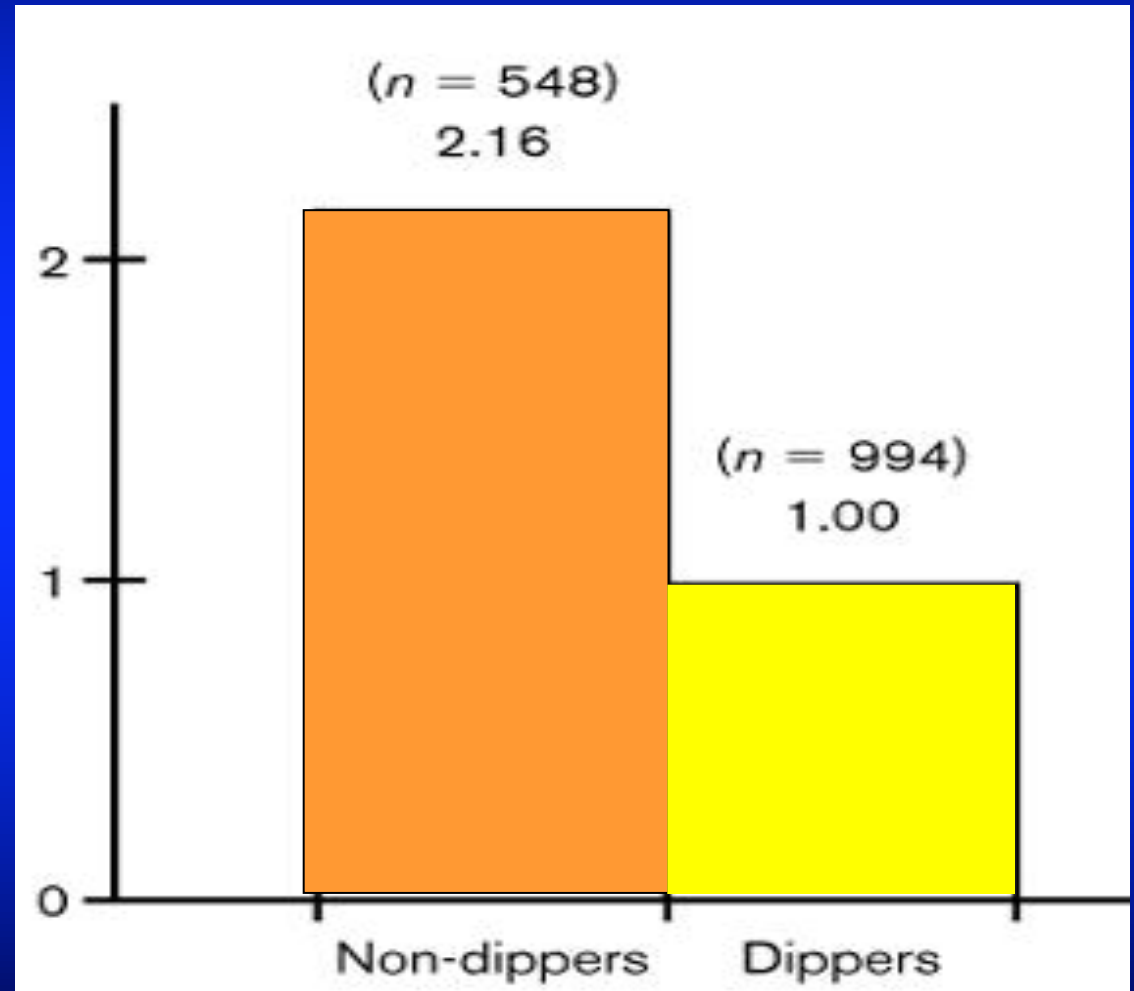
*Department of Medical and Surgical Sciences, University of Brescia, Italy*



Prognostic significance of the nocturnal decline in blood pressure in individuals with and without high 24-h blood pressure: the Ohasama study. Ohkubo T. J Hypertens 2002,20:2183-2189.

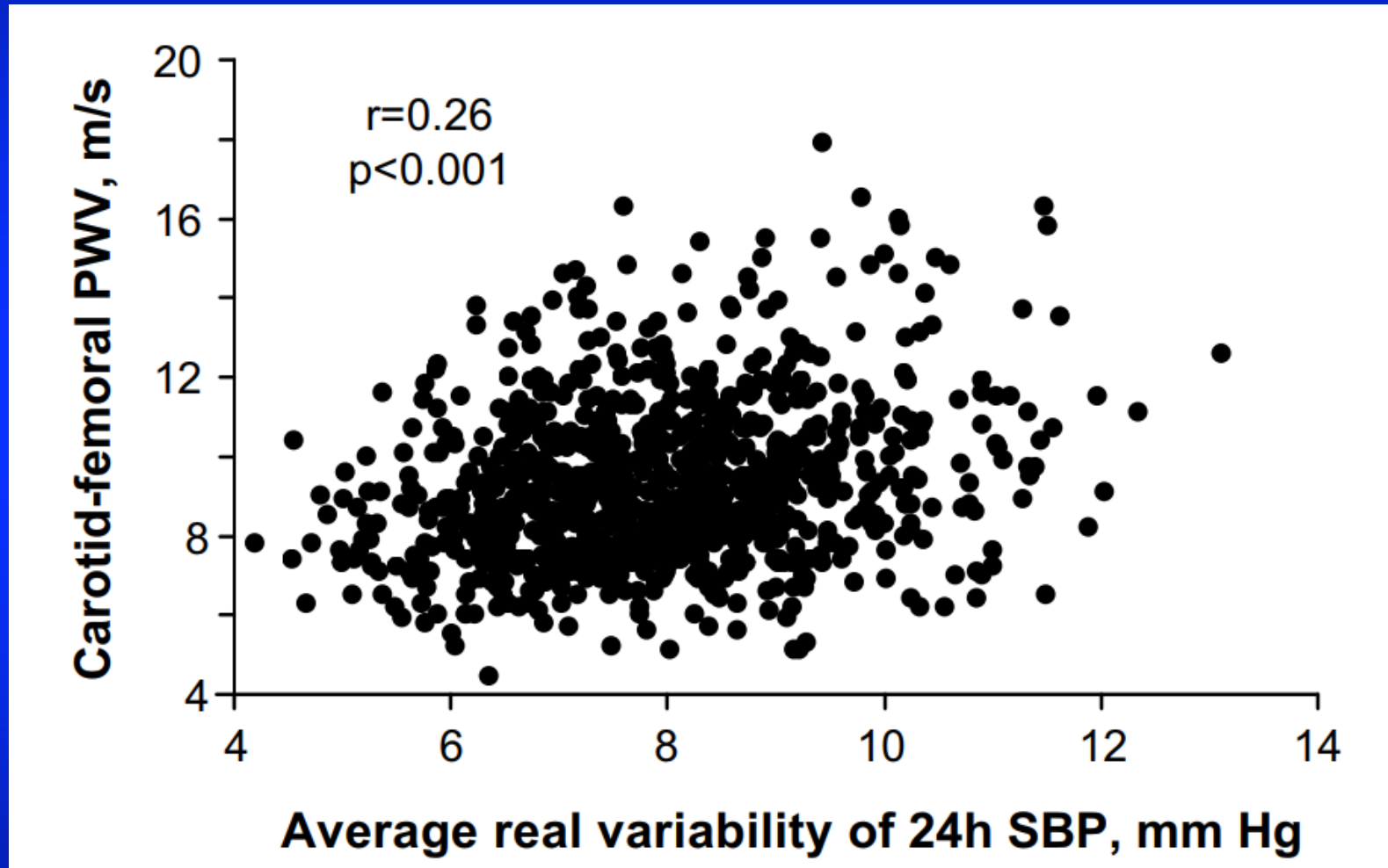
**Cardiovascular mortality (CVM)** adjusted for age, sex, smoking status, use of antihypertensive medication, and history of cardiovascular disease, hypercholesterolaemia or diabetes mellitus.

