Αξιολόγηση προφίλ αρτηριακής πίεσης

Α Κόλλιας
Καθηγητής Παθολογίας

Κέντρο Υπέρτασης, Γ' Παθολογική Κλινική Πανεπιστημίου Αθηνών, ΓΝΝΘΑ 'Η Σωτηρία', Αθήνα

ΔΗΛΩΣΗ ΣΥΓΚΡΟΥΣΗΣ ΣΥΜΦΕΡΟΝΤΩΝ

Για την Παρούσα Παρουσίαση:

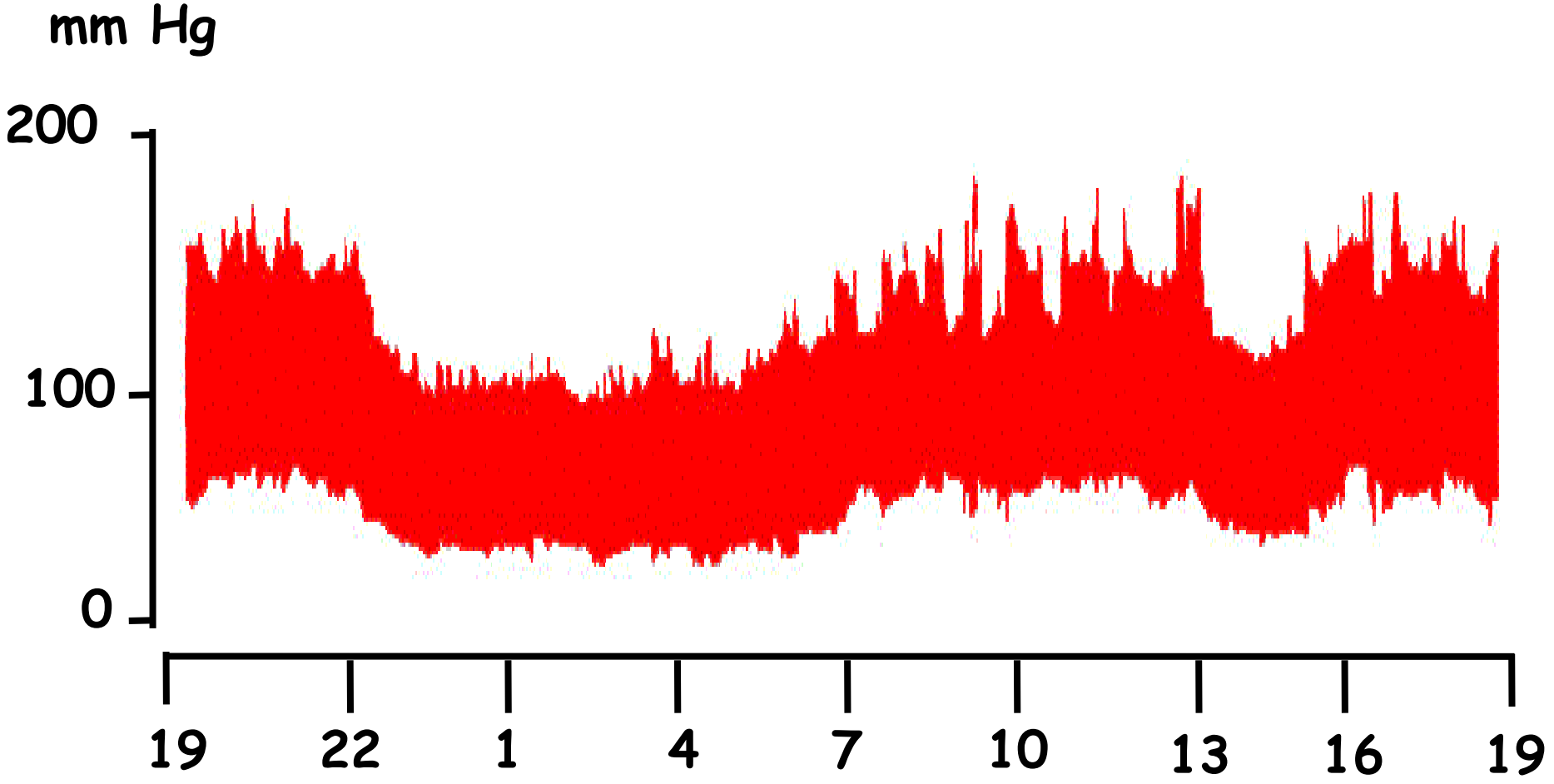
Καμία

ΑΞΙΟΛΟΓΗΣΗ ΑΡΤΗΡΙΑΚΗΣ ΠΙΕΣΗΣ

- ✓ Αρτηριακή πίεση: Δυναμικός χαρακτήρας
- ✓ Μετρήσεις στο ιατρείο - Μεθοδολογία μετρήσεων
- ✓ Μετρήσεις εκτός ιατρείου
- ✓ Αξιολόγηση αρτηριακής πίεσης-Διάγνωση

"the blood would rise and fall at and after each pulse by 2, 3 or 4 inches"

ΜΕΤΑΒΛΗΤΟΤΗΤΑ ΑΠ

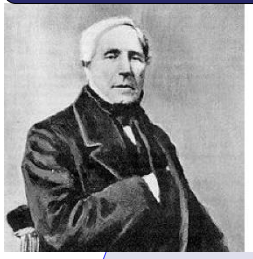


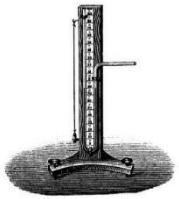
Mancia G, Parati G, J Hypertens 1990;8(suppl. 7):S1-S13

Ορόσημα στην ιστορία μέτρησης ΑΠ

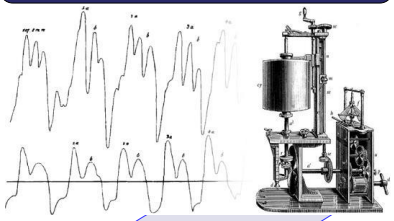
1773 S. Hales

1828 JLM Poiseuille

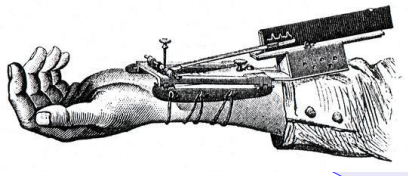




1847 C Ludwig

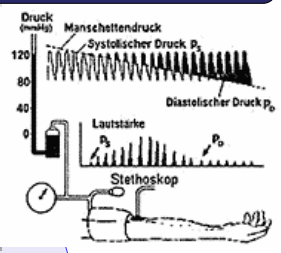


1863 É-J Marey



1896 R Rocci

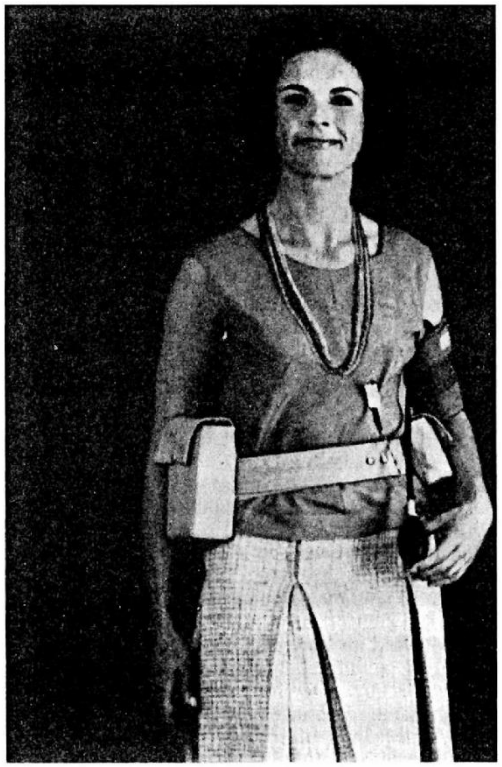
1905 N Korotkov



1916 WA Baum

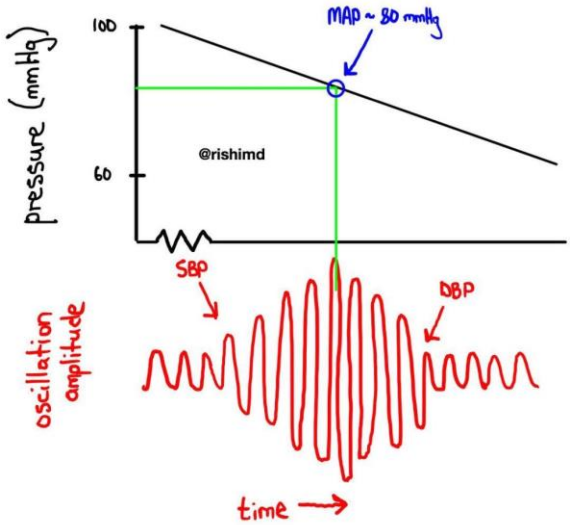
Ορόσημα στην ιστορία μέτρησης ΑΠ: Μετρήσεις εκτός Ιατρείου

- 1940 Ayman, Goldshne
  n=34 HTN ΑΠ σπίτι < ΑΠ
- 1962 24ωρη καταγραφή
  (μη επεμβατική)
- 1966 24ωρη καταγραφή
  (επεμβατική)



Αυτόματη μη επεμβατική μέτρηση ΑΠ

1976: Dinamap 825
"Device for Indirect Non-invAsive Mean Arterial Pressure



ΑΞΙΟΛΟΓΗΣΗ ΑΡΤΗΡΙΑΚΗΣ ΠΙΕΣΗΣ

- ✓ Αρτηριακή πίεση: Δυναμικός χαρακτήρας
- ✓ Μετρήσεις στο ιατρείο - Μεθοδολογία μετρήσεων
- ✓ Μετρήσεις εκτός ιατρείου
- ✓ Αξιολόγηση αρτηριακής πίεσης-Διάγνωση

Diagnosis and Classification

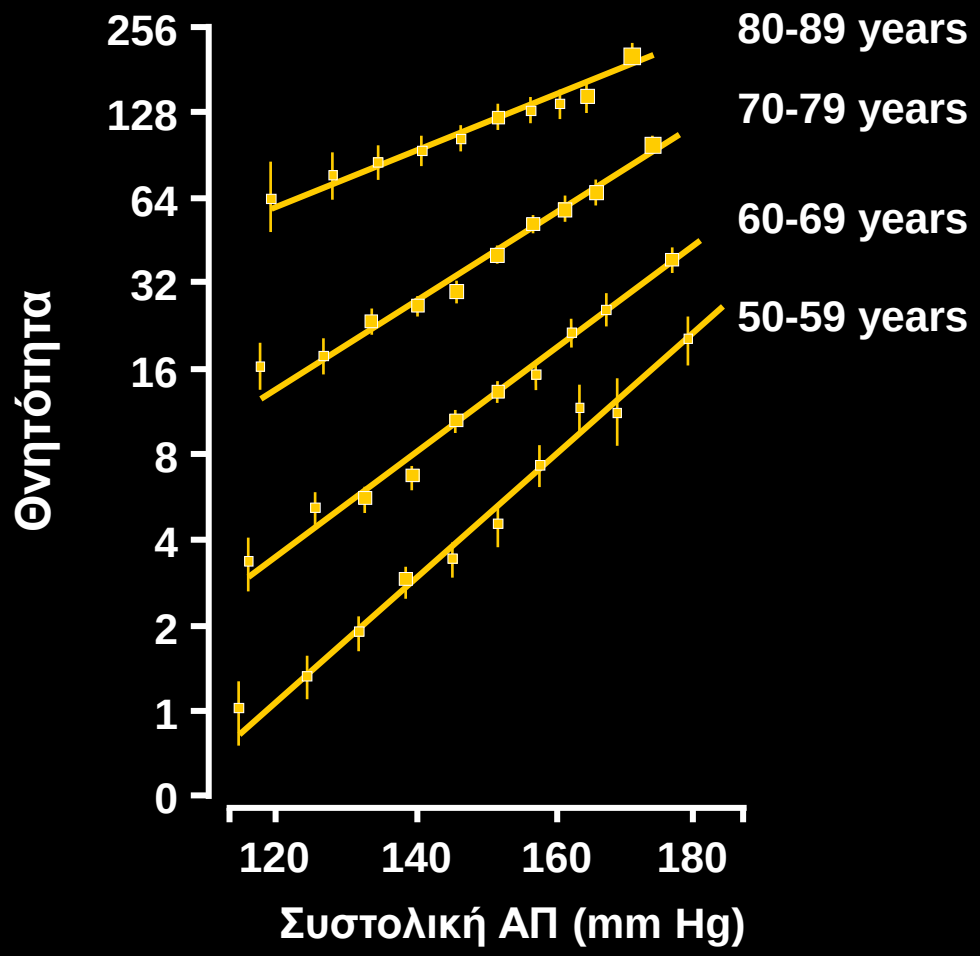
European Society of Hypertension

TABLE 1. Classification of office BP and definitions of hypertension grades

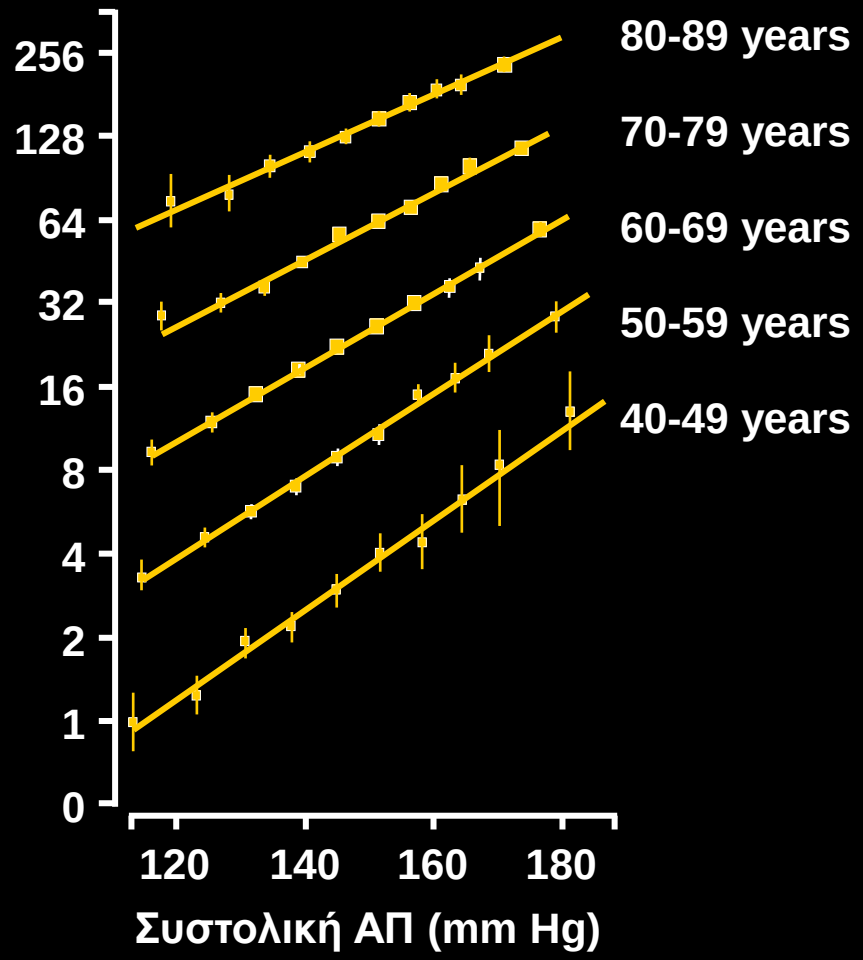
Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	120–129	and	80–84
High-normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension[a]	≥140	and	<90
Isolated diastolic hypertension[a]	<140	and	≥90

ΣΥΣΤΟΛΙΚΗ ΑΠ ΚΑΙ ΚΑΡΔΙΑΓΓΕΙΑΚΟΣ ΚΙΝΔΥΝΟΣ

ΑΕΕ



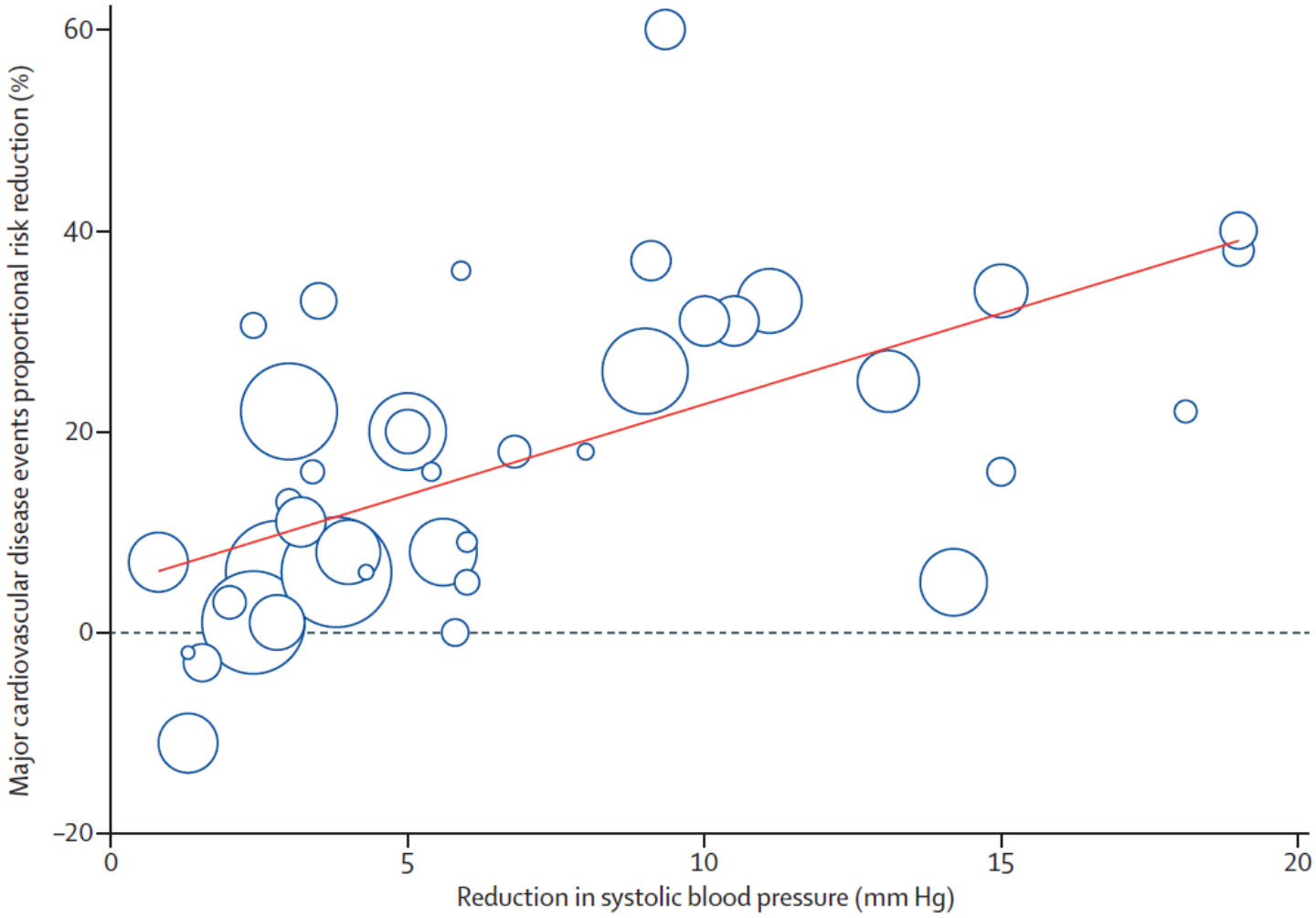
ΣΝ



Lancet. 2002;360:1903-1913.

Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis

Dena Ettehad, Connor A Emdin, Amit Kiran, Simon G Anderson, Thomas Callender, Jonathan Emberson, John Chalmers, Anthony Rodgers, Kazem Rahimi



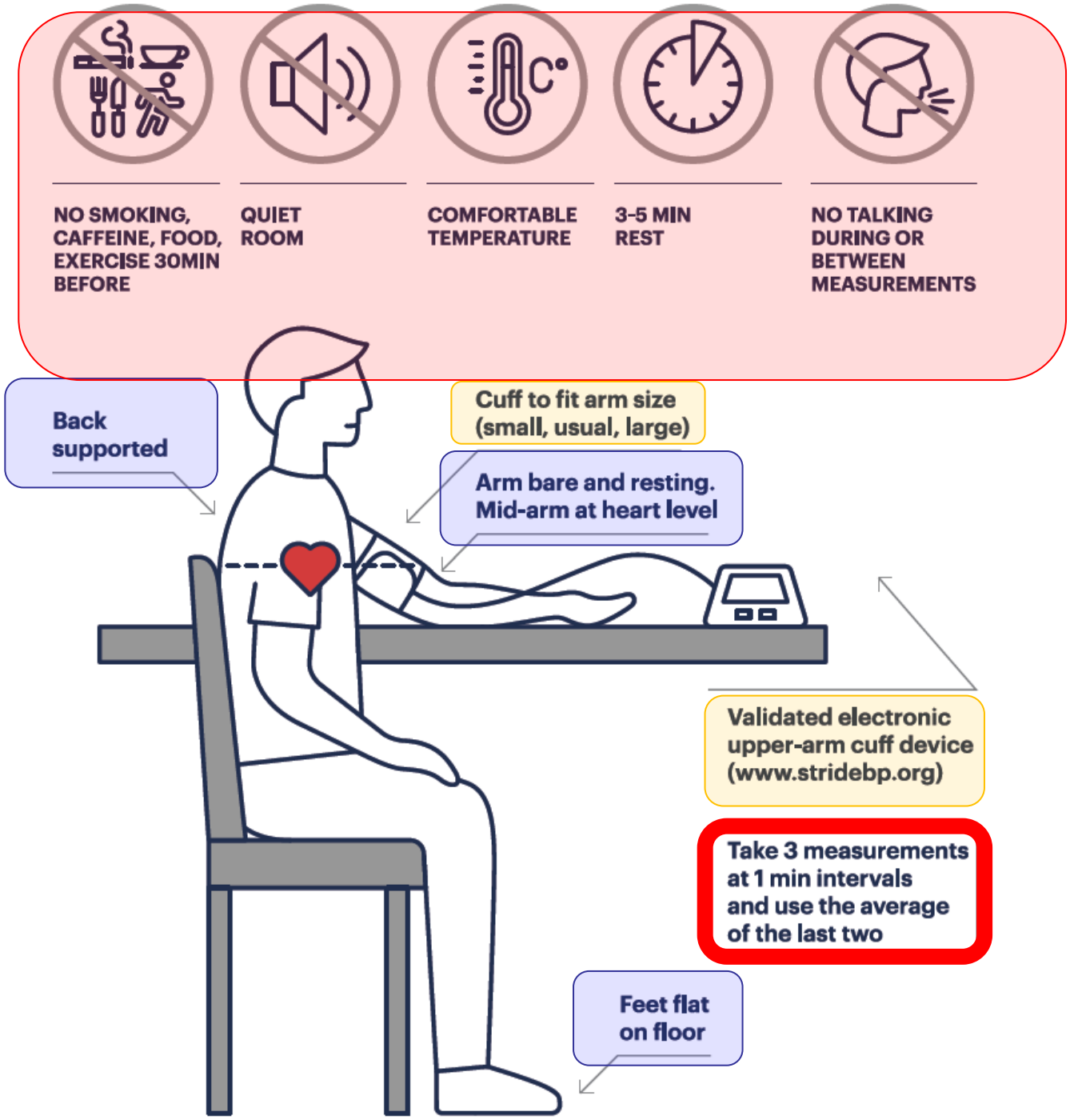
Lancet 2016;387:957-967

Consensus Document

2021 European Society of Hypertension practice guidelines for office and out-of-office blood pressure measurement

J Hypertens 2021

George S. Stergiou[a], Paolo Palatini[b], Gianfranco Parati[c,d], Eoin O'Brien[e], Andrzej Januszewicz[f], Empar Lurbe[g,h], Alexandre Persu[i], Giuseppe Mancia[j], Reinhold Kreutz[k], on behalf of the European Society of Hypertension Council and the European Society of Hypertension Working Group on Blood Pressure Monitoring and Cardiovascular Variability


NO SMOKING, CAFFEINE, FOOD, EXERCISE 30MIN BEFORE
QUIET ROOM
COMFORTABLE TEMPERATURE
3-5 MIN REST
NO TALKING DURING OR BETWEEN MEASUREMENTS
Back supported
Cuff to fit arm size (small, usual, large)
Arm bare and resting. Mid-arm at heart level
Validated electronic upper-arm cuff device (www.stridebp.org)
Take 3 measurements at 1 min intervals and use the average of the last two
Feet flat on floor

A SPHYGMOMANOMETER FOR EPIDEMIOLOGISTS

G. A. ROSE
M.A., D.M. Oxon., M.R.C.P.

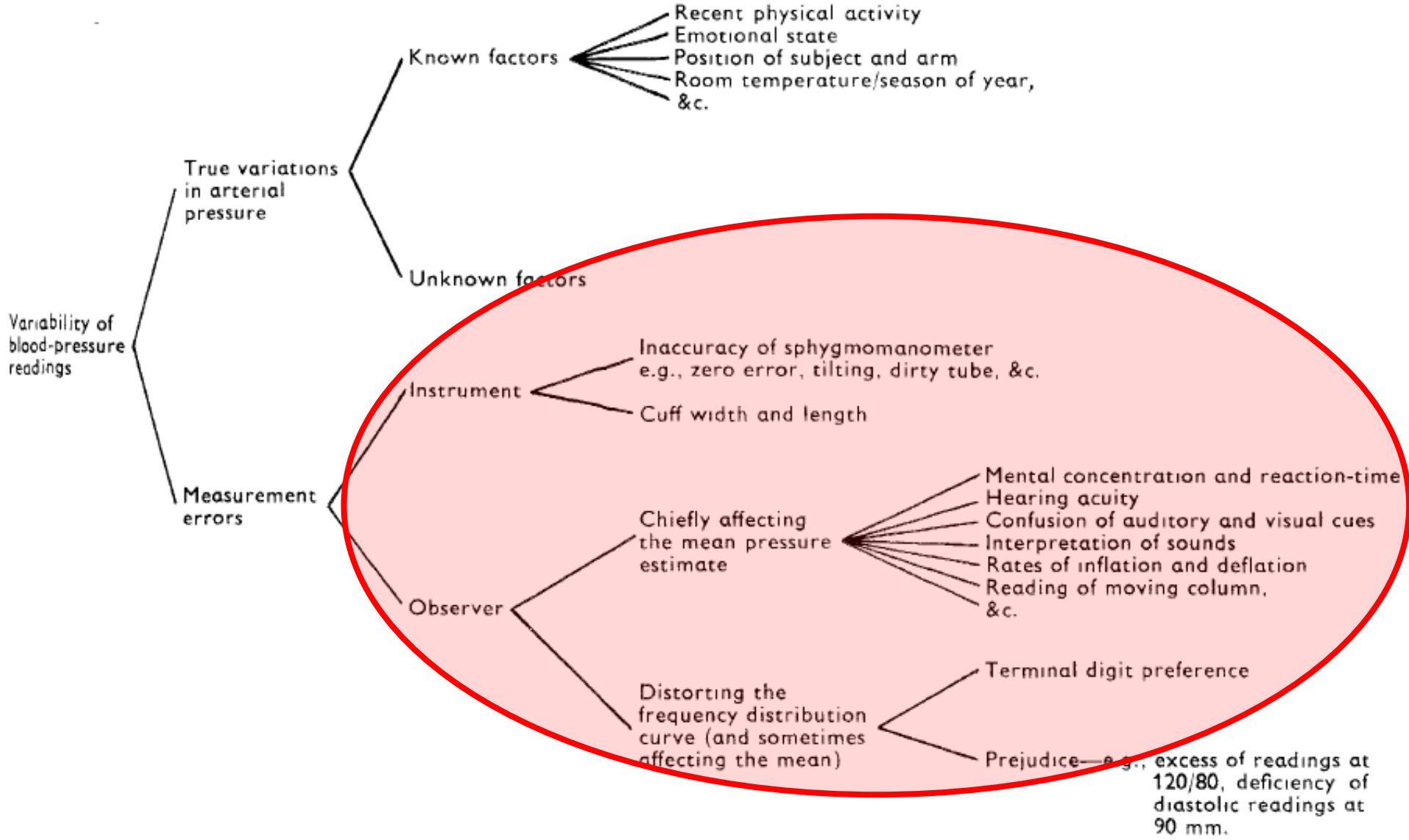
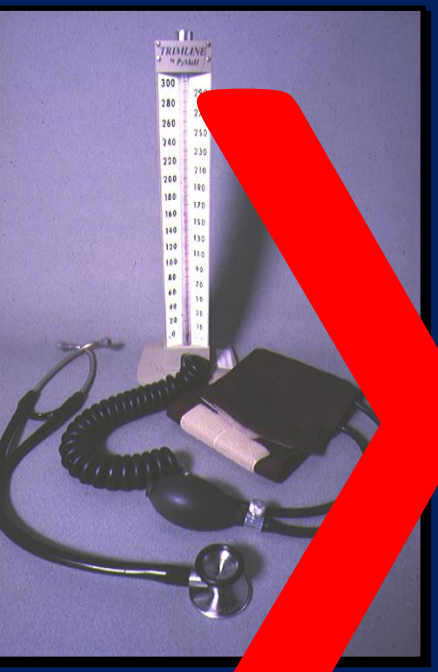


Fig. 1—A schematic representation of some sources of variation in measuring blood-pressure.

ΣΥΣΚΕΥΕΣ ΜΕΤΡΗΣΗΣ ΑΠ ΣΤΟ ΙΑΤΡΕΙΟ



Υδραργυρικό

Μεταλλικό

Υβριδικό

Αυτόματο ηλεκτρονικό

ΚΛΙΝΙΚΕΣ ΜΕΛΕΤΕΣ ΣΤΗΝ ΥΠΕΡΤΑΣΗ

ΜΕΛΕΤΗ	ΠΙΕΣΟΜΕΤΡΟ
UKPDS	
HOT	
ASCOTT-BPLA	
ADVANCE	
ONTARGET	
ACCORD BP	
HOPE-3	
SPRINT	

~4.000 ΣΥΣΚΕΥΕΣ ΣΤΗΝ ΑΓΟΡΑ

Μόνο 304 συσκευές έχουν αξιολογηθεί με PubMed μελέτη

>92% Μη πιστοποιημένες

Stergiou GS. J Hypertens 2020 Mar;38:395-9.

European Society of Hypertension

World Hypertension League

International Society of Hypertension

STRIDE BP

www.stridebp.org

ΠΙΣΤΟΠΟΙΗΜΕΝΕΣ ΣΥΣΚΕΥΕΣ ΜΕΤΡΗΣΗΣ ΤΗΣ ΑΡΤΗΡΙΑΚΗΣ ΠΙΕΣΗΣ

Ανεξάρτητη - Συστηματική Αξιολόγηση

STRIDE BP

JOINT INITIATIVE WITH

European Society of Hypertension

International Society of Hypertension

World Hypertension League

STRIDE BP is an international scientific non-profit organization founded by hypertension experts with the mission of improving the diagnosis and management of hypertension.

Read more →

Validated blood pressure monitors

Home

Download

Office/Hospital

Download

Ambulatory

Download

Children

Download

Pregnancy

Download

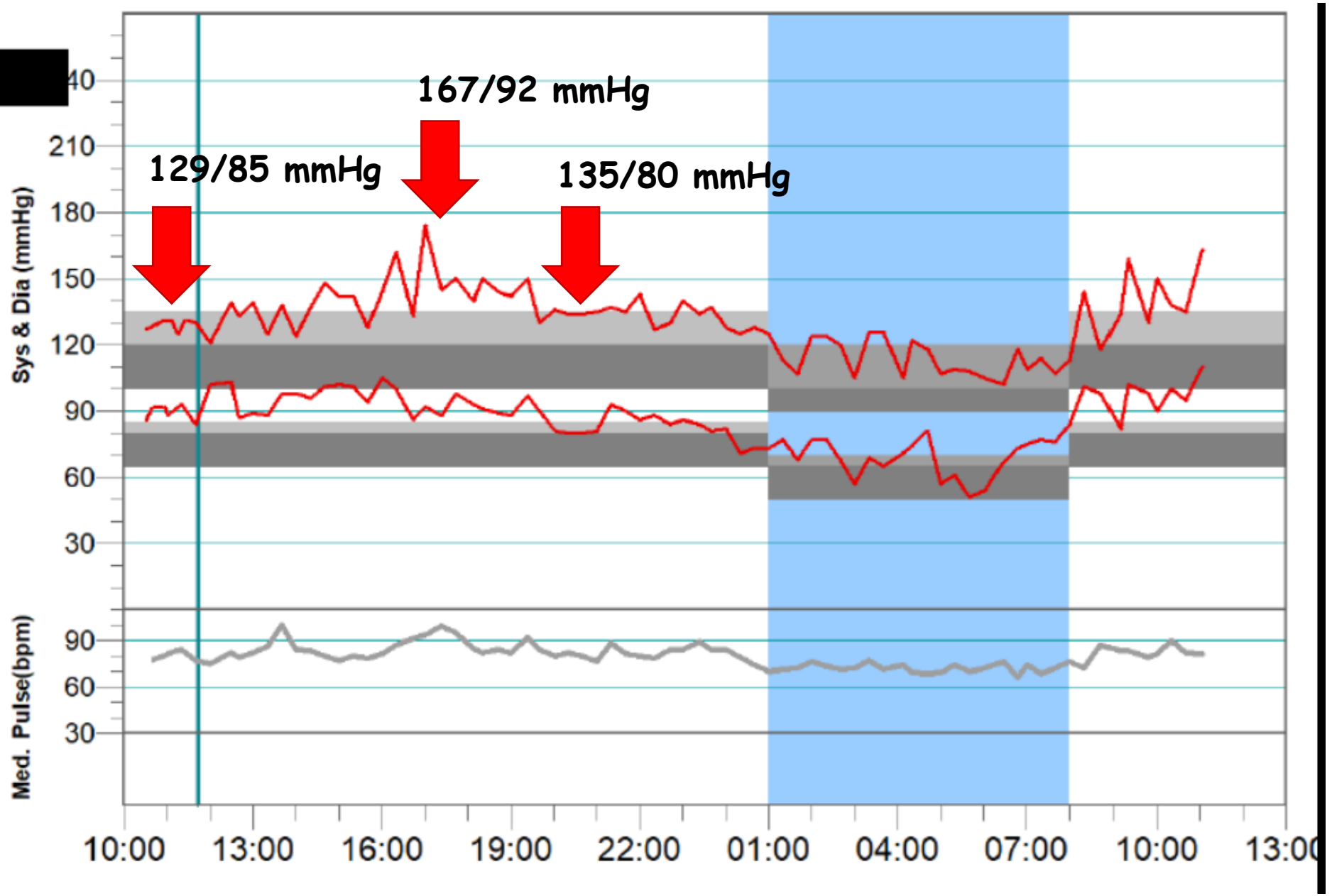
Editorial Commentary

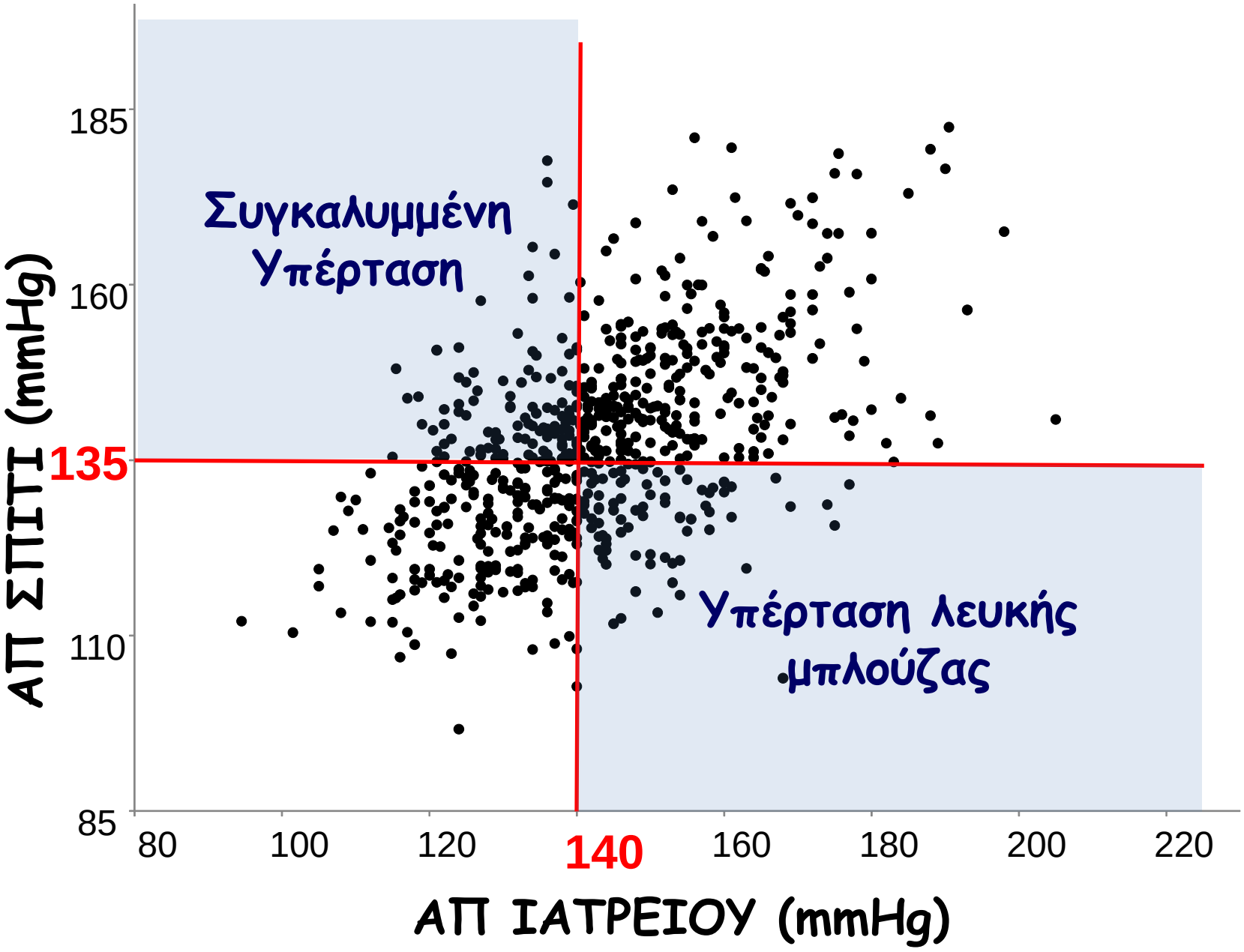
Office Blood Pressure Measurement
The Weak Cornerstone of Hypertension Diagnosis

George Stergiou, Anastasios Kollias, Gianfranco Parati, Eoin O'Brien

American Heart Association. Hypertension

2018;71(5):813-815

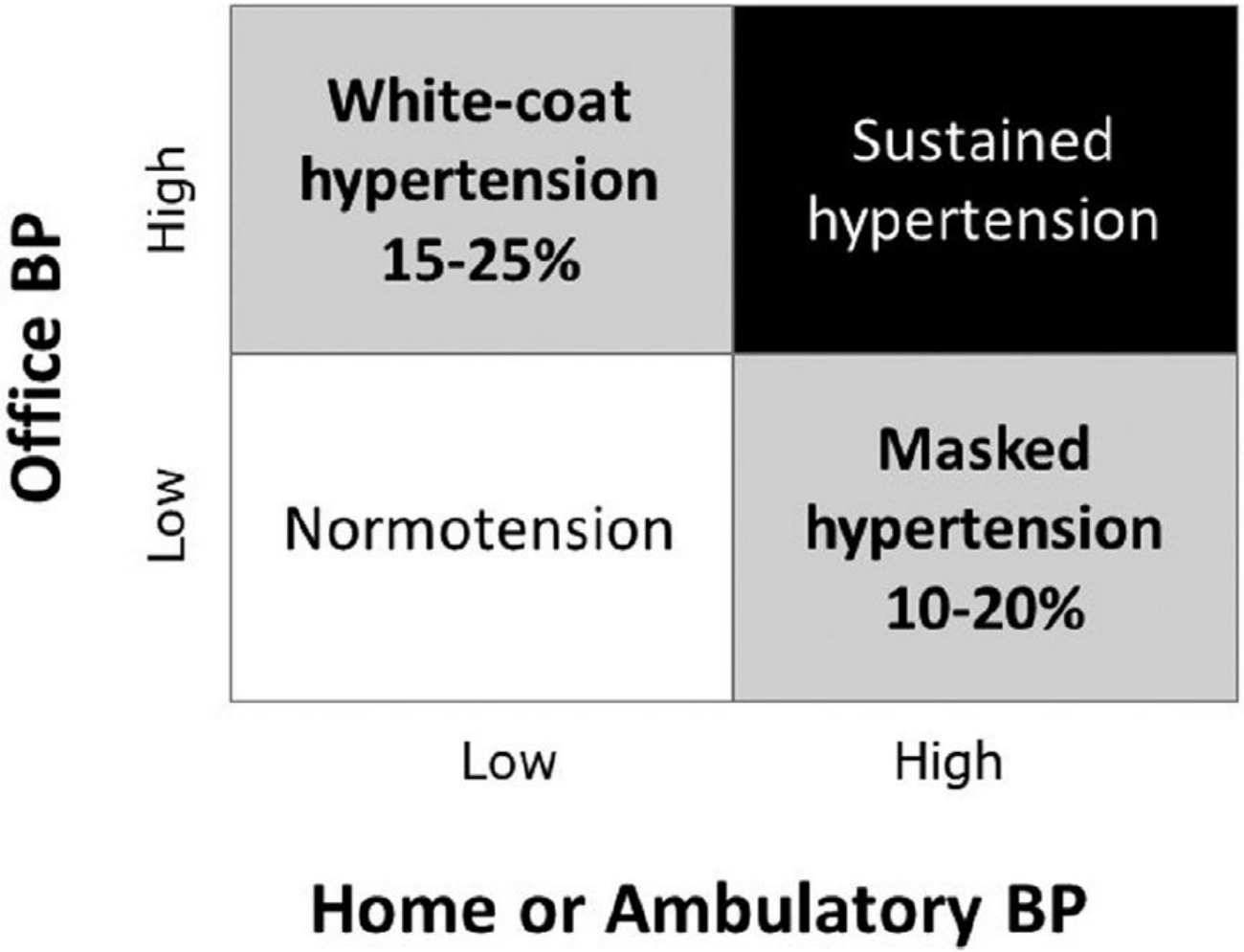

167/92 mmHg
129/85 mmHg
135/80 mmHg
Sys & Dia (mmHg)
240
210
180
150
120
90
60
30
Med. Pulse(bpm)
90
60
30
10:00
13:00
16:00
19:00
22:00
01:00
04:00
07:00
10:00
13:00



