公開シンポジウム［私立大学戦略的研究基盤形成支援事業］:
大規模地域ゲノムバンク／介入・コホート研究推進事業：JMSIIプロジェクト

高血圧の多地域研究
-JHOP研究からJAMP研究へ-

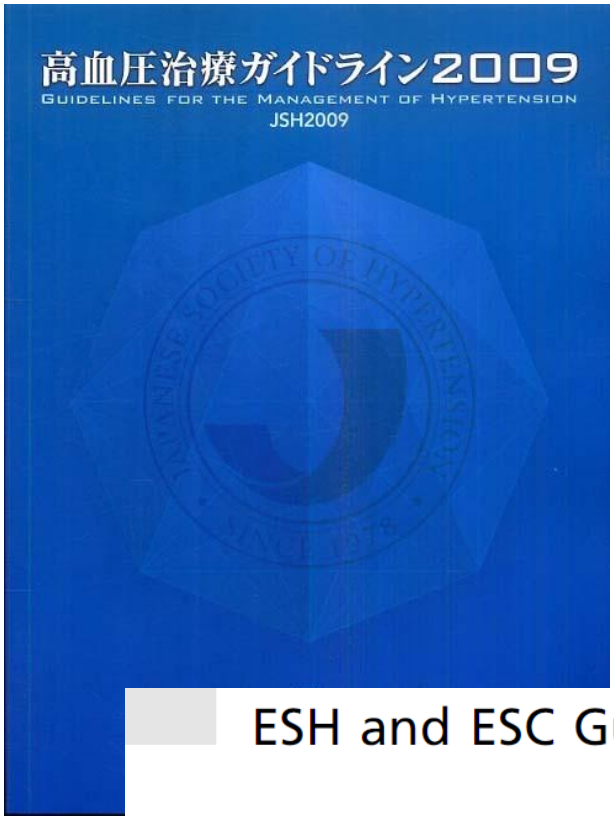
Satoshi Hoshide, Kazuomi Kario

Division of Cardiovascular Medicine
Department of Medicine
Jichi Medical University School of Medicine

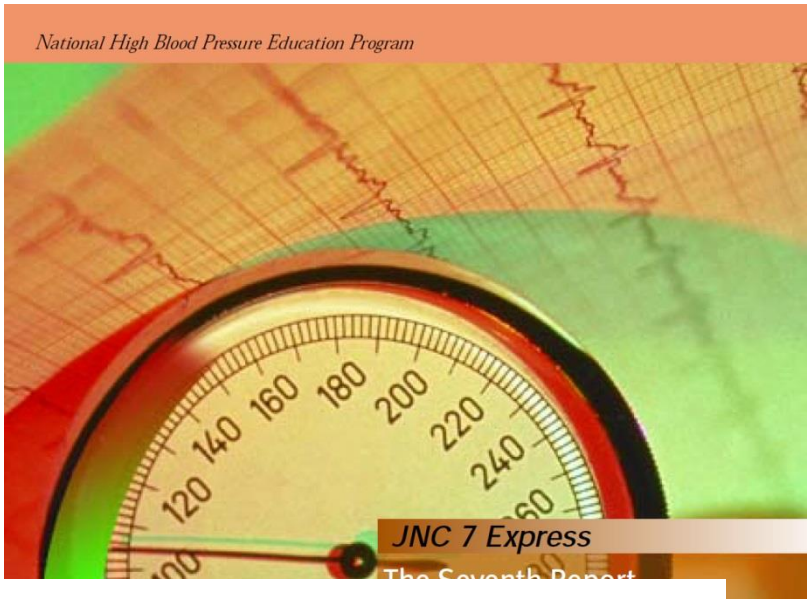
2013年7月5日

高血圧ガイドライン

日本



アメリカ



ESH and ESC Guidelines

欧州

2013 ESH/ESC Guidelines for the management of arterial hypertension

The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC)