CVM

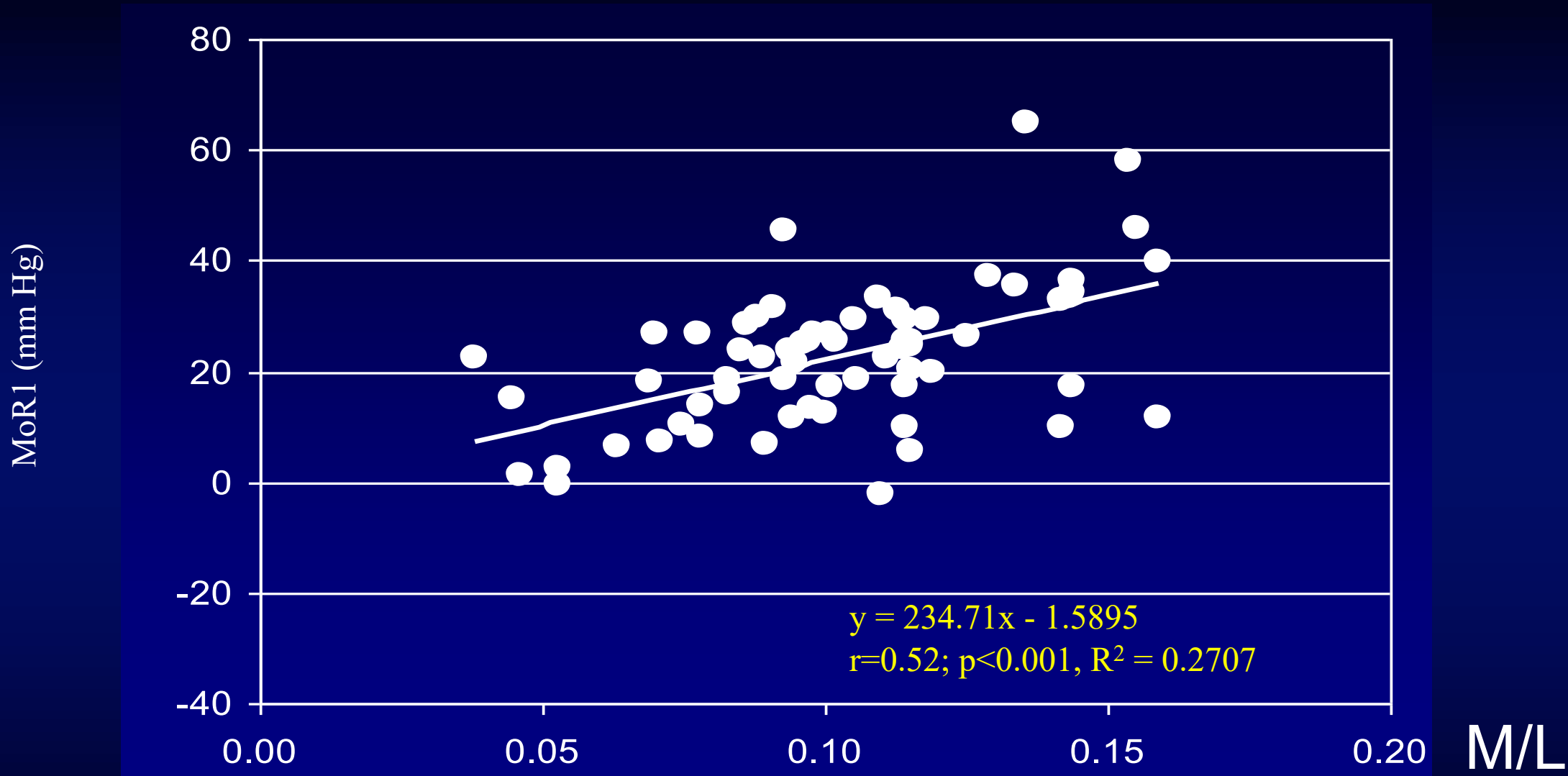


(a) **'non-dippers'** : nocturnal decline in systolic or diastolic blood pressure <10%.