Stergiou et al. Unpublished data

2021 European Society of Hypertension practice guidelines for office and out-of-office blood pressure measurement

J Hypertens 2021



Contents lists available at ScienceDirect

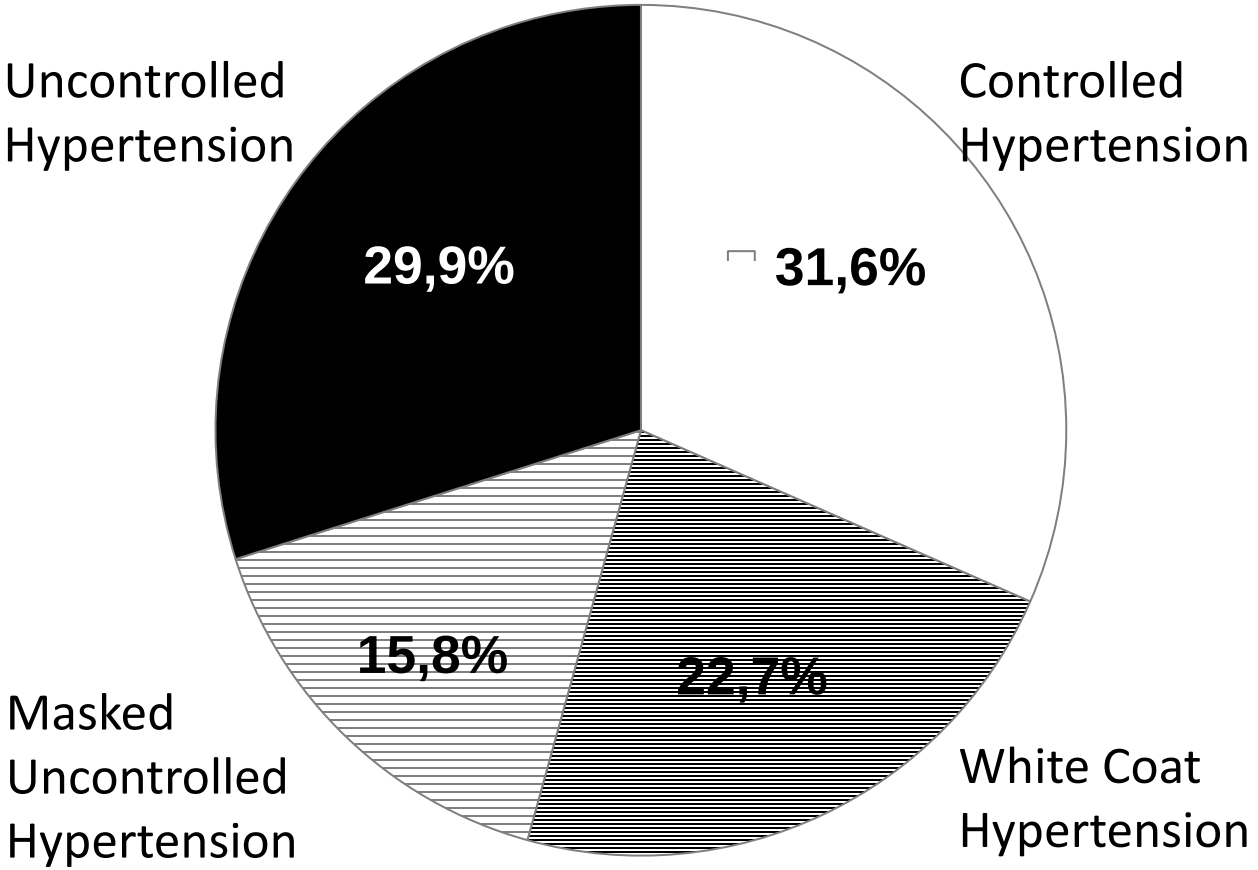
Hellenic Journal of Cardiology

journal homepage: http://www.journals.elsevier.com/hellenic-journal-of-cardiology/

Original Article

Automated office blood pressure measurements in primary care are misleading in more than one third of treated hypertensives: The VALENTINE-Greece Home Blood Pressure Monitoring study

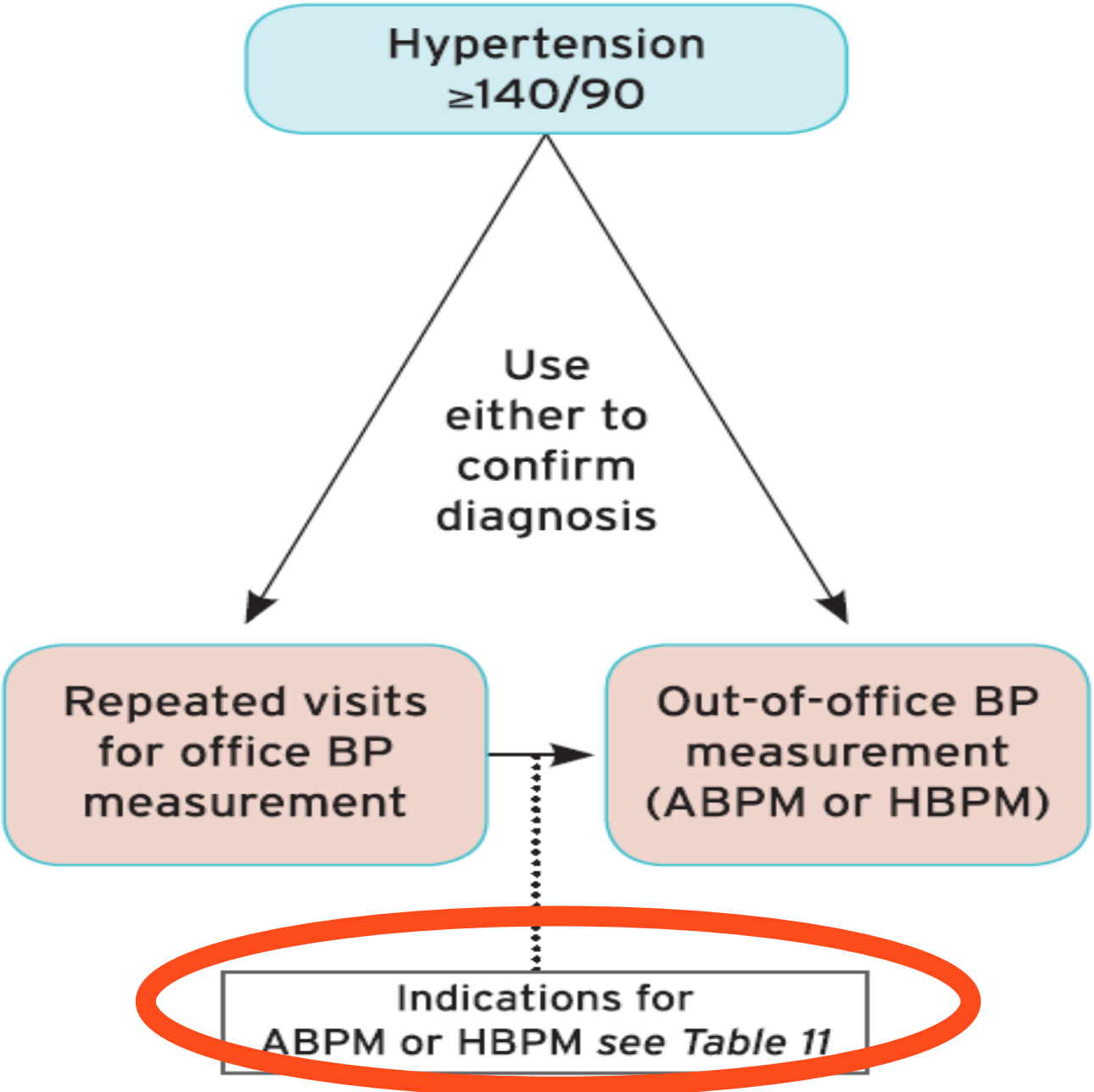
A. Kollias [a], S.S. Papadatos [b], A.F. Dominiczak [b], G. Parati [c, d], G.S. Stergiou [a, *], on behalf of the Valentine-Greece Home Blood Pressure Monitoring Study Group



ΑΞΙΟΛΟΓΗΣΗ ΑΡΤΗΡΙΑΚΗΣ ΠΙΕΣΗΣ

- ✓ Αρτηριακή πίεση: Δυναμικός χαρακτήρας
- ✓ Μετρήσεις στο ιατρείο - Μεθοδολογία μετρήσεων
- ✓ Μετρήσεις εκτός ιατρείου
- ✓ Αξιολόγηση αρτηριακής πίεσης-Διάγνωση

ESC/ESH 2018 Guidelines



ESH/ECS GUIDELINES 2018

New concepts

BP measurement

- **Wider use of out-of-office BP measurement with ABPM and/or HBPM, especially HBPM**, as an option to confirm the diagnosis of hypertension, detect white-coat and masked hypertension, and monitor BP control.

2017 US Guidelines

4.2. Out-of-Office and Self-Monitoring of BP

Recommendation for Out-of-Office and Self-Monitoring of BP References that support the recommendation are summarized in Online Data Supplement 3 and Systematic Review Report.		
COR	**LOE**	**Recommendation**
I	A^{SR}	1. Out-of-office BP measurements are recommended to confirm the diagnosis of hypertension (Table 11) and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions (1-4).

Home BP monitoring (HBPM)

Recommendations and statements	CoR	LoE
HBPM is recommended **in addition to OBPM to improve CV risk prediction** due to better reproducibility and prognostic value than OBPM, although lacking data on treatment benefit from RCTs.	**II**	**B**
HBPM is recommended to identify white-coat hypertension or masked hypertension.	**I**	**B**
HBPM is recommended **for long-term follow-up of treated hypertension** because it improves BP control, especially when combined with education and counselling.	**I**	**B**
HBPM should be performed using automated upper arm-cuff BP monitors validated according to an established protocol. www.stridebp.org	**I**	**C**
Home BP should be monitored for 7 (not fewer than 3) days with duplicate morning (with 1 minute between them) and evening measurements before office visits. Average home BP should be calculated after discarding readings of the first day.	**I**	**C**

Ambulatory BP monitoring (ABPM)

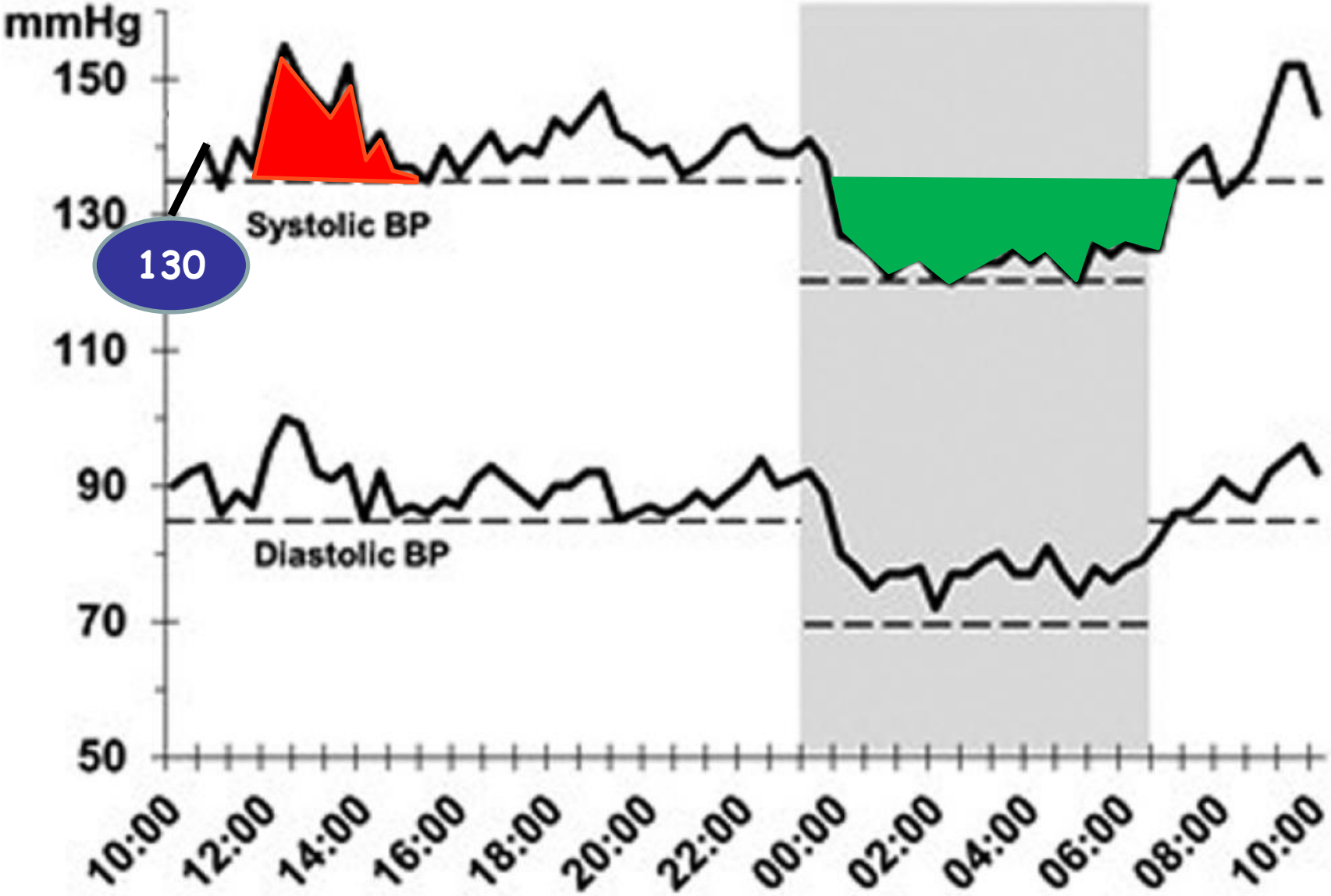
Specific recommendations and statements	CoR	LoE
ABPM is recommended **in addition to OBPM to improve CV risk** prediction due to better reproducibility and prognostic value than OBPM, although lacking data on treatment benefit from RCTs.	**II**	**B**
ABPM is recommended to **identify white-coat hypertension, masked hypertension and nocturnal BP phenotypes**. Repeated ABPM may be necessary because these phenotypes have a limited reproducibility.	**I**	**B**
ABPM should be used to diagnose true resistant hypertension.	**I**	**B**
ABPM should be measured using upper arm-cuff automated BP monitors validated according to an established protocol. www.stridebp.org	**I**	**C**
The recommended frequency of measurements is 20 minutes during day and night to minimize the risk of missing day or night periods.	**I**	**C**

24ωρη καταγραφή
ΑΠ

24ωρη καταγραφή: Πλεονεκτήματα

- ✓ Μεγάλος αριθμός αντικειμενικών μετρήσεων
- ✓ Μετρήσεις στο σύνηθες περιβάλλον/δραστηριότητα
- ✓ Καλύτερη επαναληψιμότητα
- ✓ Υπέρταση λευκής μπλούζας και συγκαλυμμένη υπέρταση
- ✓ Προγνωστική αξία
- ✓ Νυχτερινή πίεση
- ✓ Αναγνώριση ανθεκτικής υπέρτασης
- ✓ 24ωρη αποτελεσματικότητα αντιυπερτασικών

Stergiou et al. ESH. *J Hypertens* 2021


mmHg
150
130
110
90
70
50
130
Systolic BP
Diastolic BP
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00
02:00
04:00
06:00
08:00
10:00

Κριτήρια αξιόπιστης 24ωρης καταγραφής

15-30 min- Συνηθισμένη ημέρα

70% αναμενόμενων μετρήσεων

20 μετρήσεις ημέρα

7 μετρήσεις νύχτα

European Society of Hypertension. *J Hypertens* 2013;31:1731-68.

Patient ID : 3341
Name : [redacted] IKOS
Sex :
Age :
DOB

Day and Night Period

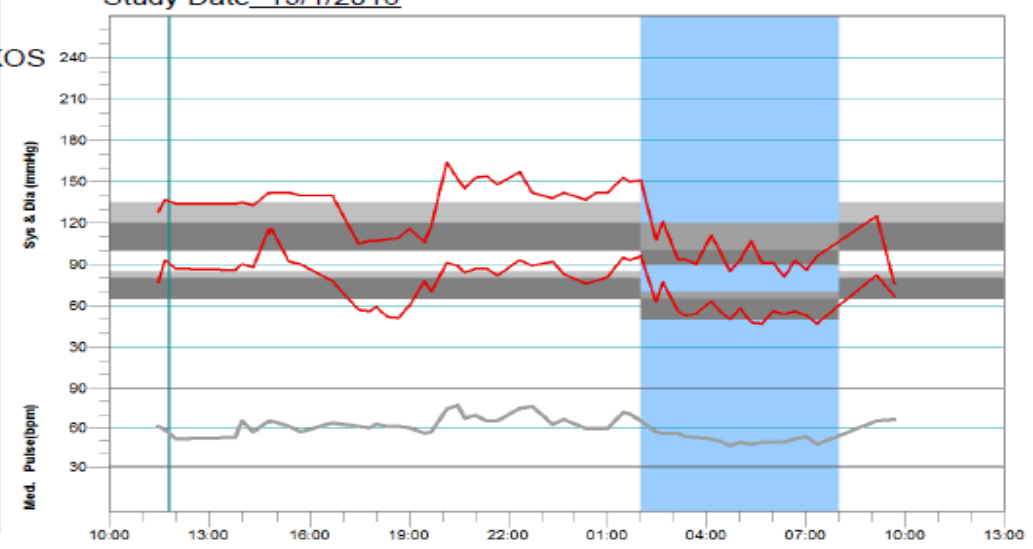
	Time	Interval
Day :	07 ~ 23	20 min
Night :	23 ~ 07	20 min

Actual Awake / Asleep

Awake : 08 ~ 02 h
Asleep : 02 ~ 08 h

BP Threshold

Day : 135/85 mmHg
Night : 120/70 mmHg



Readings

Total Readings : 72
Successful : 52 (72,2%)
Afib : 4 (7,7%)

Day readings ≥ 135/85 **68,6%**
Night readings ≥ 120/70 **11,8%**

Average Blood Pressure (SD)

	Sys	Dia	HR	MAP	PP	Afib
24-hr	124 (22)	75 (16)	64 (9)	88 (18)	49	4(52)
Awake	133 (17)	81 (12)	68 (7)	95 (15)	52	4(35)
Asleep	99 (14)	58 (11)	55 (5)	68 (11)	41	0(17)

White Coat Window

	Sys	Dia	HR
Readings	2	2	2
1st hr Max	137	93	66

Night-time Dip%

	Sys	Dia
Dip%	25,5	28,9

Date / Time	Sys	Dia	HR	MAP	Afib
19/1/2016					
11:29	128	77	66	94	^H
11:40	137	93	63	106	
12:00	134	87	55	103	
13:48	134	86	56	104	
14:00	135	90	71	108	
14:20	133	88	61	105	
14:50	142	116	71	120	
15:23	142	92	66	109	
15:44	140	90	61	108	
16:40	140	78	69	86	
17:28	105	57	66	63	
17:49	107	56	65	66	
18:00	107	59	68	74	
18:20	108	52	66	69	
18:40	109	51	66	57	
19:01	116	60	65	72	
19:29	106	78	60	85	^H
19:40	118	70	61	78	
20:09	164	91	81	100	
20:28	152	89	85	97	
20:40	145	84	73	94	
21:00	153	87	76	113	^H
21:20	154	87	71	117	
21:40	148	82	71	92	
22:20	157	93	82	100	
22:44	142	89	84	95	
23:21	138	92	68	97	
23:40	142	83	72	107	
20/1/2016					
00:20	137	76	64	96	
00:40	142	78	64	101	
01:00	142	81	64	103	
01:28	153	95	78	103	
01:41	150	93	77	120	
02:00	151	96	71	103	
02:28	108	63	61	70	
02:40	121	77	60	93	
03:08	93	56	60	64	
03:20	94	53	57	60	
03:40	90	54	56	61	
04:08	111	63	55	88	
04:23	101	57	53	65	
04:43	85	50	49	57	
05:01	93	58	52	68	
05:20	107	48	50	61	
05:40	91	47	52	63	
06:00	91	56	52	61	
06:20	81	54	52	66	
06:40	93	56	55	65	
07:01	86	53	57	66	
07:20	96	47	50	55	
09:08	125	82	71	103	
09:41	76	67	72	70	^H

Patient ID : 3341
Name : [redacted]
Sex :
Age :
DOB

Day and Night Period

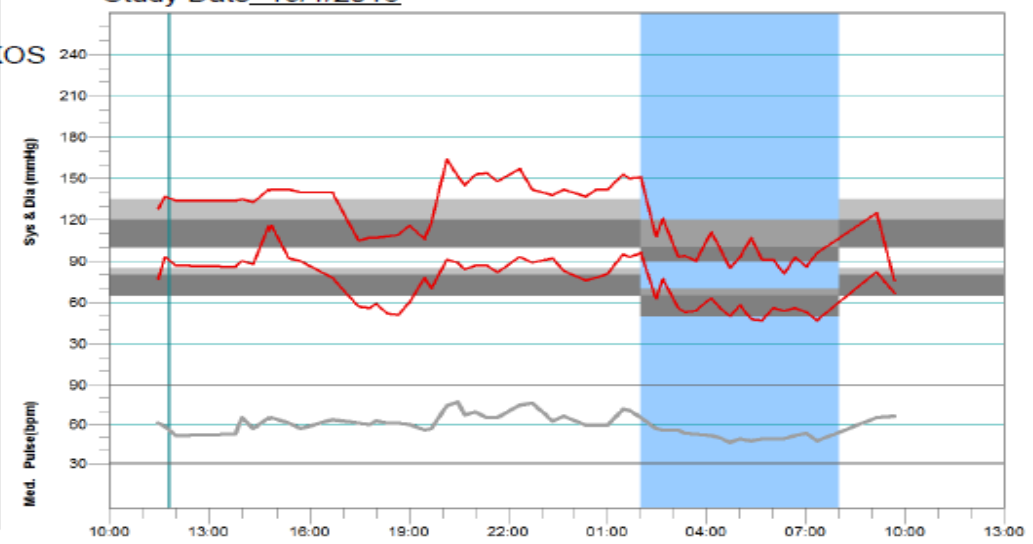
	Time	Interval
Day :	07 ~ 23	20 min
Night :	23 ~ 07	20 min

Actual Awake / Asleep

Awake : 08 ~ 02 h
Asleep : 02 ~ 08 h

BP Threshold

Day : 135/85 mmHg
Night : 120/70 mmHg



Readings

Total Readings : 72
Successful : 52 (72,2%)

BP Load

Day readings ≥ 135/85 **68,6%**
Night readings ≥ 120/70 **11,8%**

Average Blood Pressure (SD)

	Sys	Dia	HR
24-hr	124 (22)	75 (16)	64 (9)
Awake	133 (17)	81 (12)	68 (7)
Asleep	99 (14)	58 (11)	55 (5)

<130/80
<135/85
<120/70

Date / Time	Sys	Dia	HR	MAP	Afib	Date / Time	Sys	Dia	HR	MAP	Afib	Date / Time	Sys	Dia	HR	MAP	Afib
[illegible]						22:20	157	93	82	100		07:01	86	53	57	66	
11:29	128	77	66	94	^H	22:44	142	89	84	95		07:20	96	47	50	55	
11:40	137	93	63	106		23:21	138	92	68	97		09:08	125	82	71	103	
12:00	134	87	55	103		23:40	142	83	72	107		09:41	76	67	72	70	^H
13:48	134	86	56	104		20/1/2016											
14:00	135	90	71	108		00:20	137	76	64	96							
14:20	133	88	61	105		00:40	142	78	64	101							
14:50	142	116	71	120		01:00	142	81	64	103							
15:23	142	92	66	109		01:28	153	95	78	103							
15:44	140	90	61	108		01:41	150	93	77	120							
16:40	140	78	69	86		02:00	151	96	71	103							
17:28	105	57	66	63		02:28	108	63	61	70							
17:49	107	56	65	66		02:40	121	77	60	93							
18:00	107	59	68	74		03:08	93	56	60	64							
18:20	108	52	66	69		03:20	94	53	57	60							
18:40	109	51	66	57		03:40	90	54	56	61							
19:01	116	60	65	72		04:08	111	63	55	88							
19:29	106	78	60	85	^H	04:23	101	57	53	65							
19:40	118	70	61	78		04:43	85	50	49	57							
20:09	164	91	81	100		05:01	93	58	52	68							
20:28	152	89	85	97		05:20	107	48	50	61							
20:40	145	84	73	94		05:40	91	47	52	63							
21:00	153	87	76	113	^H	06:00	91	56	52	61							
21:20	154	87	71	117		06:20	81	54	52	66							
21:40	148	82	71	92		06:40	93	56	55	65							

Patient ID : 1
Name : [redacted]
Sex : Female
Age : 76
DOB : 15/02/1941

Day and Night Period

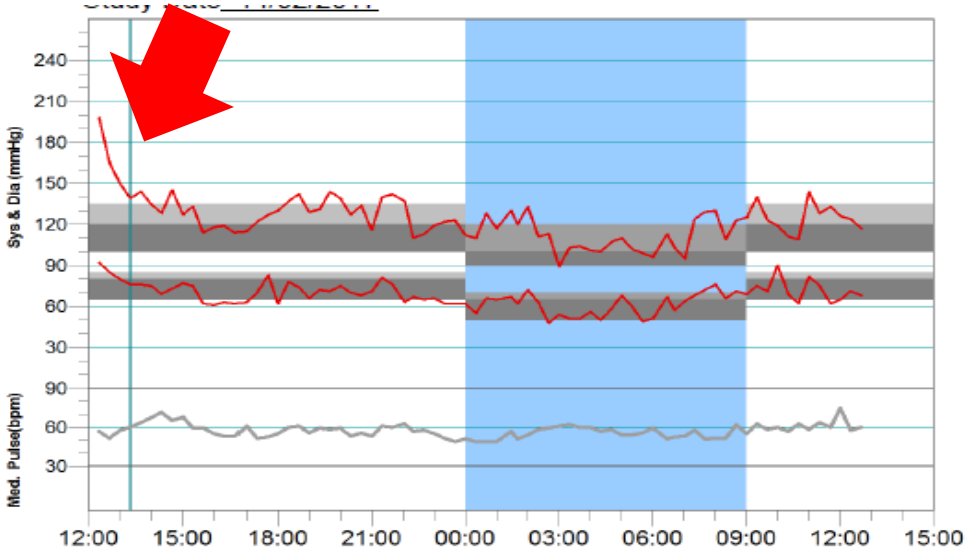
	Time	Interval
Day :	07 ~ 23	20 min
Night :	23 ~ 07	20 min

Actual Awake / Asleep

Awake : 09 ~ 00 h
Asleep : 00 ~ 09 h

BP Threshold

Day : 135/85 mmHg
Night : 120/70 mmHg



Readings

Total Readings : 74
Successful : 74 (100,0%)
Afib : 1 (1,4%)

BP Load

Day readings ≥ 135/85 **36,2%**
Night readings ≥ 120/70 **29,6%**

Average Blood Pressure (SD)

	Sys	Dia	HR	MAP	PP	Afib
24-hr	124 (17)	68 (8)	62 (5)	86 (11)	56	1 (74)
Awake	131 (16)	72 (6)	63 (5)	90 (10)	59	0 (47)
Asleep	112 (9)	61 (6)	59 (4)	79 (8)	51	1 (27)

White Coat Window

	Sys	Dia	HR
Readings	3	3	3
1st hr Max	198	92	62

Night-time Dip%

	Sys	Dia
Dip%	15,1	14,7

e / Time	Sys	Dia	HR	MAP	Afib
02/2017					
12:20	198	92	61	125	
12:40	165	85	55	110	
13:00	150	80	62	118	
13:20	139	76	65	94	
13:40	144	76	69	100	
14:00	135	75	73	93	
14:20	128	69	78	76	
14:40	145	73	71	95	
15:03	127	77	74	99	
15:20	133	75	64	106	
15:40	114	62	64	77	
16:00	118	61	59	74	
16:20	119	63	57	97	
16:40	114	62	57	75	
17:00	115	63	66	95	
17:20	122	70	55	96	
17:43	127	83	56	97	
18:00	130	62	59	70	
18:20	137	78	65	83	
18:40	142	74	66	84	

Date / Time	Sys	Dia	HR	MAP	Afib
20:20	127	70	57	95	
20:40	134	68	60	89	
21:00	116	71	57	84	
21:21	140	81	66	98	
21:40	142	76	65	103	
22:04	137	63	68	66	
22:21	110	67	61	84	
22:40	113	65	62	83	
23:00	119	66	59	81	
23:20	122	62	55	72	
23:40	123	62	52	92	
15/02/2017					
00:00	112	62	54	71	
00:20	110	55	52	81	
00:40	128	66	52	87	
01:00	117	65	52	82	
01:28	130	67	61	95	★
01:40	120	62	54	89	
02:00	133	72	58	93	
02:20	111	63	63	85	
02:40	113	48	64	70	

Date / Time	Sys	Dia	HR	MAP	Afib
04:20	100	50	61	66	
04:41	107	58	63	68	
05:01	110	68	58	76	
05:20	102	60	58	70	
05:40	99	49	60	62	
06:00	96	51	64	55	
06:28	113	67	54	89	
06:43	103	57	56	79	
07:03	95	64	57	73	
07:20	124	68	62	106	
07:40	129	72	54	92	
08:00	130	76	55	91	
08:20	109	66	55	83	
08:40	123	71	67	78	
09:00	125	69	59	90	
09:20	140	75	68	98	
09:40	123	71	63	88	
10:00	119	90	65	95	
10:20	111	69	61	94	
10:40	109	62	68	75	
11:00	144	82	63	96	

Date / Time	Sys	Dia	HR	MAP	Afib
12:40	117	68	65	80	

JAMA | Original Investigation

Association of Office and Ambulatory Blood Pressure With Mortality and Cardiovascular Outcomes

IDACO

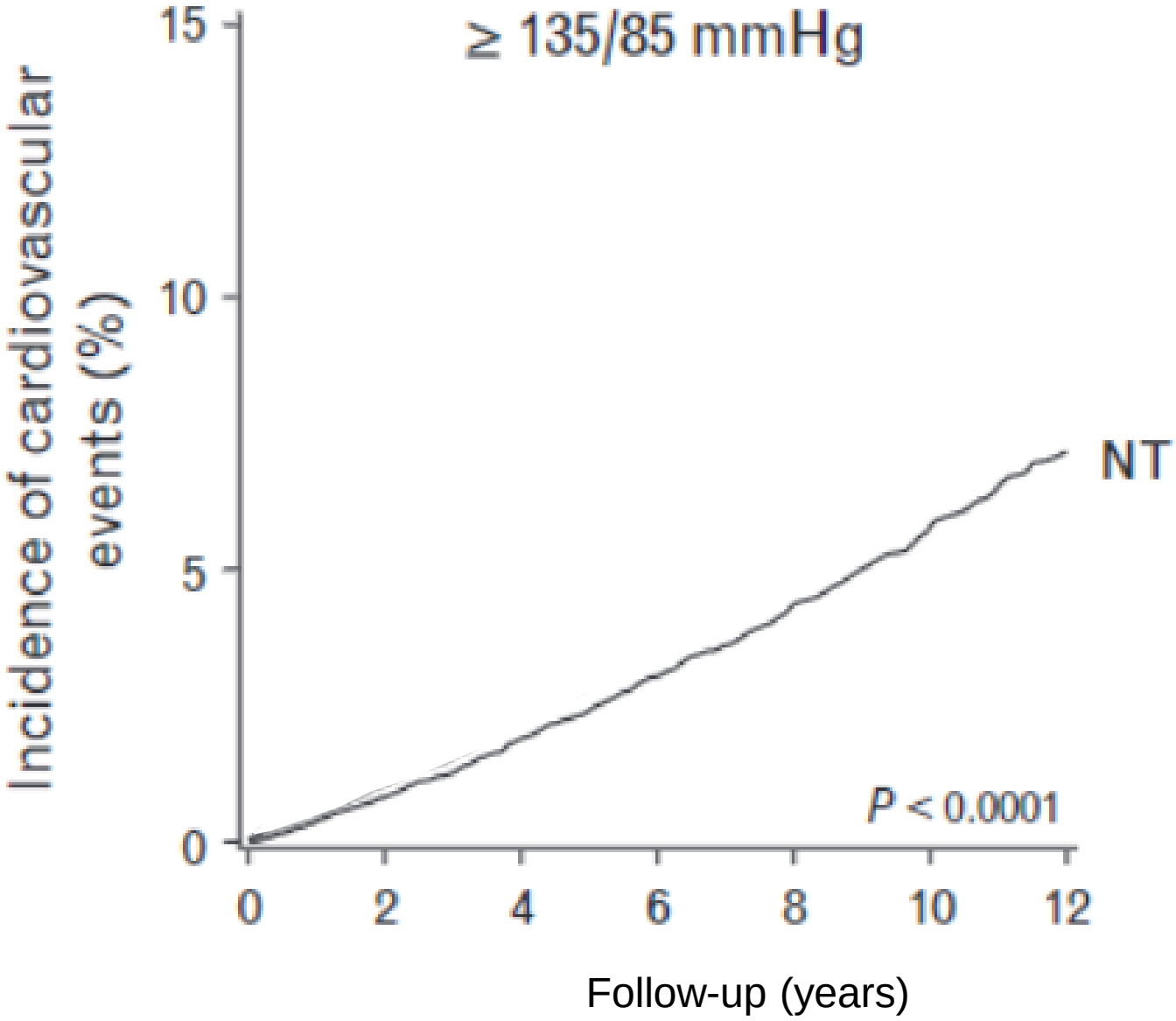
- N=11135
- Γενικοί πληθυσμοί (44% υπέρταση)
- Ευρώπη, Ασία, Ν Αμερική
- 13.8 έτη παρακολούθησης
- Μετρήσεις ιατρείο και 24ωρη καταγραφή

JAMA 2019;322:409-420

Table 2. Association of Outcomes With Systolic BP Indexes Without or With Adjustment for 24-Hour or Nighttime Systolic BP[a]

Outcomes	Adjusted Hazard Ratio (95% CI)[c]	*P* Value
Total Mortality (n = 2836)		
Systolic BP index		
Conventional	1.12 (1.08-1.17)	<.001
Automated office systolic BP	1.08 (1.04-1.12)	<.001
Measure times		
24 hours	1.22 (1.16-1.28)	<.001
Daytime	1.14 (1.09-1.20)	<.001
Nighttime	1.23 (1.17-1.28)	<.001
Dipping ratio[d]	1.13 (1.09-1.18)	<.001
All Cardiovascular Outcomes (n = 2049)		
Systolic BP index		
Conventional	1.20 (1.15-1.26)	<.001
Automated office	1.19 (1.14-1.24)	<.001
Measure times		
24 hours	1.45 (1.37-1.54)	<.001
Daytime	1.33 (1.26-1.41)	<.001
Nighttime	1.36 (1.30-1.43)	<.001
Dipping ratio[d]	1.14 (1.08-1.19)	<.001

Daytime ABP

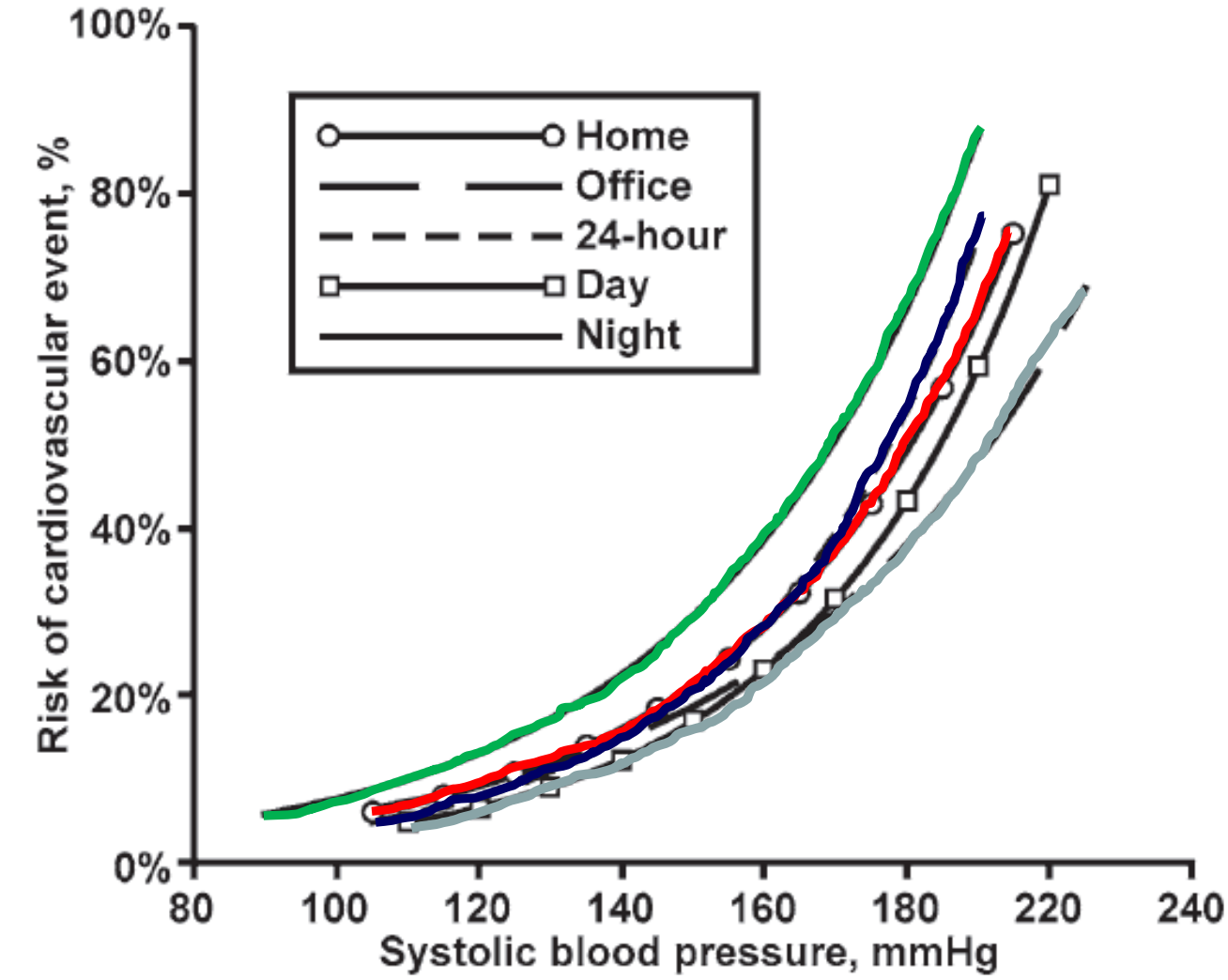


J Hypertens 2007;25:1554-64

Office, Home and Ambulatory Blood Pressures as Predictors of Cardiovascular Risk

Hypertension
Journal of the American Heart Association

American Heart Association®



n=502
16 έτη

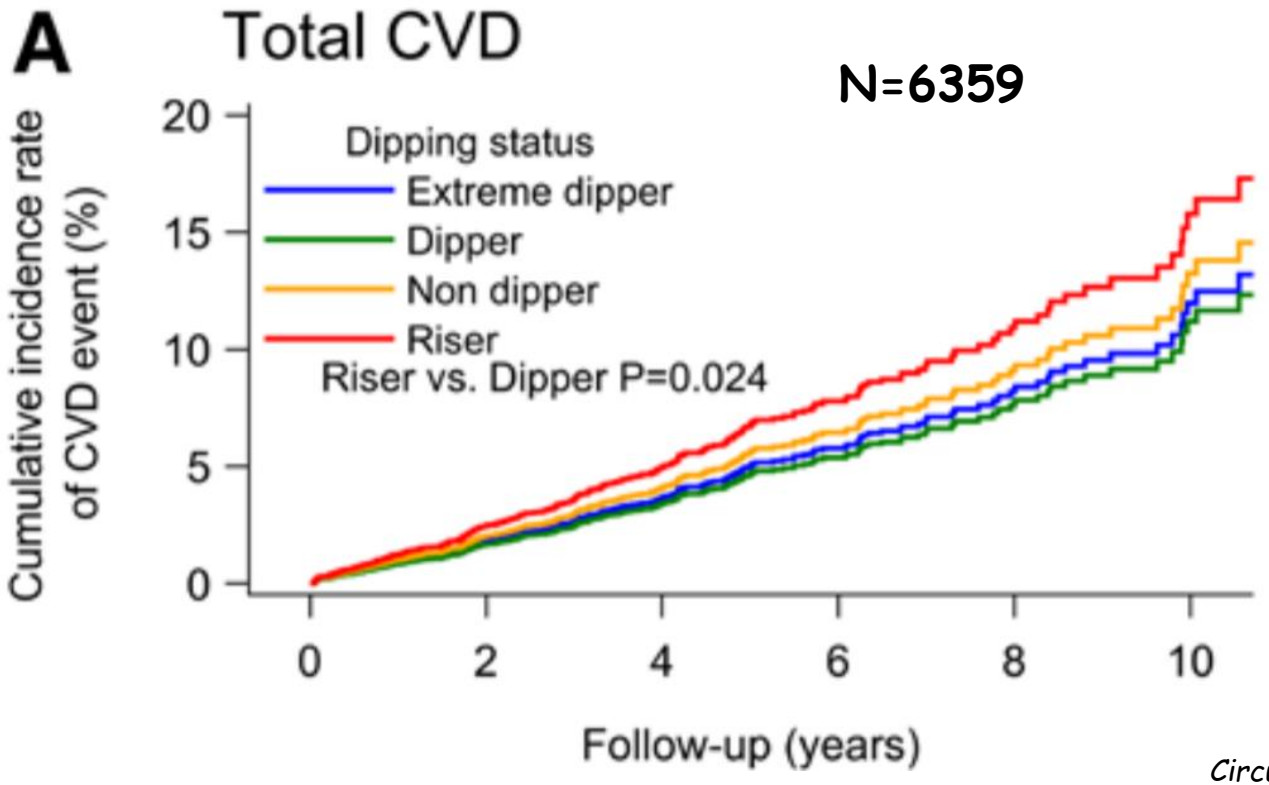
Niiranen et al. Hypertension 2014;64:281-286

Circulation

ORIGINAL RESEARCH ARTICLE

Nighttime Blood Pressure Phenotype and Cardiovascular Prognosis

Practitioner-Based Nationwide JAMP Study



Circulation. 2020;142:1810–1820.