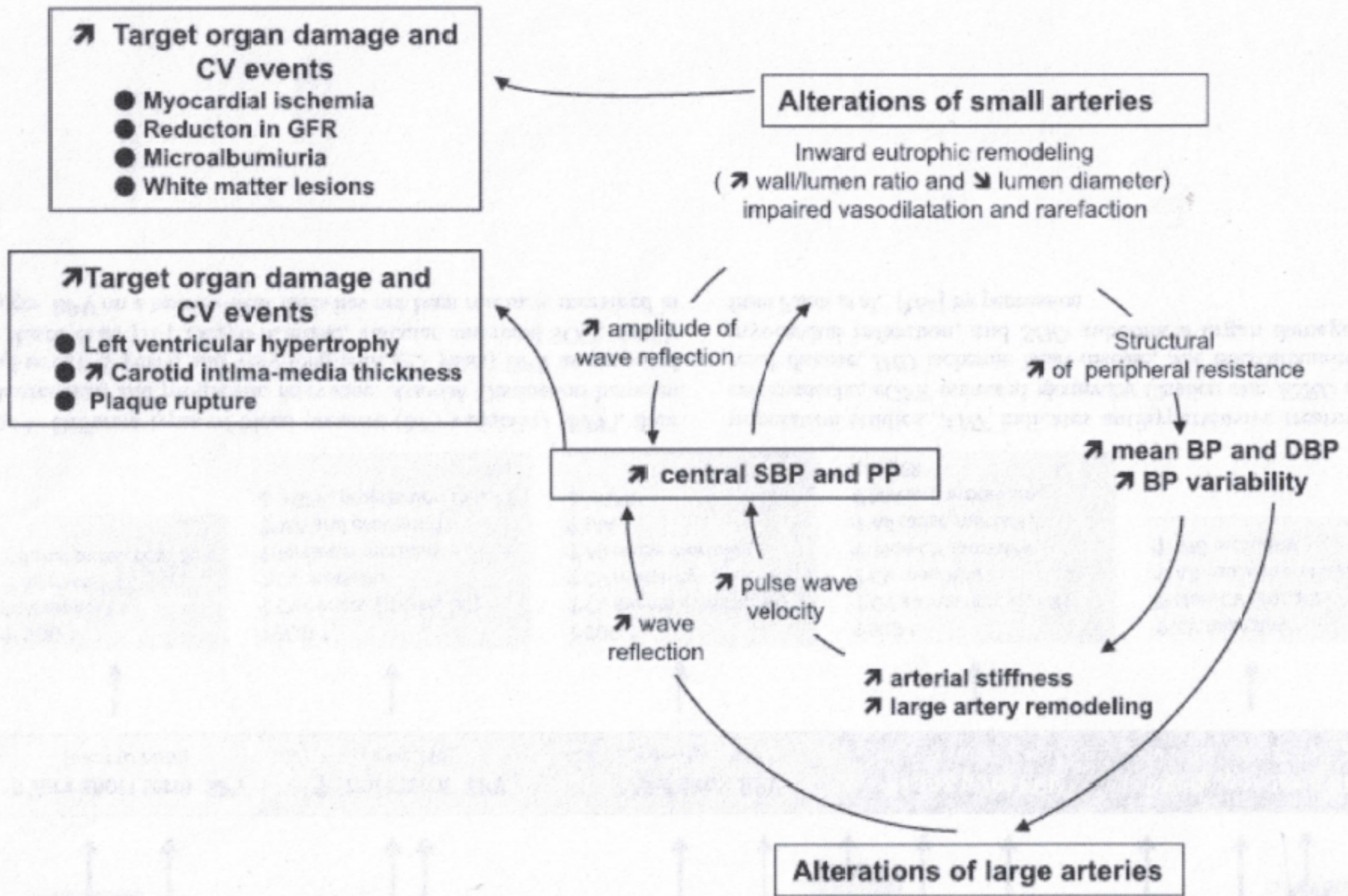
Correlation of **carotid-femoral pulse wave velocity** with the **average real variability** of 24-hour systolic blood pressure in 911 untreated hypertensive patients



# MORNING RISE OF BLOOD PRESSURE AND SUBCUTANEOUS SMALL RESISTANCE ARTERY STRUCTURE



MoR 1 = mean of systolic blood pressure (SBP) measured two hours following wake-up (h.7-9) – mean among the lowest SBP recorded during night, the preceding one and the following one.