REVIEW

Annals of Internal Medicine

Diagnostic and Predictive Accuracy of Blood Pressure Screening Methods With Consideration of Rescreening Intervals: A Systematic Review for the U.S. Preventive Services Task Force

Margaret A. Piper, PhD, MPH; Corinne V. Evans, MPP; Brittany U. Burda, MPH; Karen L. Margolis, MD, MPH; Elizabeth O'Connor, PhD; and Evelyn P. Whitlock, MD, MPH

Background: Elevated blood pressure (BP) is the largest contributing risk factor to all-cause and cardiovascular mortality.

Purpose: To update a systematic review on the benefits and harms of screening for high BP in adults and to summarize evidence on rescreening intervals and diagnostic and predictive accuracy of different BP methods for cardiovascular events.

Data Sources: Selected databases searched through 24 February 2014.

Study Selection: Fair- and good-quality trials and diagnostic accuracy and cohort studies conducted in adults and published in English.

Data Extraction: One investigator abstracted data, and a second checked for accuracy. Study quality was dual-reviewed.

Data Synthesis: Ambulatory BP monitoring (ABPM) predicted long-term cardiovascular outcomes independently of office BP (hazard ratio range, 1.28 to 1.40, in 11 studies). Across 27 studies, 35% to 95% of persons with an elevated BP at screening outcomes in those who were normotensive at screening. In 40 studies, hypertension incidence after rescreening varied considerably at each yearly interval up to 6 years. Intrastudy comparisons showed at least 2-fold higher incidence in older adults, those with high-normal BP, overweight and obese persons, and African Americans.

Limitation: Few diagnostic accuracy studies of office BP methods and protocols in untreated adults.

Conclusion: Evidence supports ABPM as the reference standard for confirming elevated office BP screening results to avoid misdiagnosis and overtreatment of persons with isolated clinic hypertension. Persons with BP in the high-normal range, older persons, those with an above-normal body mass index, and African Americans are at higher risk for hypertension on rescreening within 6 years than are persons without these risk factors.

Primary Funding Source: Agency for Healthcare Research and Quality.

Ann Intern Med. 2015;162:192-204. doi:10.7326/M14-1539 **www.annals.org**

24ωρη καταγραφή: Μειονεκτήματα

- ✓ Μη ευρέως διαθέσιμη στην πρωτοβάθμια περίθαλψη
- ✓ Κόστος
- ✓ Δυσφορία (νύχτα)
- ✓ Δυσκολία αποδοχής από ασθενή

Stergiou et al. ESH. *J Hypertens* 2021

Μετρήσεις ΑΠ στο σπίτι

Consensus Document

2021 European Society of Hypertension practice guidelines for office and out-of-office blood pressure measurement

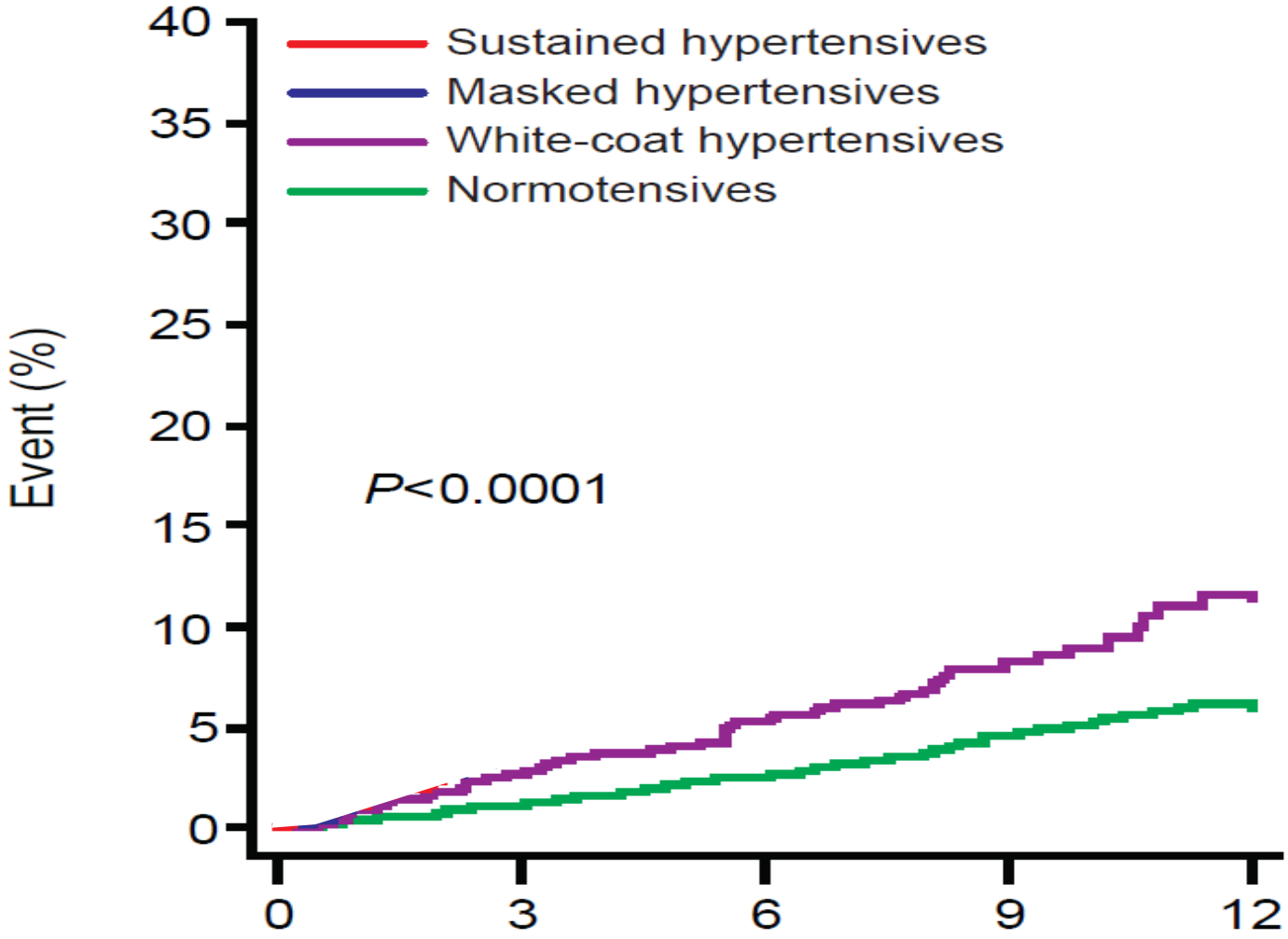
George S. Stergiou[a], Paolo Palatini[b], Gianfranco Parati[c,d], Eoin O'Brien[e], Andrzej Januszewicz[f], Empar Lurbe[g,h], Alexandre Persu[i], Giuseppe Mancia[j], Reinhold Kreutz[k], on behalf of the European Society of Hypertension Council and the European Society of Hypertension Working Group on Blood Pressure Monitoring and Cardiovascular Variability

Consensus Document

Home blood pressure monitoring: methodology, clinical relevance and practical application: a 2021 position paper by the Working Group on Blood Pressure Monitoring and Cardiovascular Variability of the European Society of Hypertension

Gianfranco Parati[a,b], George S. Stergiou[c], Grzegorz Bilo[a,b], Anastasios Kollias[c], Martino Pengo[a], Juan Eugenio Ochoa[a], Rajiv Agarwal[d], Kei Asayama[e,f,g], Roland Asmar[h], Michel Burnier[i], Alejandro De La Sierra[j], Cristina Giannattasio[b,k], Philippe Gosse[l], Geoffrey Head[m], Satoshi Hoshide[n], Yutaka Imai[g], Kazuomi Kario[n], Yan Li[o], Efstathios Manios[p], Jonathan Mant[q], Richard J. McManus[r], Thomas Mengden[s], Anastasia S. Mihailidou[t], Paul Muntner[u], Martin Myers[v], Teemu Niiranen[w,x], Angeliki Ntineri[c], Eoin O'Brien[y], José Andres Octavio[z], Takayoshi Ohkubo[e,g], Stefano Omboni[aa,ab], Paul Padfield[ac], Paolo Palatini[ad], Dario Pellegrini[ae], Nicolas Postel-Vinay[af], Agustin J. Ramirez[ag], James E. Sharman[ah], Andrew Shennan[ai], Egle Silva[aj], Jirar Topouchian[ak], Camilla Torlasco[a], Ji Guang Wang[o], Michael A. Weber[al], Paul K. Whelton[am], William B. White[an], and Giuseppe Mancia[ao], on behalf of the Working Group on Blood Pressure Monitoring and Cardiovascular Variability of the European Society of Hypertension

Prognosis of white-coat and masked hypertension: IDHOCO



Office	Home
↑	↑
↔	↑
↑	↔
↔	↔

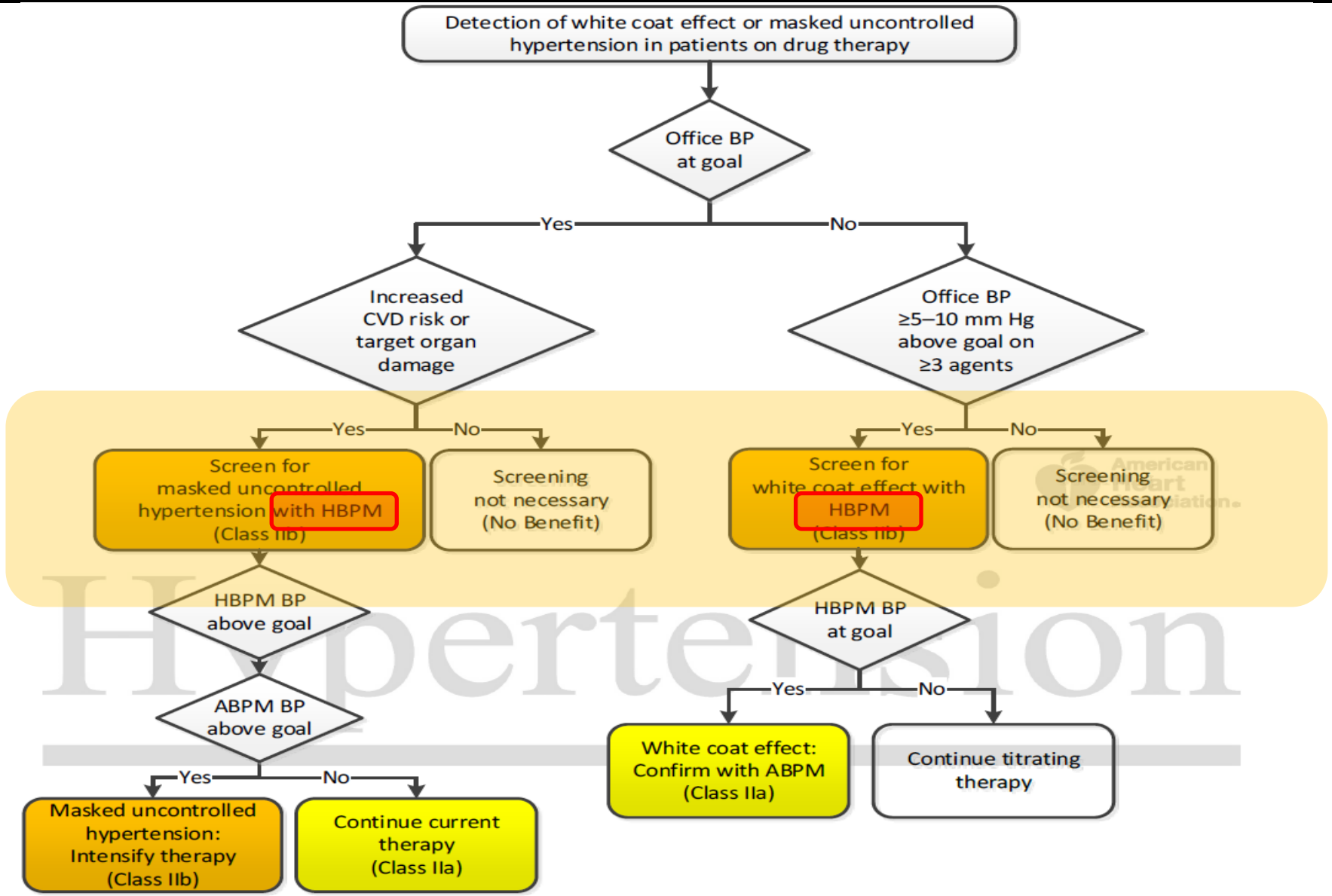
Stergiou et al. Hypertension 2014;63:675-682

2017 US Guidelines

4.2. Out-of-Office and Self-Monitoring of BP

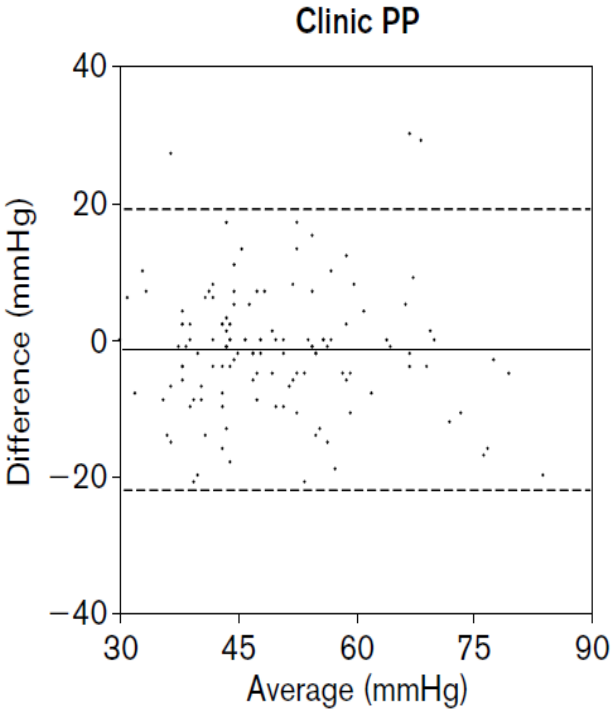
Recommendation for Out-of-Office and Self-Monitoring of BP References that support the recommendation are summarized in Online Data Supplement 3 and Systematic Review Report.		
COR	**LOE**	**Recommendation**
I	A^{SR}	1. Out-of-office BP measurements are recommended to confirm the diagnosis of hypertension (Table 11) and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions (1-4).