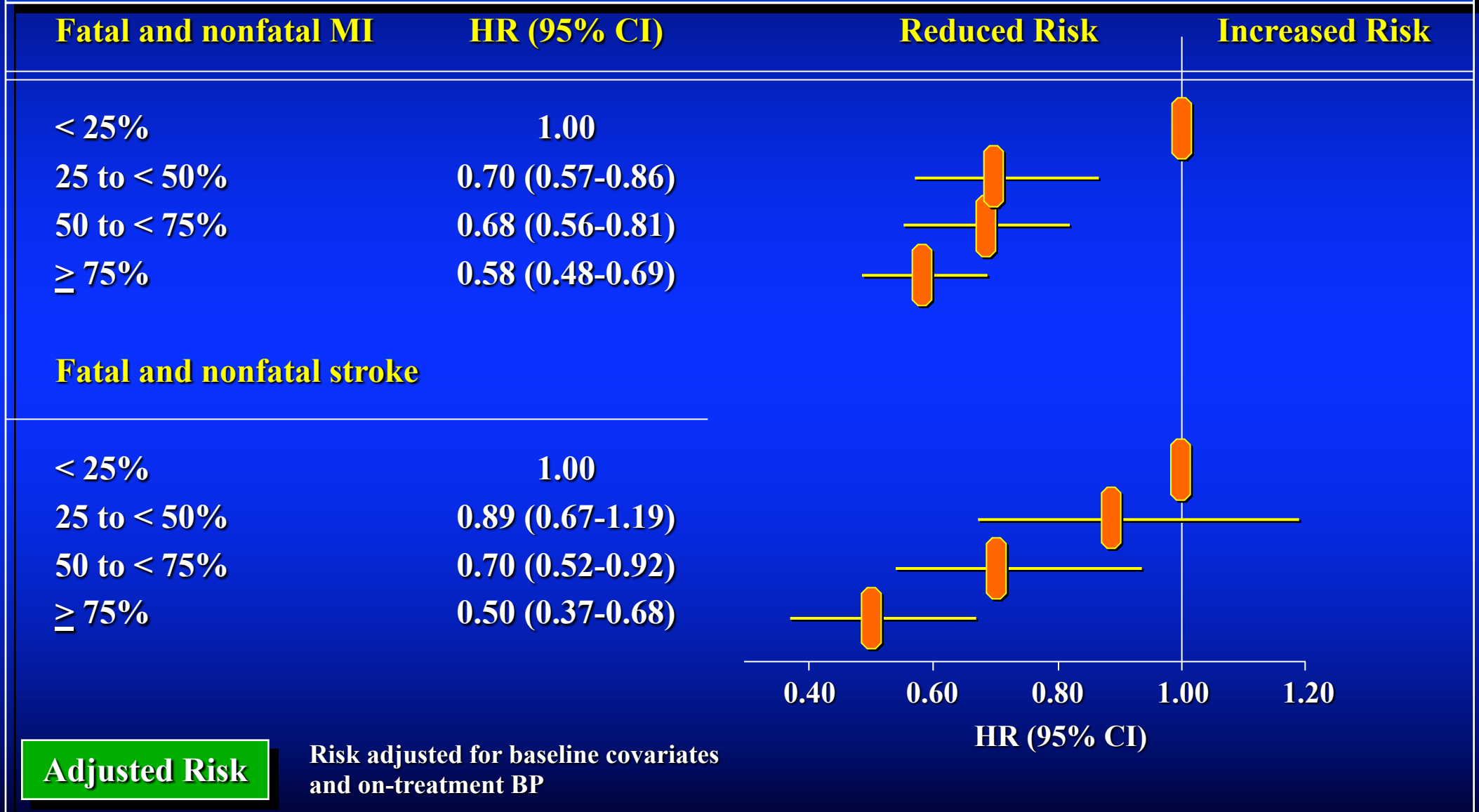




*“...A number of additional indices derived from ABPM recordings have some prognostic value, including 24 h BP variability, morning BP surge, and the ambulatory arterial stiffness index. However, their incremental predictive value is not yet clear. Thus, these indices should be regarded as research tools, with no current indication for routine clinical use...”*

Tipo di variabilità pressoria	Determinanti
<b>Variabilità a medio termine</b> (giorno-giorno)	<ul style="list-style-type: none"><li>- Improprio dosaggio/titolazione della terapia antiipertensiva</li><li>- ↑ rigidità arteriosa</li><li>- Età</li></ul>
<b>Variabilità a lungo termine</b> (visita-visita <5 anni) e <b>variabilità a lunghissimo termine</b> (visita-visita >5 anni)	<ul style="list-style-type: none"><li>- Improprio dosaggio/titolazione della terapia antiipertensiva</li><li>- ↑ rigidità arteriosa</li><li>- Età</li><li>- ↓ aderenza alla terapia</li><li>- Errori di misurazione della pressione arteriosa</li><li>- Modificazioni stagionali</li><li>- Invecchiamento</li></ul>

## INVEST: Risk of Death and CVD by % of Visits with BP Control (< 140/90 mmHg)

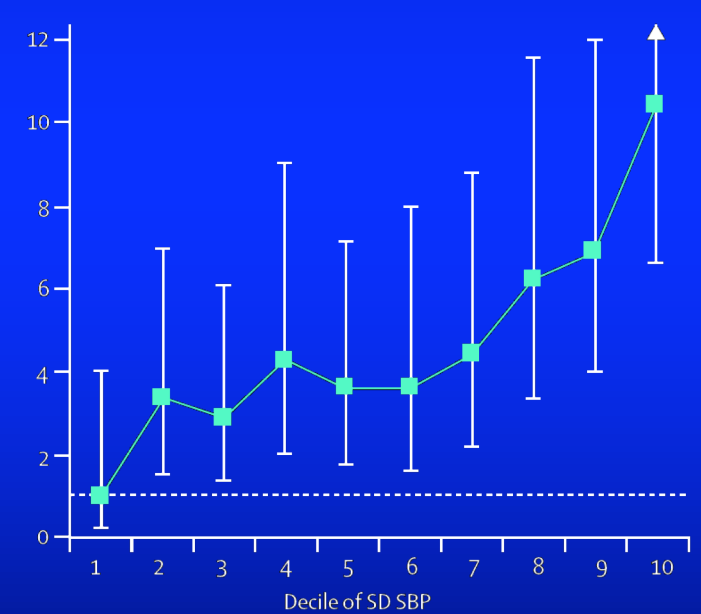
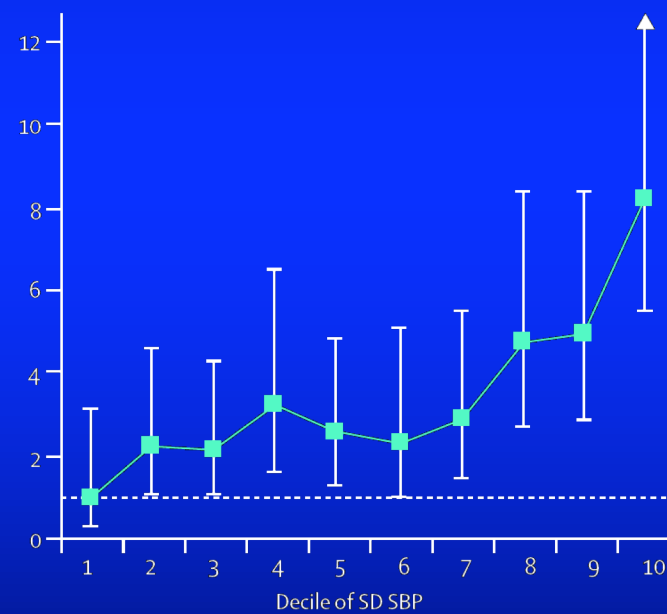
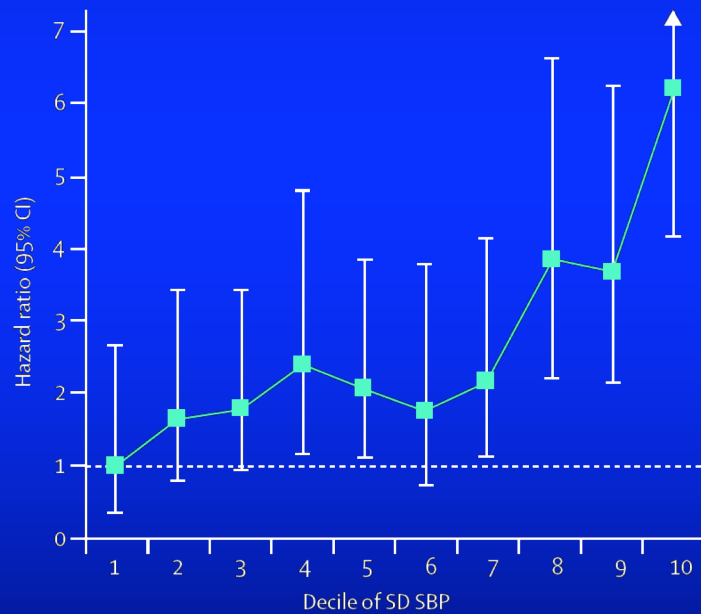