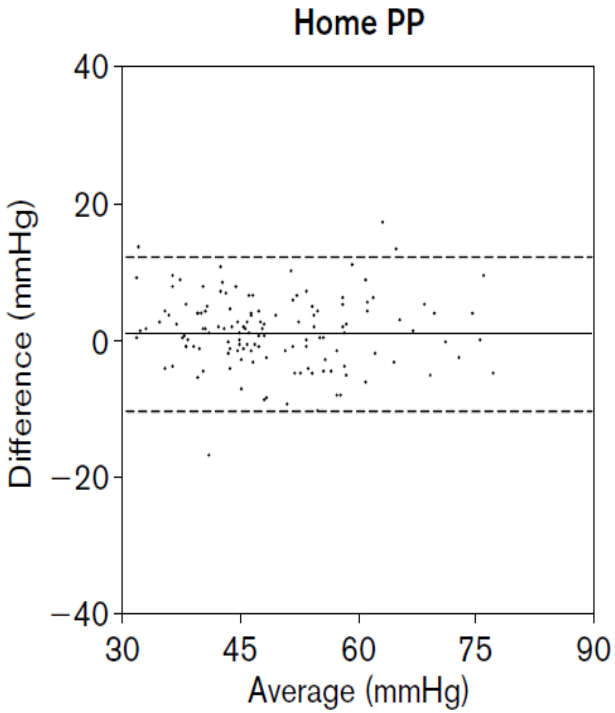
Έλεγχος ρύθμισης σε θεραπευόμενους

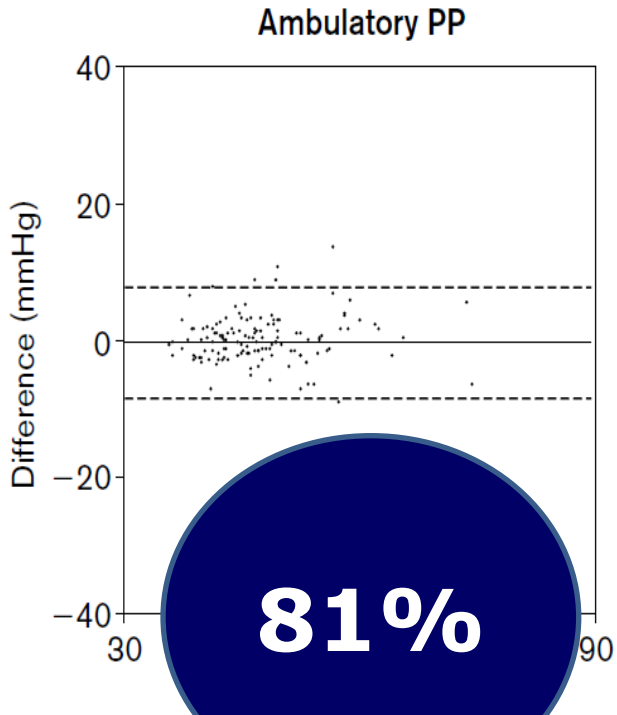


Επαναληψιμότητα Τεχνικών Μέτρησης ΑΠ

n=133	SDD:10 mmHg	5.2 mmHg	4 mmHg

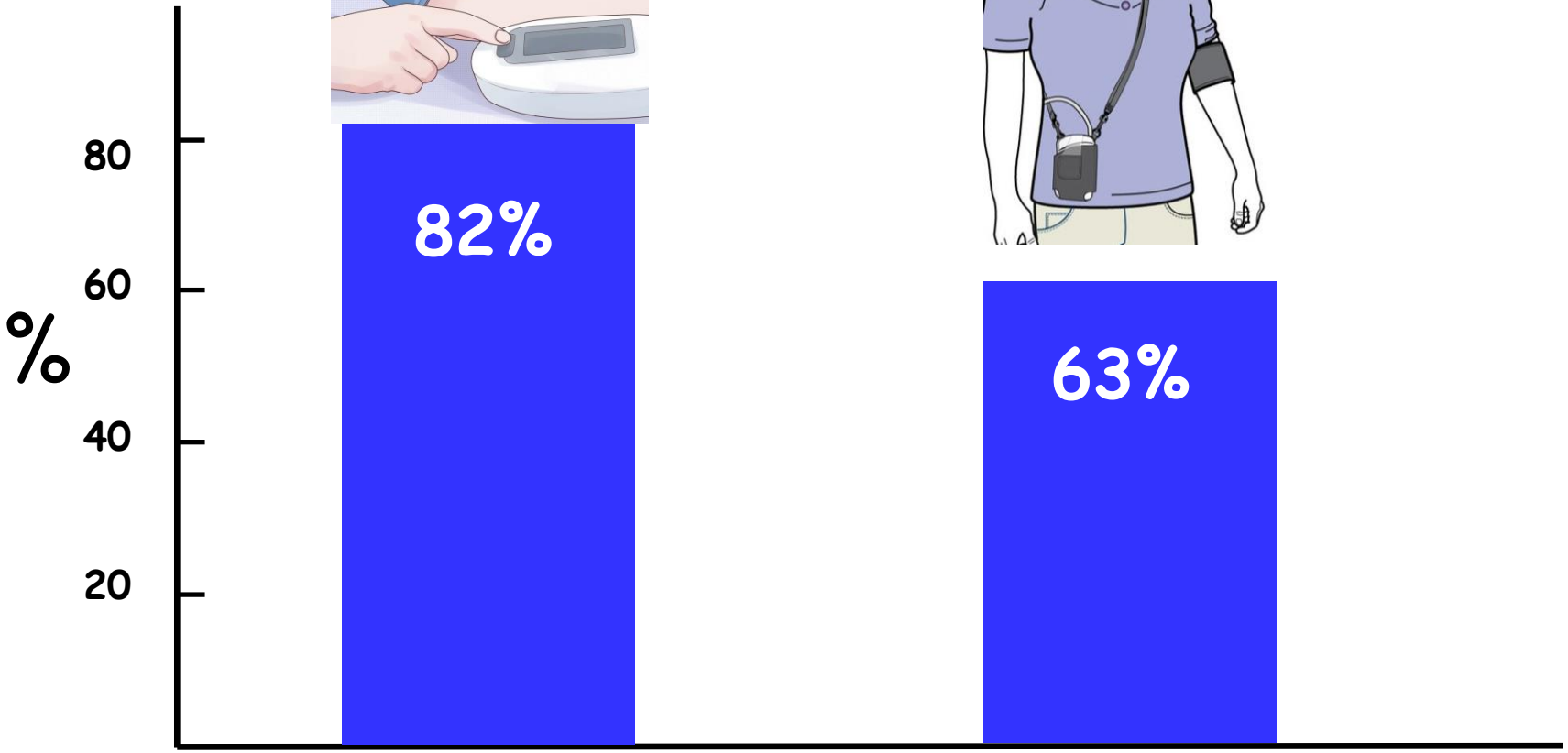




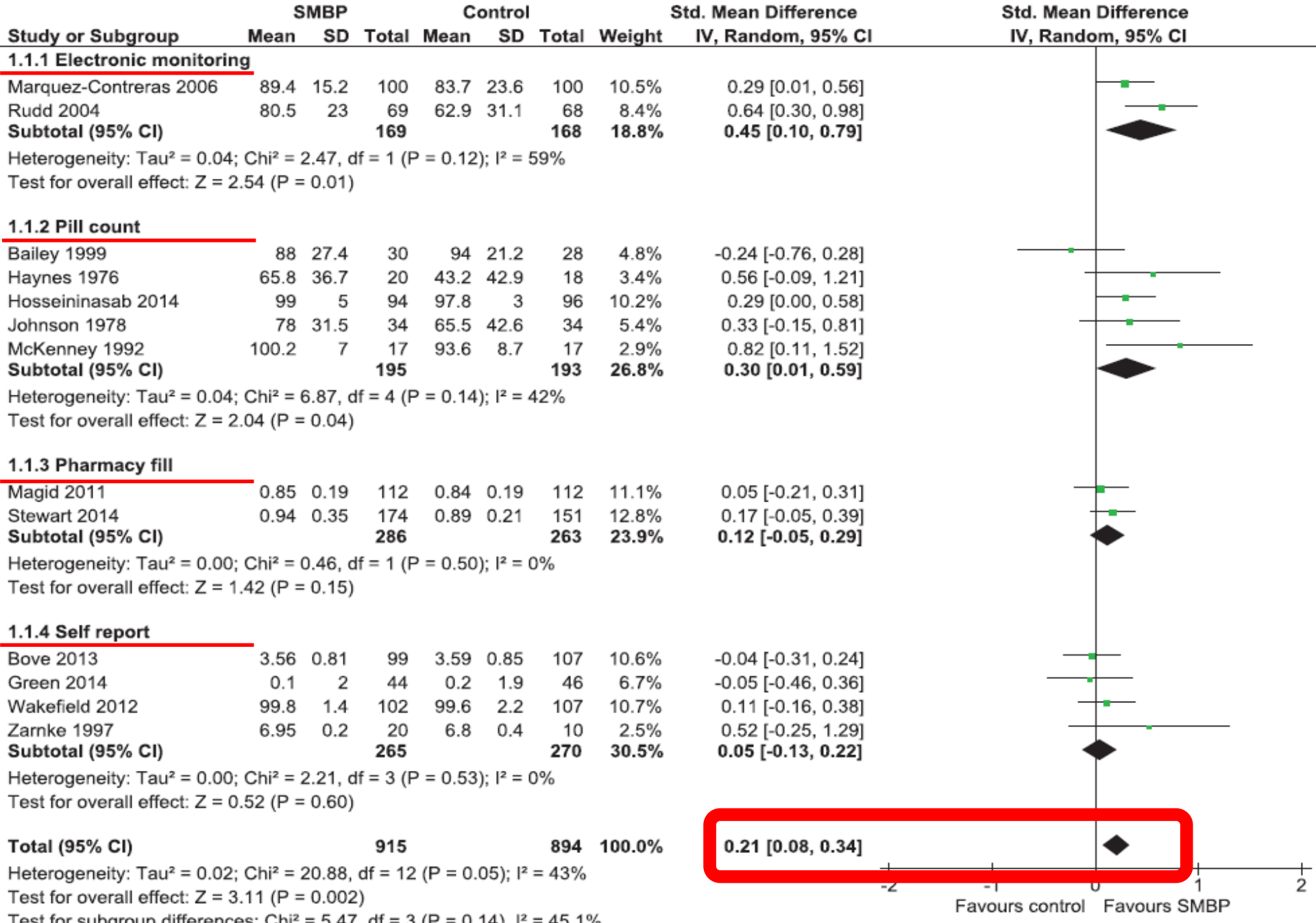


Stergiou GS et al. J Hypertens 2002;20:1987

Προτίμηση ασθενών: Θετική γνώμη



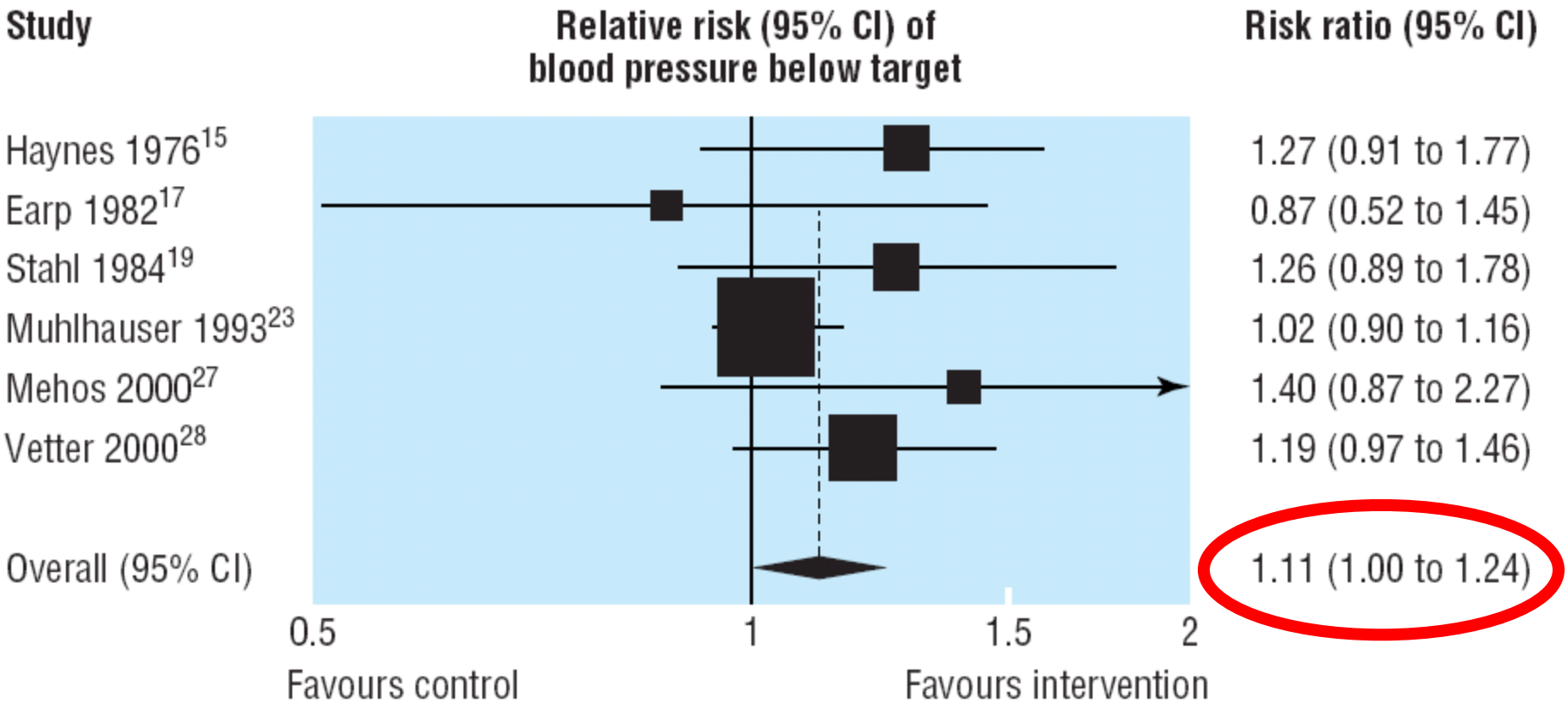
Nasothimiou, et al. J Hum Hypertens 2014;28:224



Am J Hypertens.2015;28:1209-21

Blood Pressure Control by Home Monitoring
Meta-analysis of Randomised Trials

Cappuccio F, et al. *BMJ* 2004



Πλεονεκτήματα μετρήσεων ΑΠ στο σπίτι

- Υψηλή διαγνωστική και προγνωστική αξία
- Παρέχει πολλές μετρήσεις στο σύνηθες περιβάλλον
- Αναγνωρίζει υπέρταση λευκής μπλούζας και συγκαλυμμένη
- Ευρέως διαθέσιμη και αποδεκτή τεχνική
- Καλύτερη μέθοδος για την μακροχρόνια παρακολούθηση των θεραπευόμενων υπερτασικών

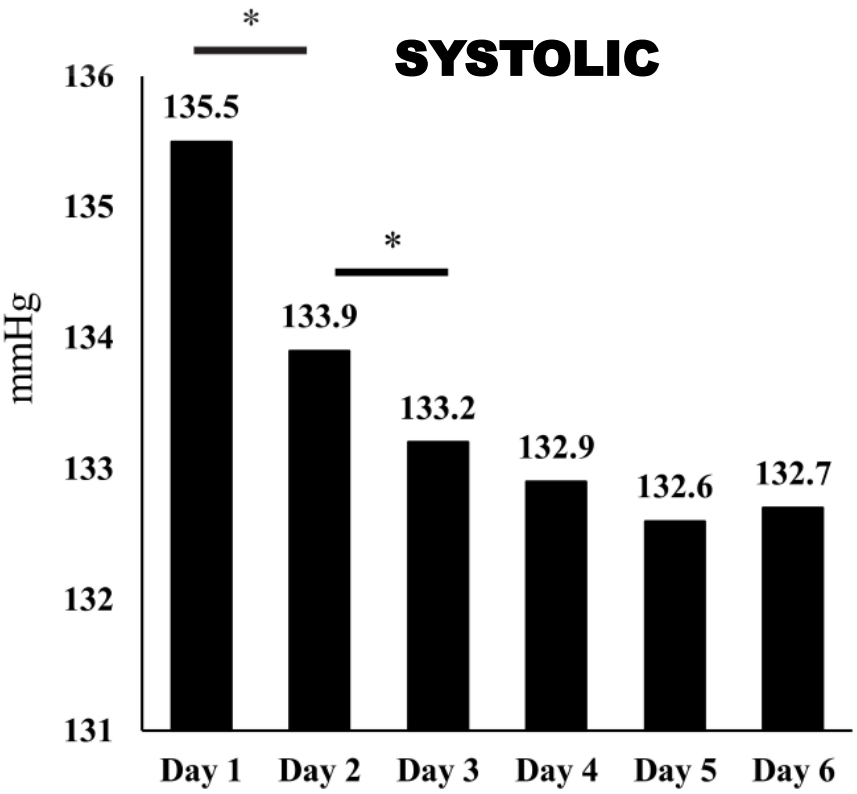
Μετρήσεις ΑΠ στο σπίτι

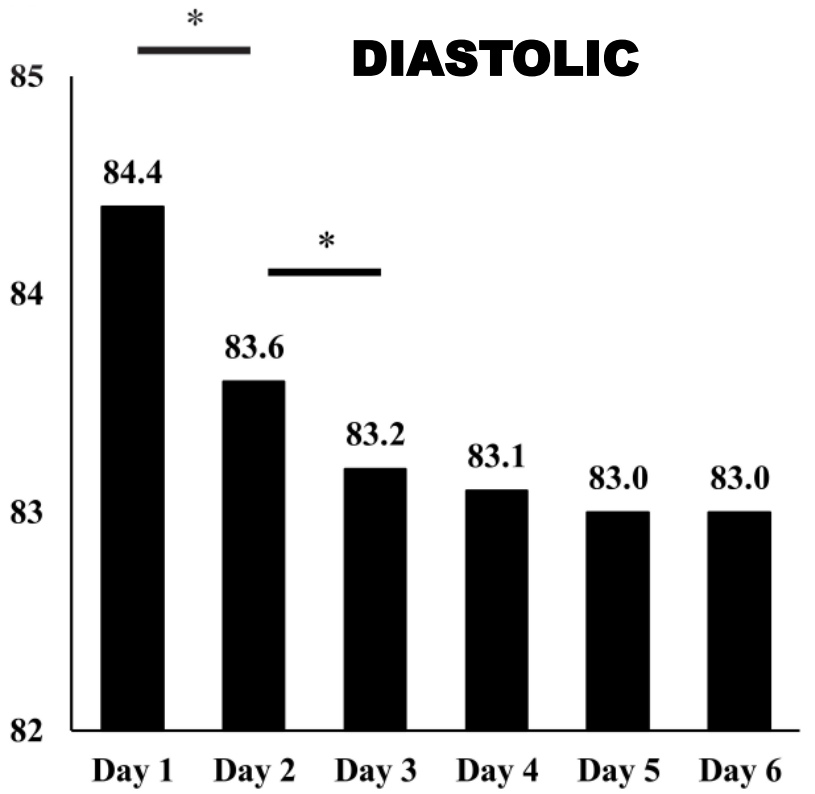
- Πιστοποιημένα πιεσόμετρα (http://stridebp.org)
- Πιεσόμετρα βραχίονα
- Κατάλληλο μέγεθος περιχειρίδας

A&D UA-631 (UA-779 Life Source)
A&D UA-651
A&D UA-705
A&D UA-767
A&D UA-767F
A&D UA-767S
A&D UA-774 (UA-767 Plus)
A&D UA-778
A&D UA-787
A&D UA-853
A&D UA-1020
Alvita Advanced (MA801)
Alvita Arm (CG156)
Andon KD-391
Andon KD-556
Andon KD-5031
Andon KD-5851
Andon KD-5913
Andon KD-5965
Andon MD-534
Artsana CS[illegible]*
Beurer BM[illegible]
Beurer BM[illegible]
Beurer BM[illegible]
Beurer BM60
Beurer BM65
Beurer BM85
Beurer SBM43
Beurer SBM45
BIOS 80204
BIOS 80209
Braun BP[illegible]00
Braun BP[illegible]00
Braun BP6000
Braun BP6100
Braun BP6200
Braun BUA5000
Braun BUA5000LA
Braun BUA5000LAD1
AVITA BPM635
Citizen CH-4328
Citizen CH-452
Citizen CH-[illegible]
Citizen CH-[illegible]
Foreacare Fora D 30
Foreacare Fora D 40b
Foreacare Fora P30 Plus
Foreacare Fora P60 Diamond CuffTP (Fora Test N' Go BP)
Hartmann Tensoval Duo control
Hartmann Tensoval Duo Control II
Health & Life HL-868BA
Health and Life HL-888HA
Honsun LD-30
Honsun LD - 578
IEM Stabil-O-Graph
iHealth BP3 (KD-931)
iHealth BP5
Kingsveld BP101H
Lloyds Pharmacy BP11
Medel Check (92187)
Medel Elite (92125)
Medel Idea (91913 IDEA)
Medipro MediCare 100f
Microlife BP 3AC1-1
Microlife BP 3AC1-1 PC
Microlife BP 3AC1-2
Microlife BP 3AG1
Microlife BP 3B1D-1
Microlife BP 3B1D-A
Microlife BP 3B1D-A(2)
Microlife BP 3B1D-AP
Microlife BP A1 Easy (BP3GR1-1P)
Microlife BP A2 Basic (BP3GQ1-3P)
Microlife BP A3 PC
Microlife BP A6 PC (BP3GU1-6Y)
Microlife BP A 100
Microlife BP A 100 Plus
Microlife Exact BP (BP3MD1-3)*
Microlife Exact BP
Microlife RM 100
Microlife WatchBP Home
Microlife WatchBP Home A
Microlife WatchBP Home N
Microlife WatchBP Home S
Microlife WatchBP O3
Microlife Watch O3 (3MZ0)
Microlife Watch O3 (3MZ1)
Nissei DS-400
Nissei DS-500
Nissei DSK-1011
Nissei DSK-1031
Nissei DSK-1051
Omron 705IT (HEM-759-E)
Omron 708-IT (HEM-708I-ITE)
Omron BP760 (HEM-7220-Z)
Omron BP785 (HEM-7222-Z)
Omron 705IT*
Omron HEM-705CP *
Omron HEM-705CP-E (HEM-759-E2)
Omron HEM-706/711 *
Omron HEM-713C *
Omron HEM-722C (M4) *
Omron HEM-735C *
Omron HEM-746C (HEM-746C-SH)
Omron HEM-1020
Omron HEM-7051 (HEM-7051-SH)
Omron M3 Intellisense (HEM-7051-E)*
Omron HEM-7080IC
Omron HEM-7101 (HEM-7101-SH)
Omron HEM-[illegible]ense model)
Omron HEM-[illegible]
Omron IA2 (HEM-7011-C1)
Omron i-C10 (HEM-7070-E)
Omron i-Q132 SpotArm (HEM-1010-E)
Omron i-Q142 SpotArm (HEM-1040-E)
Omron M1 (HEM-4030-E)
Omron M1 Classic (HEM-442-E)
Omron M1 Compact (HEM-4022-E)
Omron M1 Compact (HEM-7102-E)*
Omron M1 Plus (HEM-4011C-E)
Omron M2 (HEM-711-E)
Omron M2 (HEM-711-E8)
Omron M2 (HEM-7119-E)
Omron M2 (HEM-7121-E)
Omron M2 Basic (HEM-716-E)
Omron M2 Basic (HEM-716-E2)
Omron M2 Basic (HEM-716-E8)
Omron M2 Basic (HEM-720-E)
Omron M2 Compact (HEM-7102-E)
Omron M3 (HEM-7131-E)
Omron M3 (HEM-7200-E)
Omron M3 (HEM-7200-E2)
Omron M3 (HEM-7200-E8)
Omron M3 Intellisense (HEM-7051-E)
Omron M3 IT (HEM-7131U-E)
Omron M3W (HEM-7202-E)
Omron M4-I (HEM-752-E)
Omron M5-I (HEM-757-E)
Omron M6 (HEM-7001-E)
Omron M6 HEM - 4500 - SOLE*
Omron M6 (HEM-7211-E)
Omron M6 (HEM-7211-E8)
Omron M6 AC (HEM-7322-E)
Omron M6 Comfort (HEM-7000-E)
Omron M6 Comfort (HEM-7221-E)
Omron M6 Comfort (HEM-7221-E8)
Omron M6 Comfort (HEM-7223-E)
Omron M6 Comfort (HEM-7321-E)
Omron M6 Comfort IT (HEM-7322-U-E)
Omron M6W (HEM-7213-E)
Omron M7 (HEM-780-E)
Omron M10-IT (HEM-7080T-E)
Omron MX2 Basic (HEM-742-E2)
Omron MX3 Plus (HEM-742-E)
Omron SEM-1 (HEM-7051-C12)
Oregon Scientific BPU 330
Panasonic EW3106
Panasonic EW3109
Pangao PG-800B11
Pic Solution (Artsana) Classic Check (100)
Pic Solution (Artsana) Classic Check (200)
Pic Solution (Artsana) Comfort Check
Pic Solution (Artsana) CS 410
Pic Solution (Artsana) CSI 610
Pic Solution (Artsana) Daily Check
Pic Solution (Artsana) Digit Extra
Pic Solution (Artsana) Digit Smart
Pic Solution (Artsana) Help Check
Pic Solution (Artsana) Marry Check
Pic Solution (Artsana) My Check
Pic Solution (Artsana) One Check
Pic Solution (Artsana) Personal Check
Polygreen K-Jump KP-7770
Rossmax CF175
Rossmax ME 701 series
Samex SE-9400
Sensacare SAA-102 (Standard)
Spengler K-Jump KP75000
Spengler K-Jump Pro M
Taidoc U-right TD-3124
Thermor Bios 80215
Transtek TMB-986
UEBE Visomat Comfort 20/40
UEBE Visomat Comfort E (Ref 24016)
UEBE Visomat Comfort Eco
UEBE Visomat Comfort Eco (Ref 24026)
UEBE Visomat Comfort Form
UEBE Visomat Double Comfort