# Visit-to-visit Variability and Risk of Stroke in UK-TIA\*

All patients

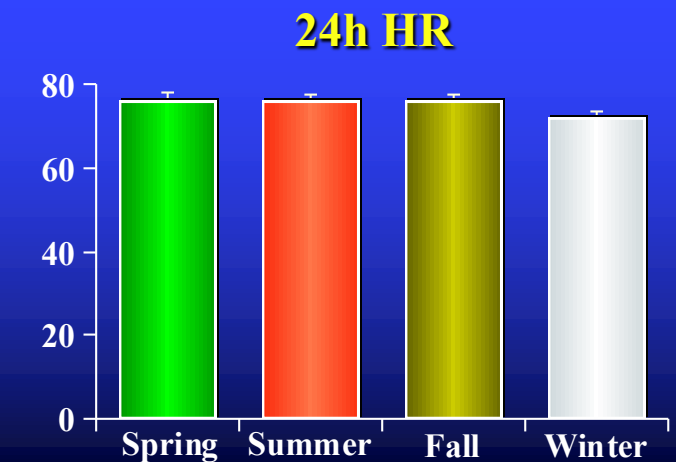
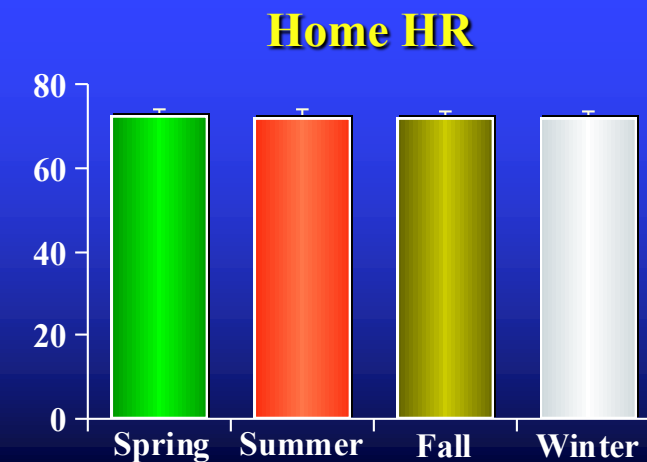
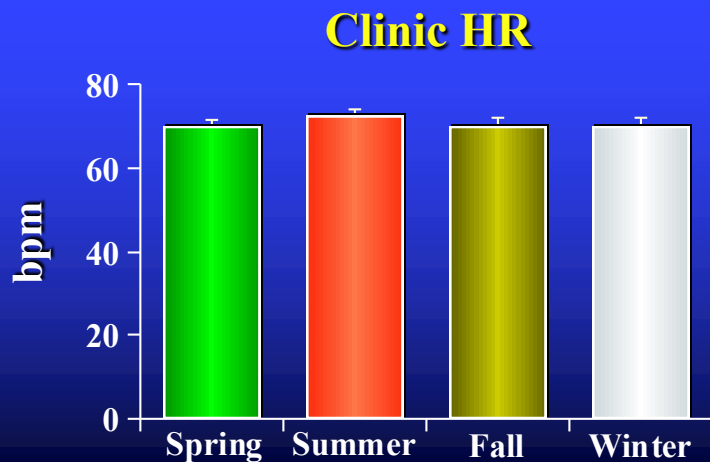
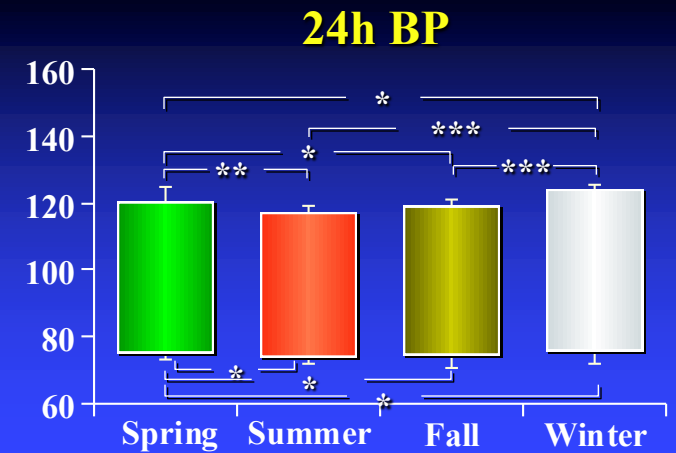
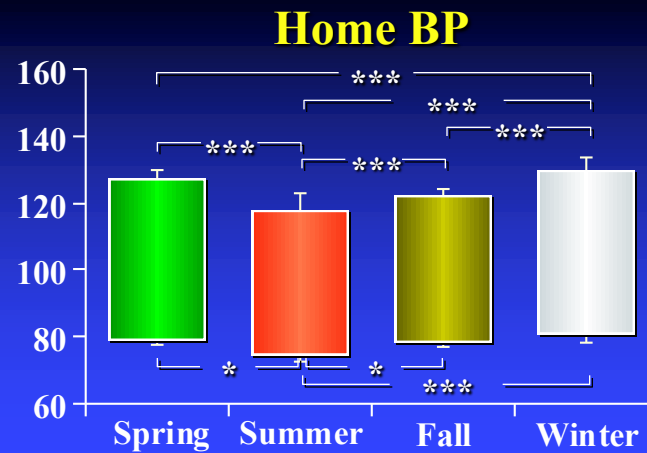
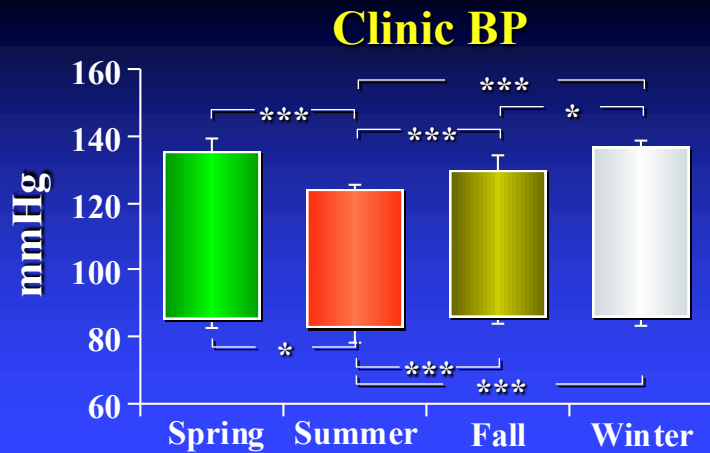
Excluding patients with stroke history