Βέλτιστο πρόγραμμα μετρήσεων στο σπίτι

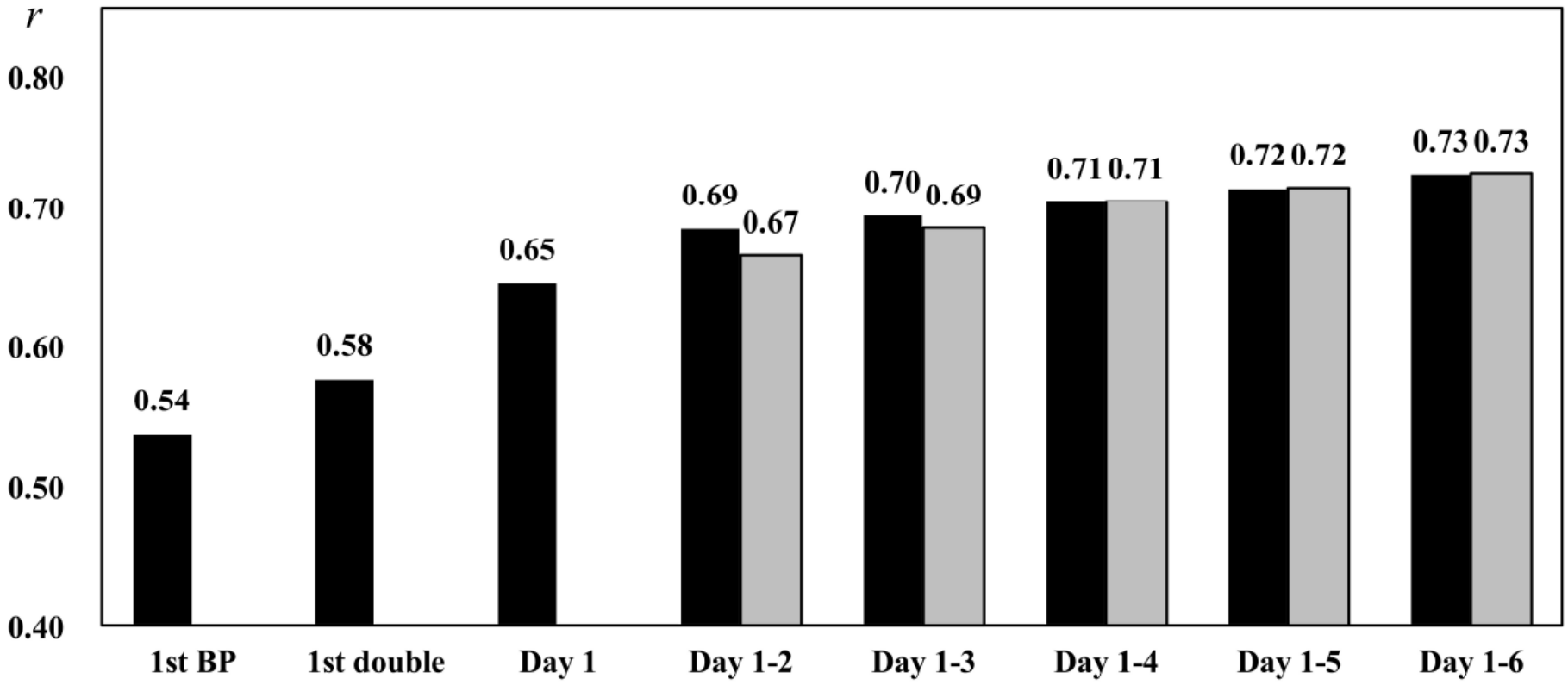
n=2122

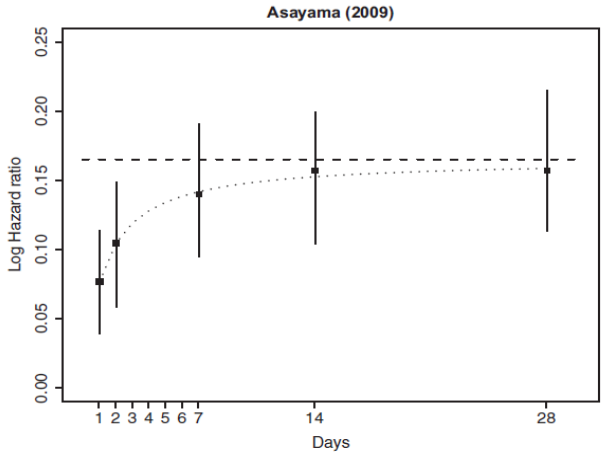


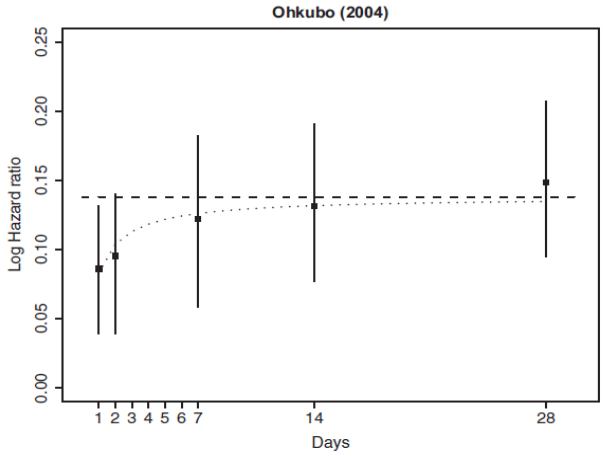


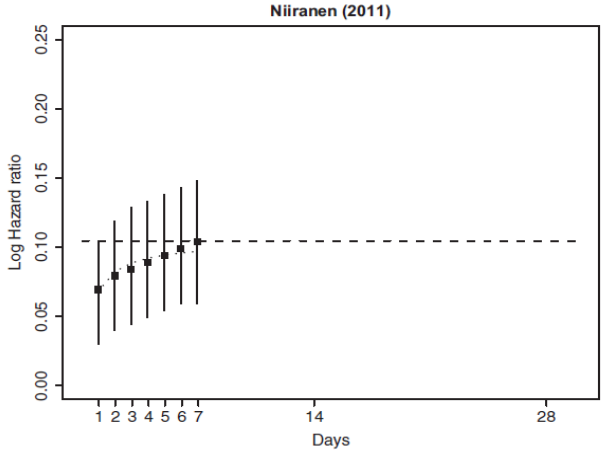
Kyriakoulis KG, et al. J Hypertens 2022; in press

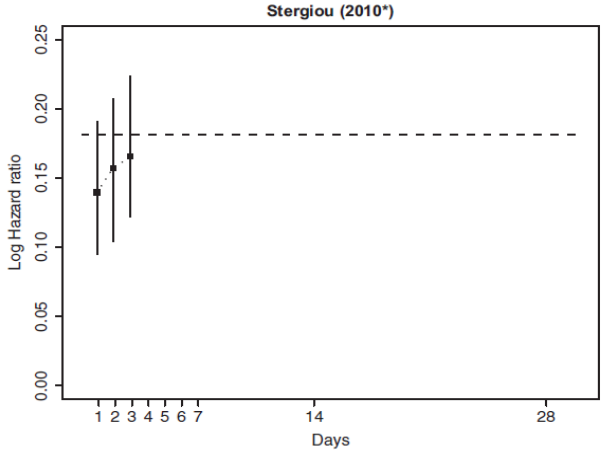
Συσχέτιση με ΑΠ ημέρας στην 24ωρη καταγραφή

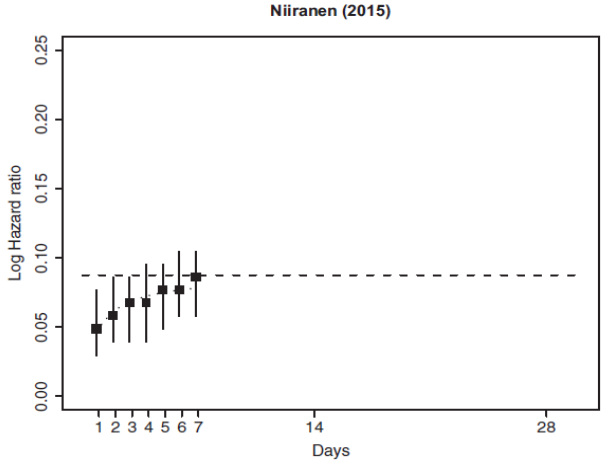












Am J Hypertens 2019;32: 350

Μετρήσεις ΑΠ στο σπίτι

ΟΝΟΜΑΤΕΠΩΝΥΜΟ: _____

ΗΜ/ΝΙΑ ΓΕΝΝΗΣΗΣ: ____/____/____ ΠΙΕΣΟΜΕΤΡΟ: _____

ΜΕΤΡΗΣΕΙΣ ΠΙΕΣΗΣ ΣΤΟ ΣΠΙΤΙ

ΠΡΙΝ ΜΕΤΡΗΣΕΤΕ ΔΙΑΒΑΣΤΕ ΠΡΟΣΕΚΤΙΚΑ ΤΙΣ ΟΔΗΓΙΕΣ

- Μετρήσεις σε 7 εργάσιμες μέρες (μέρα παρά μέρα).
- Πρωί 6-9 π.μ. (πριν τα φάρμακα) και απόγευμα 6-9 μ.μ.
- Μετά από 5 λεπτά ανάπαυση σε καθιστή θέση.
- 2 μετρήσεις κάθε φορά με μεσοδιάστημα 1 λεπτό.
- Εξαίρεση της 1ης μέρας και υπολογισμός του μέσου όρου των υπόλοιπων μετρήσεων.

1η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

2η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

3η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

4η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

5η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

6η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

7η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
__/__/2010	ΠΡΩΙ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)
	ΒΡΑΔΥ	1η)	__:__	_____ - _____	(____)
		2η)		_____ - _____	(____)

Κέντρο Υπέρτασης, Γ' Παθολογική Κλινική Πανεπιστημίου Αθηνών, Νοσοκομείο Σωτηρία.

ΑΞΙΟΛΟΓΗΣΗ ΜΕΤΡΗΣΕΩΝ

ΚΕΝΤΡΟ ΥΠΕΡΤΑΣΗΣ – ΠΡΟΓΡΑΜΜΑ STRIDE HELLAS-7
Γ' Παθολογική Κλινική Πανεπιστημίου Αθηνών
Νοσοκομείο Σωτηρία, Μεσογείων 152, Αθήνα 11527
Τηλ: 210-7763117, Fax: 210-7719981, E-mail:hcsot@otenet.gr

ΟΝΟΜΑΤΕΠΩΝΥΜΟ: [redacted]

ΗΜ/ΝΙΑ ΓΕΝΝΗΣΗΣ: 3 / 7 / 1957 **ΠΙΕΣΟΜΕΤΡΟ:** [redacted]

ΜΕΤΡΗΣΕΙΣ ΠΙΕΣΗΣ ΣΤΟ ΣΠΙΤΙ

ΔΙΑΓΝΩΣΤΙΚΟ ΟΡΙΟ 135/85 mmHg

1η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
1/2/2016	ΠΡΩΙ	1η)	6:00	150 - 75	(76)
		2η)		145 - [illegible]	(78)
	ΒΡΑΔΥ	1η)	8:00	[illegible] - 72	([illegible])
		2η)		127 - 72	(75)

2η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
3/2/2016	ΠΡΩΙ	1η)	7:15	135 - 78	(85)
		2η)		132 - 75	(78)
	ΒΡΑΔΥ	1η)	8:00	162 - 88	(77)
		2η)		158 - 80	(77)

3η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
5/2/2016	ΠΡΩΙ	1η)	8:30	147 - 76	(79)
		2η)		145 - 75	(78)
	ΒΡΑΔΥ	1η)	8:15	155 - 86	(83)
		2η)		160 - 90	(85)

4η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
8/2/2016	ΠΡΩΙ	1η)	7:30	138 - 72	(71)
		2η)		126 - 74	(72)
	ΒΡΑΔΥ	1η)	7:45	134 - 76	(81)
		2η)		136 - 72	(81)

5η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
10/2/2016	ΠΡΩΙ	1η)	8:00	141 - 75	(77)
		2η)		140 - 78	(77)
	ΒΡΑΔΥ	1η)	8:30	128 - 72	(81)
		2η)		128 - 70	(85)

6η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
12/2/2016	ΠΡΩΙ	1η)	7:15	134 - 72	(82)
		2η)		130 - 76	(80)
	ΒΡΑΔΥ	1η)	8:05	167 - 88	(78)
		2η)		170 - 85	(79)

7η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
15/2/2016	ΠΡΩΙ	1η)	8:20	163 - 77	(84)
		2η)		157 - 80	(85)
	ΒΡΑΔΥ	1η)	7:45	141 - 85	(80)
		2η)		138 - 78	(83)

Μέσος όρος 144/78 mmHg

Personal information

Name [redacted]

ID

(Patient Fil

Date of birt

Average without 1st day

minimum 12 readings needed,
untagged reading not included

Average	Sys	Dia	Pulse
All	143	88	75
MORNING	141	87	67
EVENING	146	89	84

1st DAY

22/1/2000

		Time	Sys	Dia	Pulse
MORNING	☐ 1st	07:53	132	93	62
	☐ 2nd	07:55	138	91	65
EVENING	☐ 1st	18:47	149	88	70
	☐ 2nd	18:50	147	88	65

2nd DAY

25/1/2000

		Time	Sys	Dia	Pulse
MORNING	☑ 1st	06:59	139	85	69
	☑ 2nd	07:01	136	87	65
EVENING	☐ 1st	---	---	---	---
	☐ 2nd	---	---	---	---

3rd DAY

27/1/2000

		Time	Sys	Dia	Pulse
MORNING	☑ 1st	07:52	134	87	58
	☑ 2nd	07:55	148	81	62
EVENING	☑ 1st	19:05	160	91	96
	☑ 2nd	19:08	140	93	98

4th DAY

29/1/2000

		Time	Sys	Dia	Pulse
MORNING	☑ 1st	07:55	135	93	60
	☑ 2nd	07:57	134	90	58
EVENING	☑ 1st	19:11	153	91	85
	☑ 2nd	19:14	152	89	81

5th DAY

1/2/2000

		Time	Sys	Dia	Pulse
MORNING	☑ 1st	07:59	141	85	73
	☑ 2nd	08:02	142	81	71
EVENING	☑ 1st	20:33	144	89	67
	☑ 2nd	20:36	129	86	74

6th DAY

3/2/2000

		Time	Sys	Dia	Pulse
MORNING	☑ 1st	08:15	137	84	77
	☑ 2nd	08:18	145	86	74
EVENING	☑ 1st	21:55	147	91	89
	☑ 2nd	21:58	146	89	91

7th DAY

5/2/2000

		Time	Sys	Dia	Pulse
MORNING	☑ 1st	06:59	154	92	68
	☑ 2nd	07:01	141	90	64
EVENING	☑ 1st	19:43	147	89	79
	☑ 2nd	19:45	145	85	81

Connected | Download | Print | Save | Patient files | Download usual mode | Clear memory | Exit

REPORTING BIAS: Achilles' heel of Home Blood Pressure monitoring

Study	Participants (N)	Participants (Selection Criteria)	Subjects Aware of Research Study	Subjects Aware of Device Memory	Reporting Bias (Stored vs. Reported BP Readings)
Myers[6]	39	Undergoing 24-hour ABPM	No	No	Mean difference: SBP ≥10 mm Hg in 33%; DBP ≥5 mm Hg in 23%
Mengden et al[7]	30	HTN	No	No	Reported BP readings: Lower 36%; Higher 9%
Johnson et al[9]	30	Normotensives and HTN	Yes	No	Difference >10 mm Hg: SBP 20%; DBP 17%
Mazze et al[10]	70	Treated HTN with DM2	Yes	No	Reporting precision 89% ± 10% (range, 45%–100%); under-reporting 25% ± 16% (range 0%–56%); over-reporting 12% ± 15% (range, 0%–46%).
Nordmann et al[11]	54	Referred for 24-hour ABPM	Yes	Yes	Mean difference >5 mm Hg between matched BP readings 15%
Cheng et al[12]	49	HTN in university-based family practice	Yes	Optional (% not reported)	Median % agreement between written and stored BP: 80% (range, 18%–100%)
Cirée et al[13]	38	HTN	Yes	Not mentioned	In 47% who provided 100% of requested readings, erroneous reporting was 10%
Bachmann et al[14]	48	HTN from university out-patient clinic	Yes	50% (randomized)	Erroneous readings: Subjects aware of memory 0.014%; Unaware 0.047%
Landert et al[15]	48	HTN	Yes	50% (randomized)	Non-informed group: more frequent measurements (76.1 vs. 58.8) and less agreement of stored with reported values (95.7% vs 87.5%). Report of fictional data only in non-informed group (0 vs 55). Informed group: no fictional data (0 vs 55)

Myers, Stergiou. JASH 2014;8:350

ΚΕΝΤΡΟ ΥΠΕΡΤΑΣΗΣ STRIDE -7
Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών
Γ΄ Παθολογική Κλινική, Νοσοκομείο Σωτηρία
Μεσογείων 152, Αθήνα 11527
Τηλ: 210-7763117, Fax: 210-7719981
E-mail: hcsot@otenet.gr

ΟΝΟΜΑΤΕΠΩΝΥΜΟ: [redacted]

ΗΜ/ΝΙΑ ΓΕΝΝΗΣΗΣ: 6/12/[illegible] ΠΙΕΣΟΜΕΤΡΟ: [illegible]

ΜΕΤΡΗΣΕΙΣ ΠΙΕΣΗΣ ΣΤΟ ΣΠΙΤΙ

ΠΡΙΝ ΜΕΤΡΗΣΕΤΕ
ΔΙΑΒΑΣΤΕ ΠΡΟΣΕΚΤΙΚΑ ΤΙΣ ΟΔΗΓΙΕΣ

- Μετρήσεις για 7 εργάσιμες μέρες - Μέρα παρά μέρα.
- Πρωί 6-9 π.μ. (πριν τα φάρμακα) και απόγευμα 6-9 μ.μ.
- 1η μέτρηση: μετά 5 λεπτά ανάπαυση σε καθιστή θέση.
- 2η μέτρηση: 1 λεπτό μετά την 1η μέτρηση.
- Αξιολόγηση: Υπολογισμός του μέσου όρου όλων των μετρήσεων εκτός της 1ης μέρας.