Excluding patients with stroke + MI history



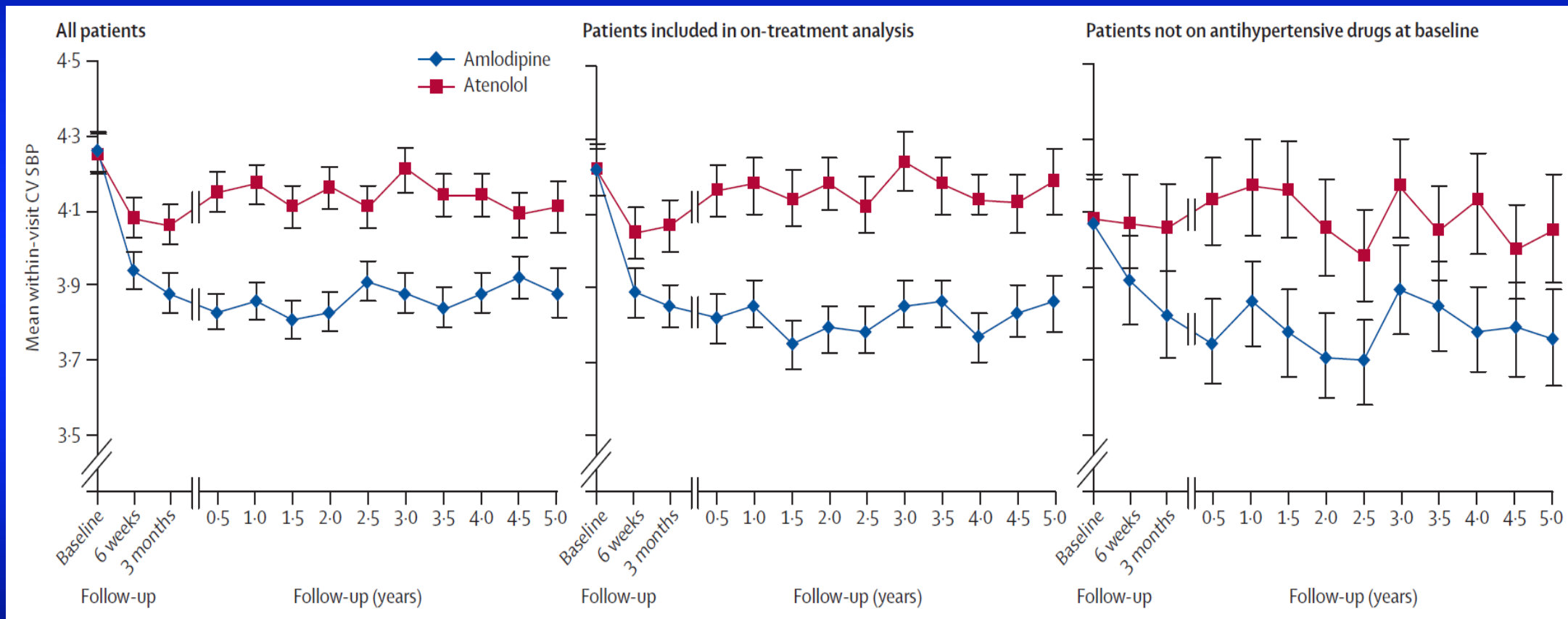
\* SD based on first 7 BP measurements within first 2 years

# Seasonal Changes in Clinic / Home and Ambulatory BP and HR



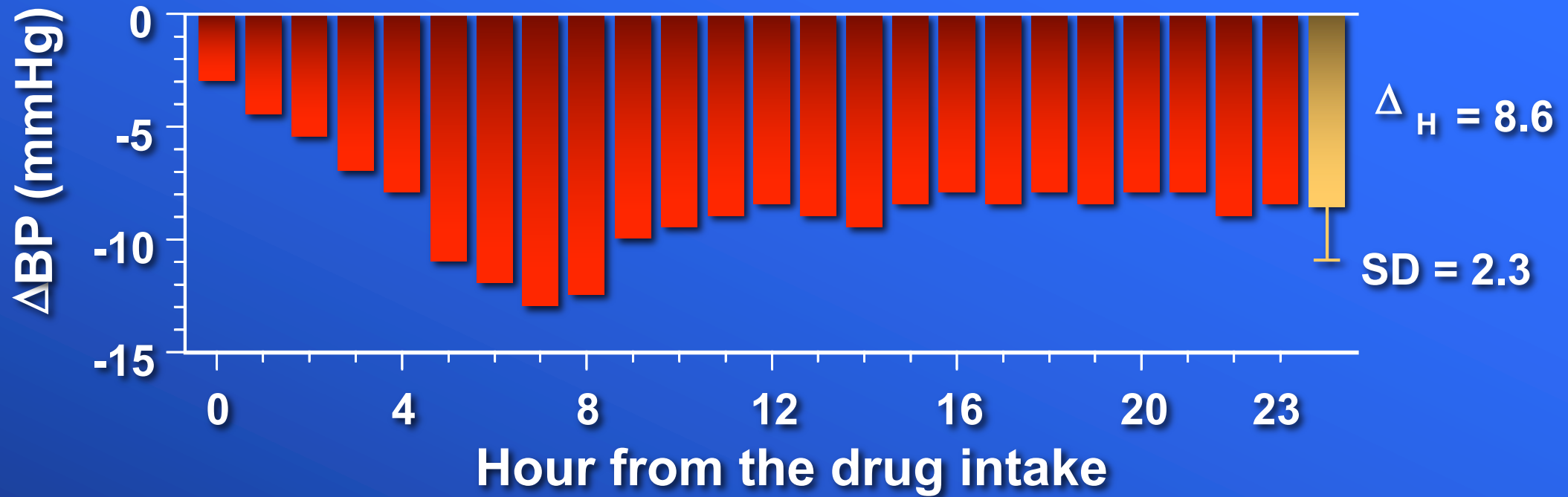
# Effects of $\beta$ blockers and calcium-channel blockers on within-individual variability in blood pressure and risk of stroke

## Within-visit variability of systolic blood pressure in ASCOT-BPLA



“...The opposite effects of calcium-channel blockers and betablockers on variability of BP account for the disparity in observed effects on risk of stroke and expected effects based on mean blood pressure. To prevent stroke most effectively, blood-pressure-lowering drugs should reduce mean blood pressure without increasing variability; ideally they should reduce both...”

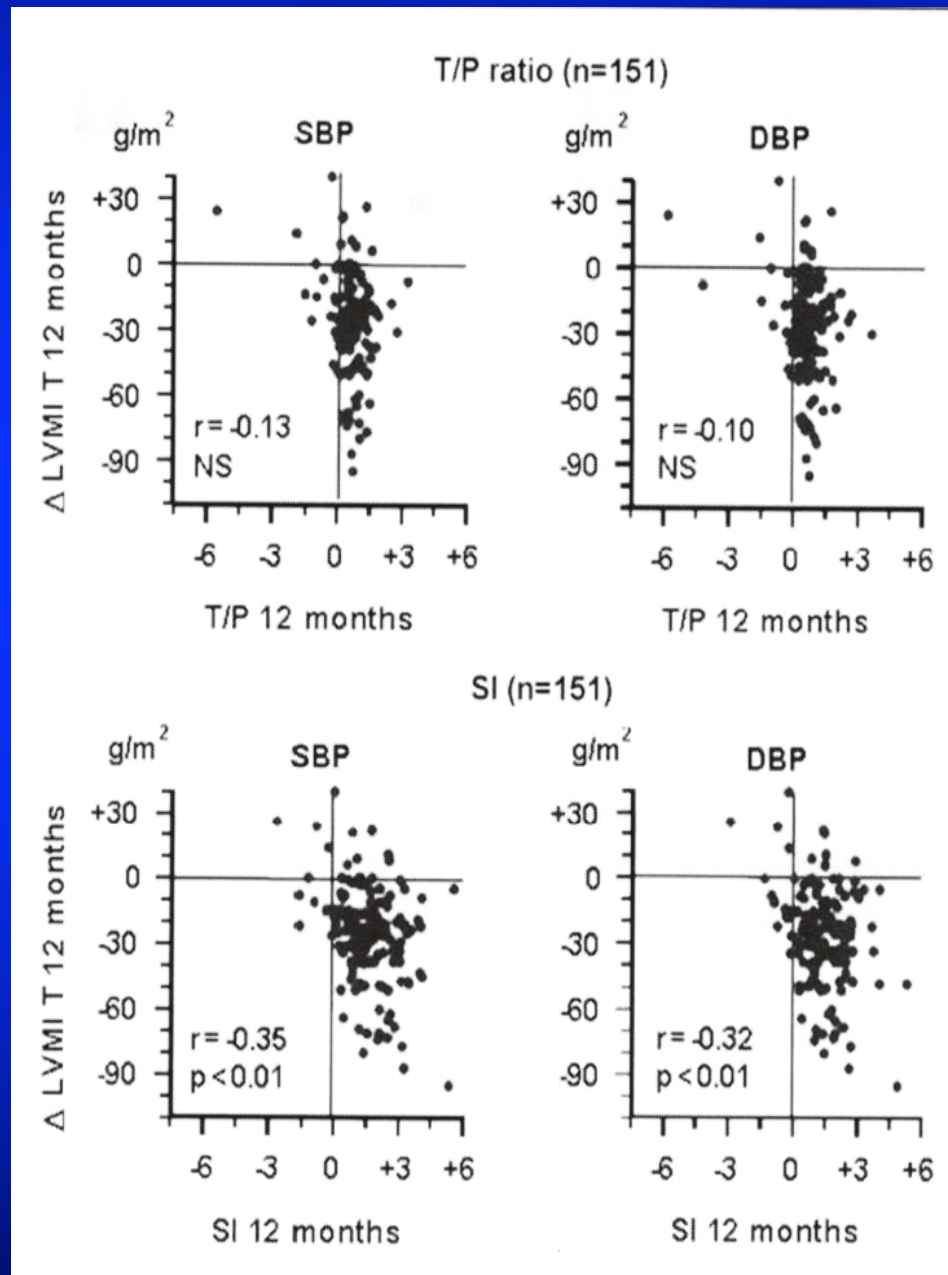
# Smoothness index



$$SI = \frac{\text{Average } \Delta_H}{SD} = 3.7$$

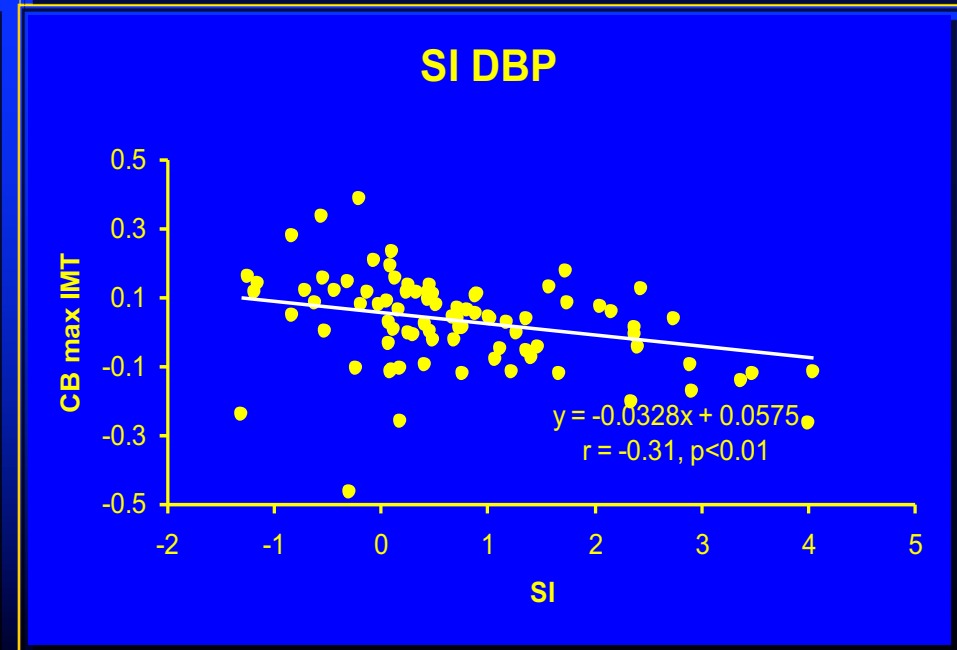
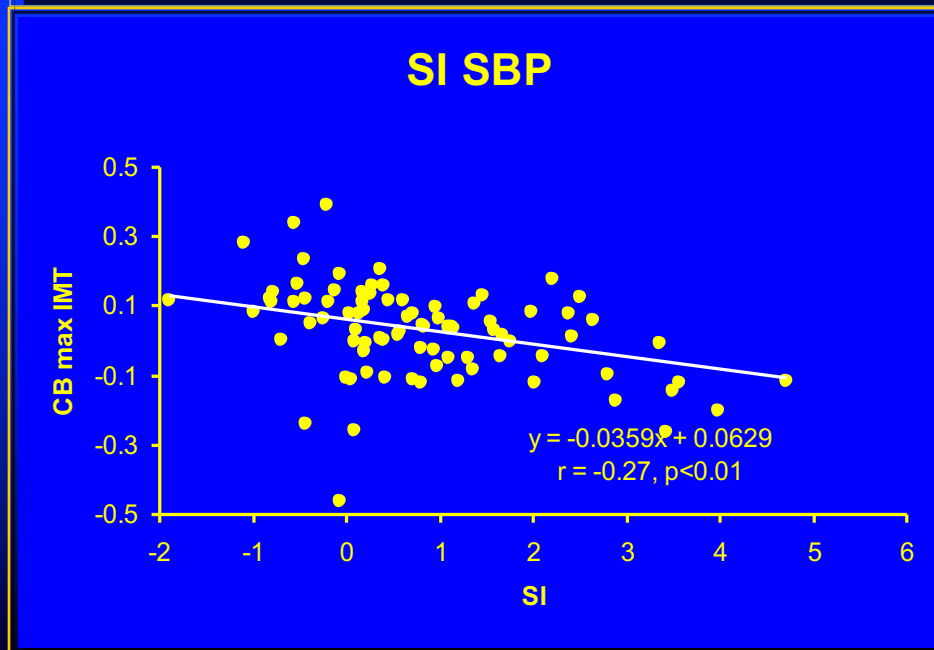
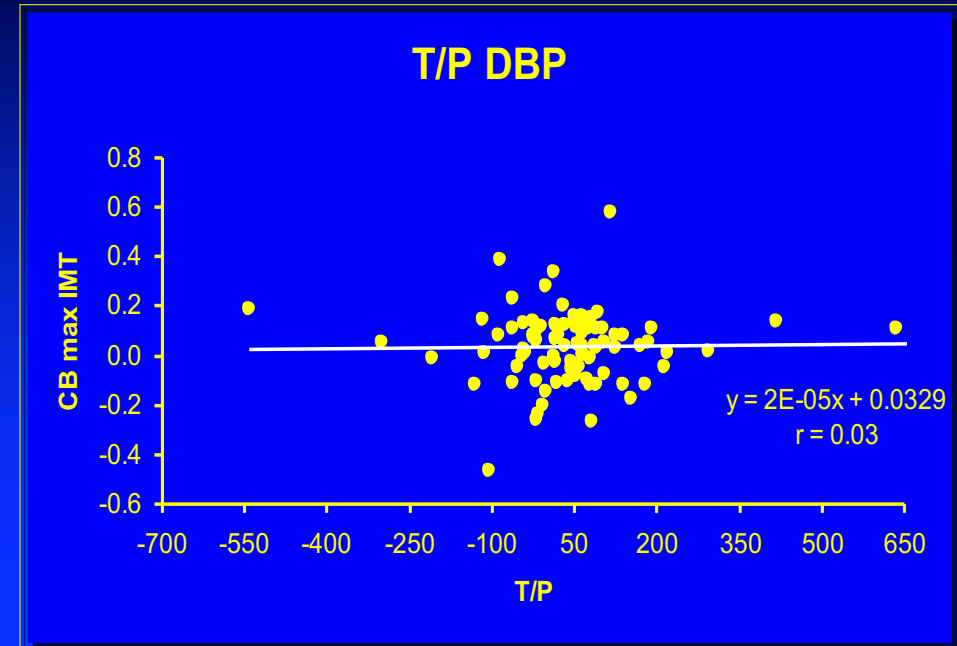
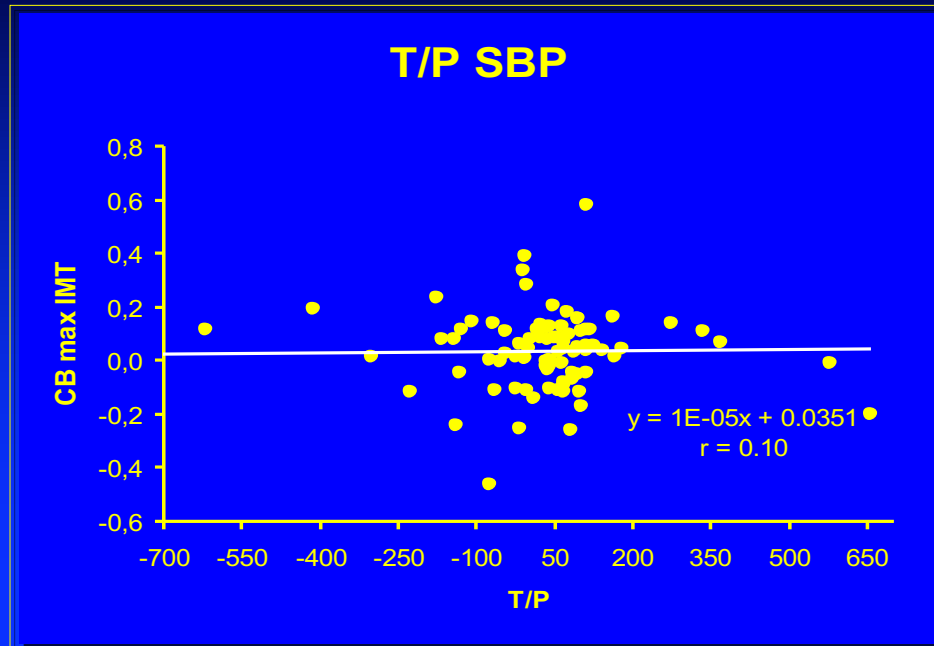
# The smoothness index: a new, reproducible and clinically relevant measure of the homogeneity of the blood pressure reduction with treatment for hypertension.

Gianfranco Parati, Stefano Omboni, Damiano Rizzoni, Enrico Agabiti-Rosei and Giuseppe Mancia





# CAROTID IMT vs SMOOTHNESS INDEX and TROUGH-to-PEAK RATIO



La Var-PA, a breve, medio e lungo termine, si associa a maggiore rischio CV.

- **QUESITI E PROBLEMI NON RISOLTI**

- Quale indice di Var-PA è più utile per una corretta stratificazione del rischio CV  
Quale è la soglia che indica un aumentato rischio

- Var-PA rappresenta un fattore di rischio indipendente, aggiuntivo alla media della PA ?  
Quale relazione con il danno vascolare

- La riduzione di Var-PA per effetto della terapia si associa a migliore prognosi?  
Quali farmaci sono più efficaci nella riduzione della Var-PA

**GRAZIE PER L'ATTENZIONE**