1η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
8/1/2017	ΠΡΩΙ	1η)	8:15	147 - 82	(82)
		2η)		140 - 77	(81)
	ΒΡΑΔΥ	1η)	10:00	133 - 80	(83)
		2η)		132 - 76	(85)

2η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
11/1/2017	ΠΡΩΙ	1η)	8:30	138 - 85	(79)
		2η)		136 - 79	(76)
	ΒΡΑΔΥ	1η)	8:10	141 - 72	(88)
		2η)		138 - 72	(84)

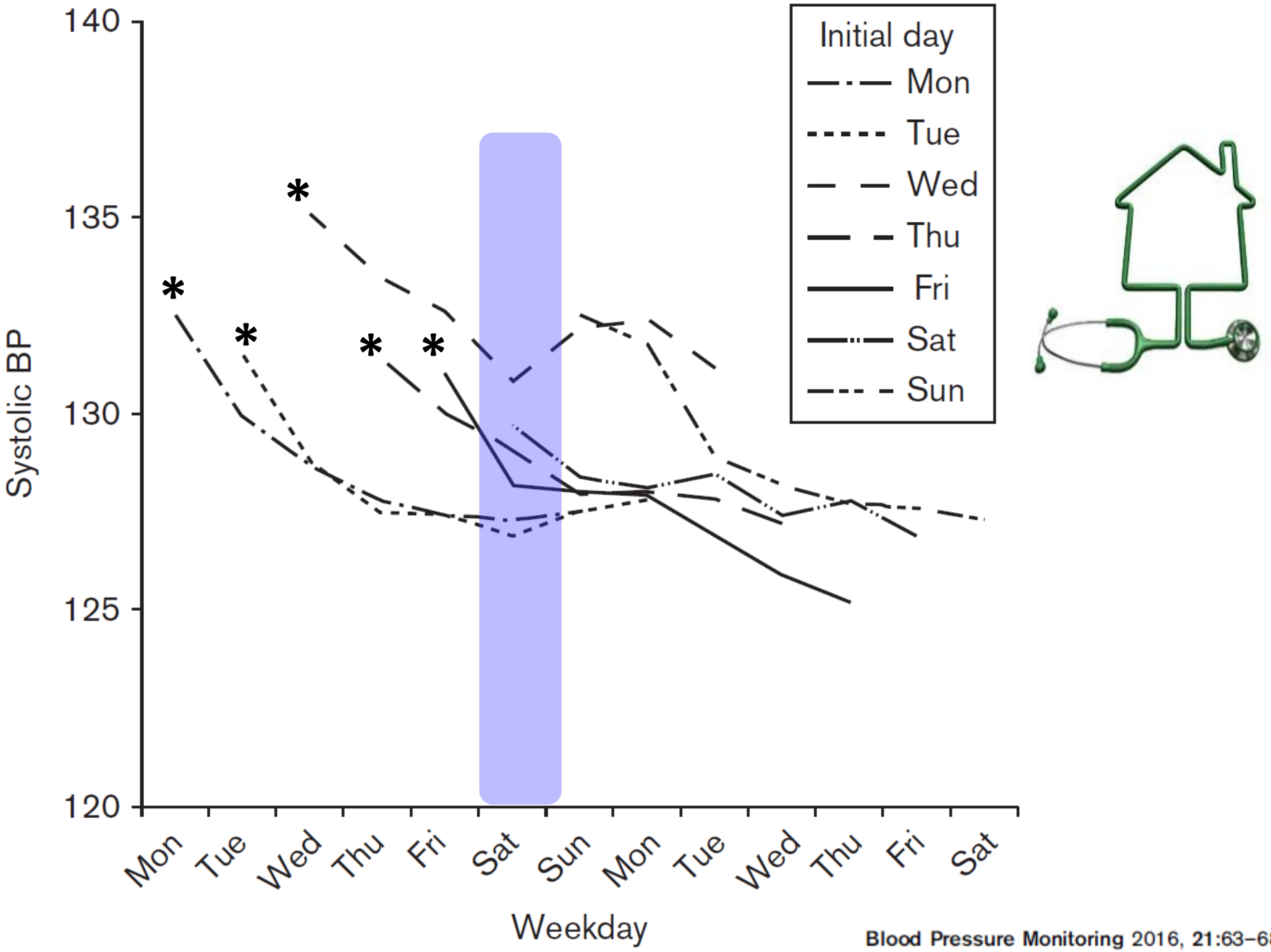
3η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
14/1/2017	ΠΡΩΙ	1η)	8:15	135 - 77	(81)
		2η)		131 - 76	(80)
	ΒΡΑΔΥ	1η)	8:20	128 - 72	(78)
		2η)		125 - 68	(76)

4η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
16/1/2017	ΠΡΩΙ	1η)	8:00	145 - 82	(71)
		2η)		143 - 82	(71)
	ΒΡΑΔΥ	1η)	10:10	124 - 72	(78)
		2η)		130 - 75	(76)

5η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
18/1/2017	ΠΡΩΙ	1η)	7:45	162 - 89	(78)
		2η)		159 - 87	(81)
	ΒΡΑΔΥ	1η)	8:00	131 - 82	(80)
		2η)		128 - 77	(80)

6η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
20/1/2017	ΠΡΩΙ	1η)	8:00	141 - 81	(82)
		2η)		140 - 83	(88)
	ΒΡΑΔΥ	1η)	7:50	143 - 87	(82)
		2η)		135 - 76	(81)

7η ΗΜΕΡΑ			ΩΡΑ	ΣΥΣΤΟΛΙΚΗ-ΔΙΑΣΤΟΛΙΚΗ	(ΣΦΥΞΕΙΣ)
23/1/2017	ΠΡΩΙ	1η)	7:50	146 - 76	(72)
		2η)		137 - 74	(74)
	ΒΡΑΔΥ	1η)	10:00	134 - 74	(80)
		2η)		133 - 70	(76)

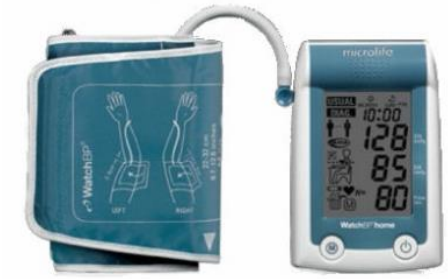


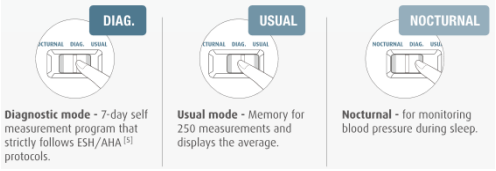
Blood Pressure Monitoring 2016, 21:63–68

Association of night-time home blood pressure with night-time ambulatory blood pressure and target-organ damage: a systematic review and meta-analysis

Anastasios Kollias, Angeliki Ntineri, and George S. Stergiou

J Hypertens 2017;35:442-52.





Studies with Nighttime Home Blood Pressure Monitoring

Authors (year)	Recruitment (country)	N° participants (% women)	Age, years (SD)	Device model (company)	Measurement days (intervals)	Measurements per night	SBP, mmHg	DBP, mmHg
Observational								
Chonan *et al.* (2001) [45]	HT (Japan)	49 (–)	–	HEM-747IC-N (Omron)	10 (1)	1 (0200 h)	118.6	72.8
Hosohata *et al.* (2007) [47]	P (Japan)	556 (71)	62 (11)	HEM-747IC-N (Omron)	2 (6)	1 (0200 h)	116.8	68.0
Ushio *et al.* (2009) [48]	V (Japan)	40 (30)	25 (5)	HEM-5041 (Omron)	7 (1)	6 (1 h interval)	107.6	59.3
Ishikawa *et al.* (2012) [49]	GP (Japan)	854 (53)	63 (11)	HEM-5001 (Omron)	9 (≥1 per wk)	3 (0200, 0300, 0400 h)	123.0	70.2
Stergiou *et al.* (2012) [58]	HT (Greece)	81 (47)	58 (11)	WatchBPN (Microlife)	3 (1)	3 (2, 3, 4 h after going to bed)	114.1	66.4
Stergiou *et al.* (2013) [30]	OSA (Greece)	39 (28)	49 (11)	WatchBPN (Microlife)	3 (1)	3 (2, 3, 4 h after going to bed)	115.1	69.3
Andreadis *et al.* (2016) [59]	HT (Greece)	131 (42)	52 (12)	WatchBPN (Microlife)	3 (1)	3 (2, 3, 4 h after going to bed)	122.4	73.9
Lindroos *et al.* (2016) [60,72]	P (Finland)	248 (55)	58 (13)	WatchBP Home N (Microlife)	2 (1)	3 (2, 3, 4 h after going to bed)	113.0	65.2
Clinial trial								
Kario *et al.* (2010) [53]	HT (Japan)	161 (53)	67 (13)	HEM-5001 (Omron)	7 (1)	3 (0200, 0300, 0400 h)	131.6	75.7
Kario *et al.* (2017) [56]	HT (Japan)	411 (45)	63 (12)	HEM-7252G-HP (Omron)	5 (1)	3 (0200, 0300, 0400 h)	128.3	79.3
Fujiwara *et al.* (2018) [55]	HT (Japan)	129 (57)	68 (12)	HEM-7252G-HP (Omron)	3 (during 4 wk)	3 0200, 0300, 0400 h)	125.1	76.3

Kollias A, Ntineri A, Stergiou G. J Hypertens 2017;35:442-52.

Night-time home vs ambulatory blood pressure: a systematic review and meta-analysis

Σε σχέση με 24ωρη καταγραφή:

- Συγκρίσιμες τιμές
- Συμφωνία στην αναγνώριση non-dippers
- Συγκρίσιμη συσχέτιση με βλάβη οργάνων-στόχων

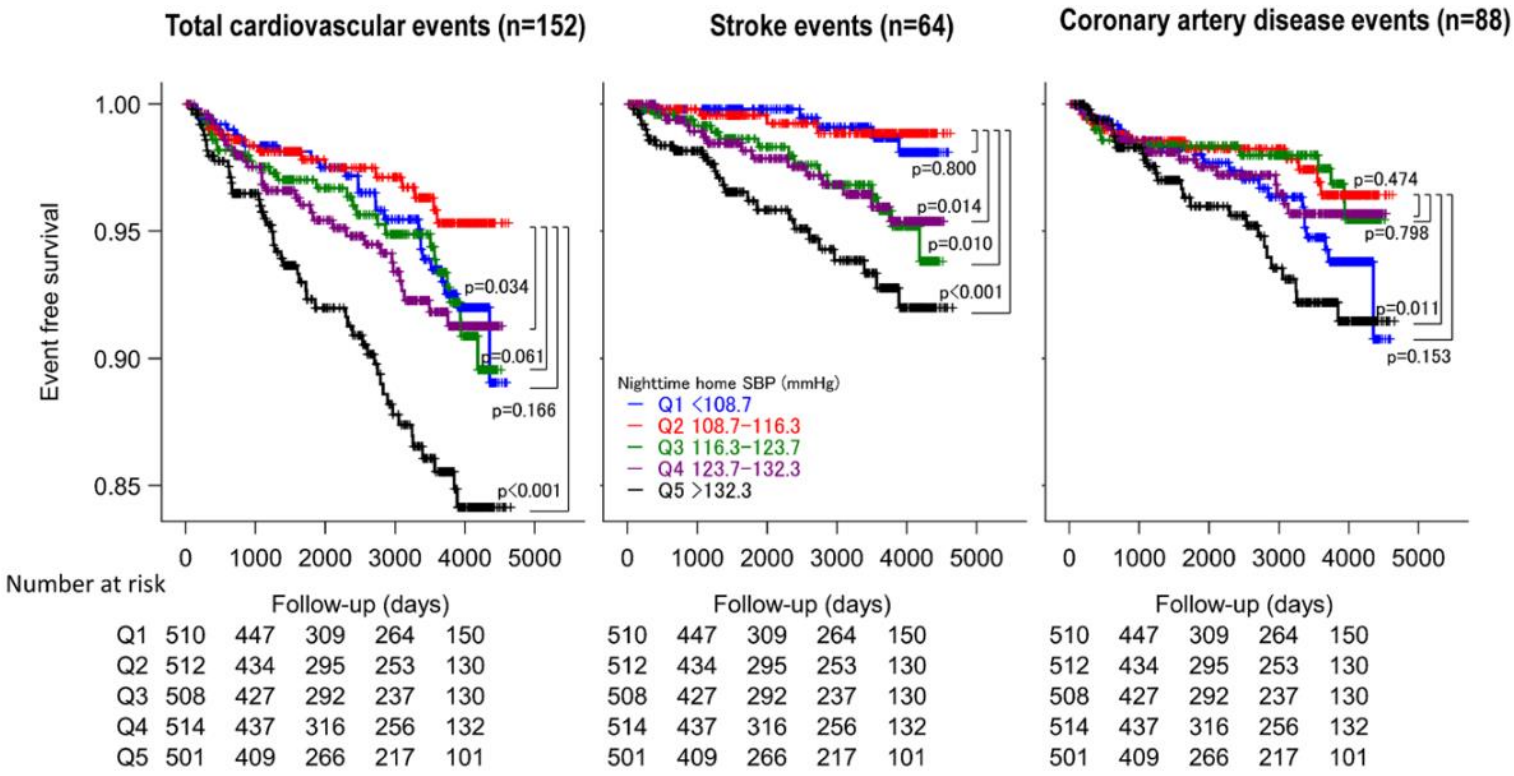
Kollias A, Ntineri A, Stergiou GS. J Hypertens 2017

OPEN

Nighttime Blood Pressure Measured by Home Blood Pressure Monitoring as an Independent Predictor of Cardiovascular Events in General Practice

The J-HOP Nocturnal Blood Pressure Study

Kazuomi Kario, Hiroshi Kanegae, Naoko Tomitani, Yukie Okawara, Takeshi Fujiwara, Yuichiro Yano, Satoshi Hoshide; on behalf of the J-HOP Study Group



Hypertension. 2019;73:1240-1248.

Wearable cuffless BP devices

Garmin Instinct Tundra (έως 36...

249,00 €

Meimaris

v5 ecg ppg spo2 έξυπνο ρολόι...

47,29 €

LightInTheBox

Garmin Instinct Graphite (έως 36...

249,00 €

Meimaris

Garmin Fenix Silver with Bla...

429,00 €

Meimaris

x 6S h Black...

,00 €

Meimaris

Garmin Instinct Tactical Edition...

349,00 €

Meimaris

Sea

vibe 3 gps 1.3 ""full-round οθόνη αφής...

51,08 €

LightInTheBox

SUUNTO 5 G1 Graphite Copper...

279,00 €

Cosmos Sport

Polar Grit X M/L

389,49 €

Trekkinn.com

★★★★½ (155)

Smart Bracelet Blood Pressu...

aliexpress.com · Διαθέσιμο

Amazon.com: Fitness T...

amazon.com

10 Best Blood Pressure Watches of 2020 - Compariso...

33rdsquare.com

15 Best Blood Pressure ...hes in 2020 - The Tren...

thetrendspotter.net

Smart wearable blood pressure monitor o...

geeky-gadgets.com

Tec Sante Optical Heart Rate...

expansys.co.nz · Διαθέσιμο

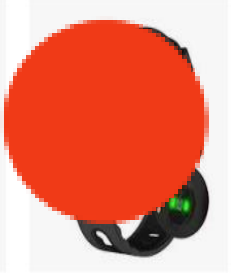
Blood Pressure Bracelet Oxy...

game-show.gr · Διαθέσιμο

8 Best Blood Pressure Smartwatches - Most Accu...

North Edge Blood Pressure ...

Samsung Galaxy Watch Active 2 receives b...



Fitness Tracker Smartwatch...

Tec Sante Optical Heart Rat...

vibe 3 gps 1.3 ""full-round οθόνη αφής...

Blood Pressure Heart Rate ...

SUUNTO 5 G1 Graphite Copper...

Polar Grit X M/L

TOP 9 Best Smartwatches With Blood Pressure M...

2021 European Society of Hypertension practice guidelines for office and out-of-office blood pressure measurement

George S. Stergiou[a], Paolo Palatini[b], Gianfranco Parati[c,d], Eoin O'Brien[e], Andrzej Januszewicz[f], Empar Lurbe[g,h], Alexandre Persu[i], Giuseppe Mancia[j], Reinhold Kreutz[k], on behalf of the European Society of Hypertension Council and the European Society of Hypertension Working Group on Blood Pressure Monitoring and Cardiovascular Variability

SECTION 8: CUFFLESS WEARABLE BP MONITORS [18]

A large number of cuffless wearable (wrist-band) devices are available on the market claiming that they accurately measure BP. These devices have a sensor, which evaluates the pulsation of arterioles and estimate BP based on pulse wave velocity, or other technologies. Cuffless wearable devices have great potential as they can obtain multiple or even continuous BP measurements for days or weeks without the disturbance of cuff-induced limb compression. The assessment of the accuracy of cuffless devices requires the use of a validation protocol, which is specific for these devices and includes procedures additional to those used for conventional cuff-devices. At present, the accuracy and usefulness of cuffless devices are uncertain. Therefore, they should not be used for diagnostic or treatment decisions.

ΣΥΜΠΕΡΑΣΜΑΤΑ

Μετρήσεις στο σπίτι

- Διαγνωστική και προγνωστική αξία
- Κύρια μέθοδος στην παρακολούθηση θεραπείας
- Αυτόματες ηλεκτρονικές πιστοποιημένες συσκευές (βραχίονα)
- Πρόγραμμα 7 ημερών
- Νέες εφαρμογές υπό εξέλιξη

ΑΞΙΟΛΟΓΗΣΗ ΑΡΤΗΡΙΑΚΗΣ ΠΙΕΣΗΣ

- ✓ Αρτηριακή πίεση: Δυναμικός χαρακτήρας
- ✓ Μετρήσεις στο ιατρείο - Μεθοδολογία μετρήσεων
- ✓ Μετρήσεις εκτός ιατρείου
- ✓ Αξιολόγηση αρτηριακής πίεσης-Διάγνωση

Diagnosis and Classification

European Society of Hypertension

TABLE 1. Classification of office BP and definitions of hypertension grades

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	120–129	and	80–84
High-normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension[a]	≥140	and	<90
Isolated diastolic hypertension[a]	<140	and	≥90

2018 ESH/ESC Hypertension Guidelines

Definitions of hypertension by office and out-of-office blood pressure levels (mmHg)

Category	Systolic	Diastolic
Office BP	**≥140**	**≥90**
Ambulatory BP		
24-h	**≥130**	**≥80**
Daytime	≥135	≥85
Nighttime	≥120	≥70
Home BP	**≥135**	**≥85**

Διαγνωστική Συμφωνία (αναγνώριση υπέρτασης)

	N	Subjects	Diagnosis	Sensitivity	Specificity	PPV	NPV	κ	r
Nesbitt *et al.*, 1997[7]	79	Untreated	H	48	93	NR	NR	NR	NR
Stergiou *et al.*, 2000[8]	133	Untreated	H	74	76	84	63	0.47	0.67/0.75
			WCH	61	79	48	86	0.37	
Masding *et al.*, 2001[9]	55	Untreated, diabetes 2	H	100	79	90	NR	NR	0.88/0.76
Hond *et al.*, [illegible]	247	Untreated	[illegible]	68	89	33	[illegible]	[illegible]	0.74/0.60[a]
Bayó *et al.*, [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NR	NR
Shimbo *et al.*, [illegible][12]	229	[illegible]	H[b]	[illegible][b]	[illegible]	94[b]	[illegible]	NR[b]	NR
Stergiou *et al.*, 1998[13]	189	Treated 42%	WCE	57	85	57	85	0.42	0.71/0.78
Comas *et al.*, [illegible]	[illegible]	Treated	WCH	84	82	70	[illegible]	[illegible]	NR
Llisterri *et al.*, [illegible]	[illegible]	[illegible]	H	97	63	NR	[illegible]	NR	NR
Stergiou *et al.*, [illegible]	276	Untreated 50%	WCE	56	87	52	89	0.42	0.71/0.69[a]
		Treated 50%	WCE	62	84	59	86	0.46	0.64/0.65[a]
Martinez *et al.*, [illegible][17]	225	Treated	WCH	50	87	64	79	[illegible]	NR
McGowan and Padfield, 2010[1]	[illegible]	[illegible]	[illegible]	NR	NR	NR	[illegible]	[illegible]	0.72/0.89
Stergiou *et al.*, 2010[19]	44	Treated (≥3 drugs)	RH	93	63	81	83	0.59	0.52/0.85
Agarwal *et al.*, 2006[20]	104	Hemodialysis	H	80	84	NR	NR	NR	NR
Wuhl *et al.*, 2004[21]	110	Children, chronic renal failure	H	52	82	NR	NR	NR	0.72[c]
Stergiou et al, 2008[22]	102	Children, untreated	H	55	92	74	82	0.50	0.66/0.66
			WCH	89	92	70	98	0.73	
			MH	36	96	50	93	0.36	

Ευαισθησία ~ 65%

Ειδικότητα ~ 80%

Συμφωνία ~ 85%

Stergiou GS et al. Am J Hypertens 2011;24:123

CLINICAL USE OF OFFICE AND OUT-OF-OFFICE BP MEASUREMENTS

	Office	Home	Ambulatory
Screening	+++	-	-
Initial diagnosis	+	++	+++
Treatment titration	+	+++	++
Follow-up	++	+++	+
	Routine screening of untreated patients and follow-up of treated ones	Preferred method for long-term follow-up of treated hypertensives	Preferred method for initial diagnosis of hypertension