rtension

ension of

European

ESH/ESC 2013ガイドラインではOut of clinicの血圧測定の重要性が明確に記載された

High normal
SBP 130-139
or
DBP 85-89

Grade 1 HT
SBP 140-159
or
DBP 90-99

Other risk factors, asymptomatic organ damage or disease	High normal SBP 130-139 or DBP 85-89	Grade 1 HT SBP 140-159 or DBP 90-99	ure (mmHg) Grade 2 HT SBP 160–179 or DBP 100–109	Grade 3 HT SBP ≥180 or DBP ≥110
No other RF	• No BP intervention	• Lifestyle changes for several months • Then add BP drugs targeting <140/90	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
1–2 RF	• Lifestyle changes • No BP intervention	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
≥3 RF	• Lifestyle changes • No BP intervention	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
OD, CKD stage 3 or diabetes	• Lifestyle changes • No BP intervention	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
Symptomatic CVD, CKD stage ≥4 or diabetes with OD/RFs	• Lifestyle changes • No BP intervention	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90

Out of clinicの血圧測定

家庭血圧計

自由行動下血圧計

白衣高血圧・仮面高血圧

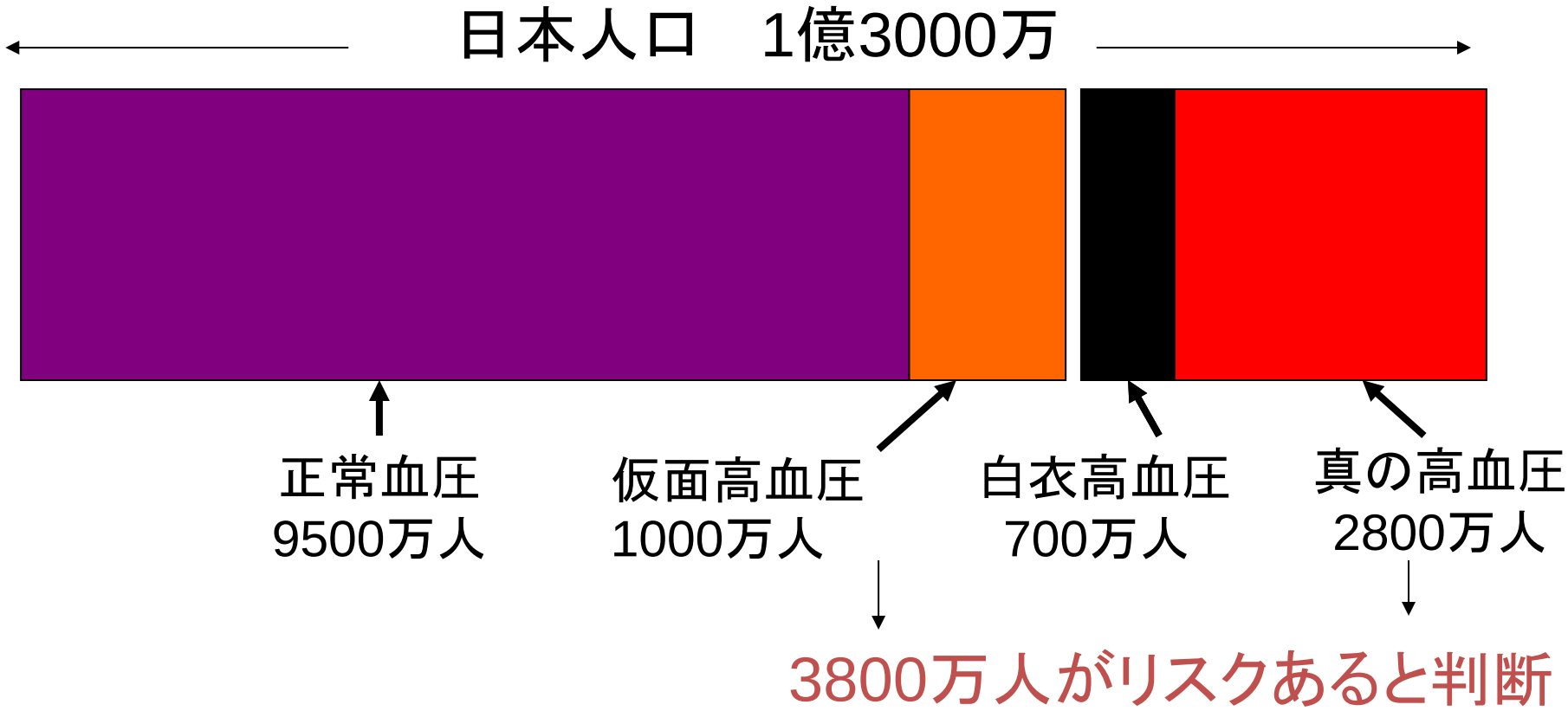
白衣高血圧・仮面高血圧の定義

家庭血圧
135/85 mmHg
ABPM
24時間血圧
130/80 mmHg
覚醒時血圧
135/85 mmHg

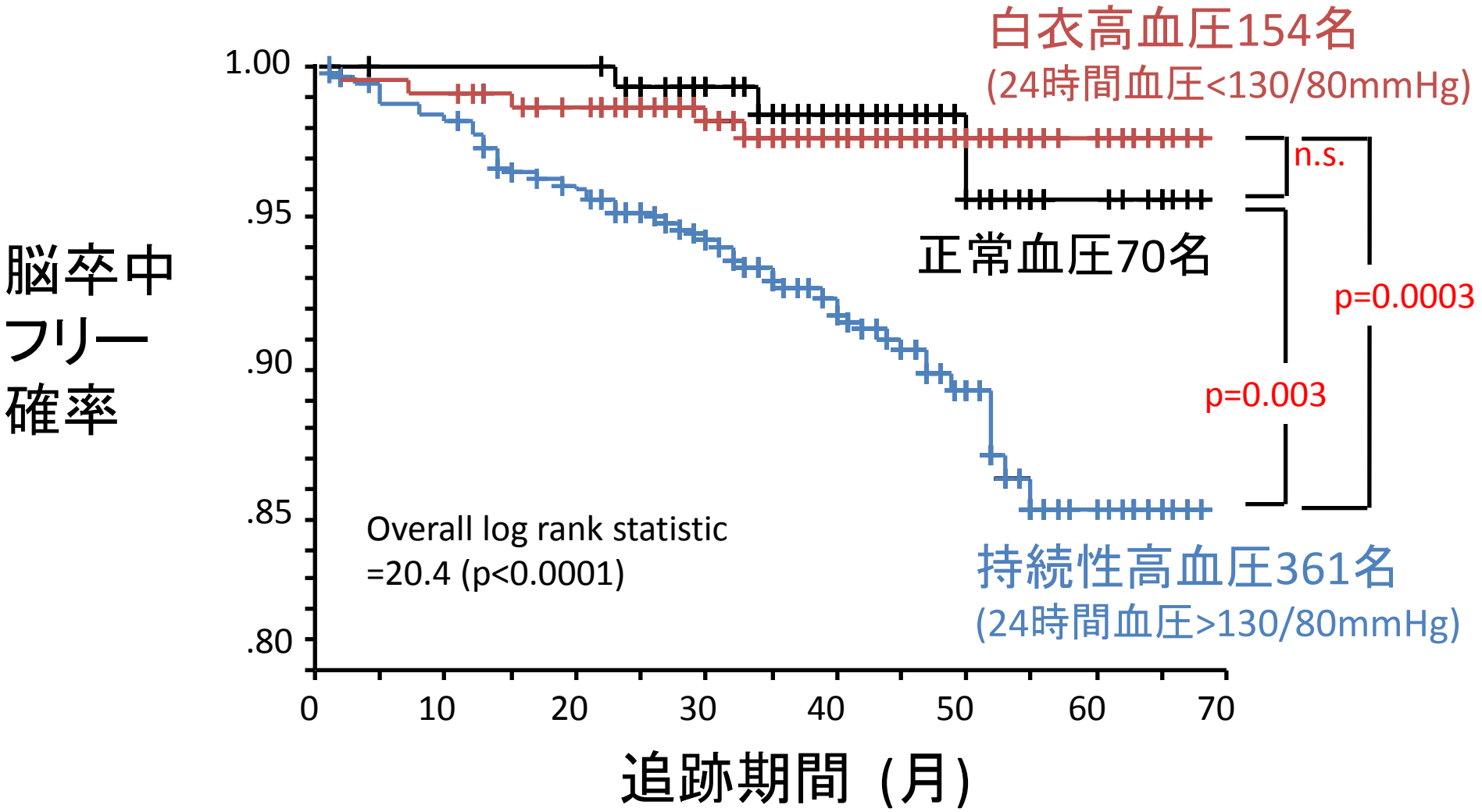
仮面高血圧	持続性高血圧
正常血圧	白衣高血圧

140/90
mmHg
診察室血圧

日本人の白衣高血圧と仮面高血圧

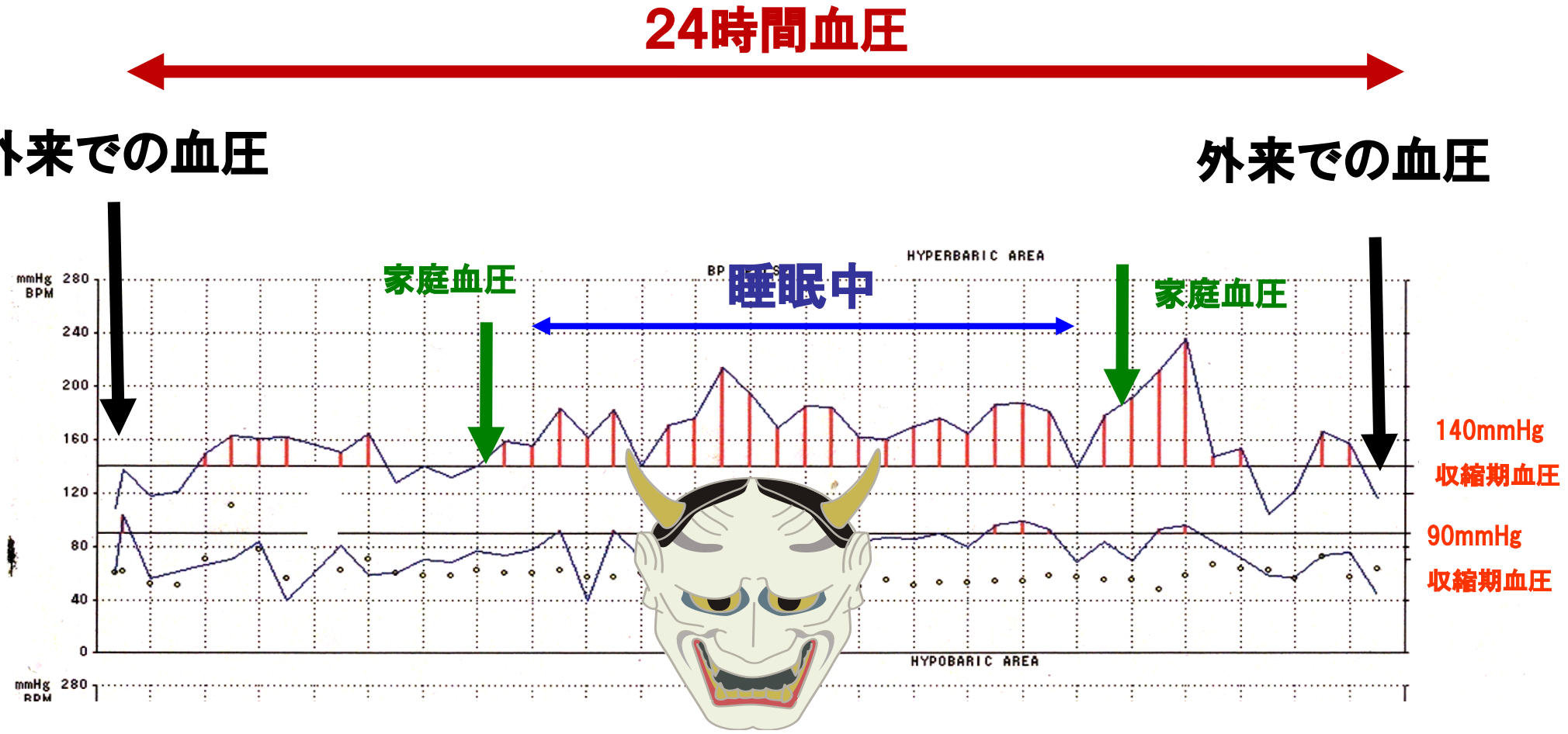


日本人高血圧患者の脳卒中予後
自治医科大学ABPM研究 Wave 1



Kario, Shimada,Hoshide et al. J Am Coll Cardiol 2001;38:238-45.

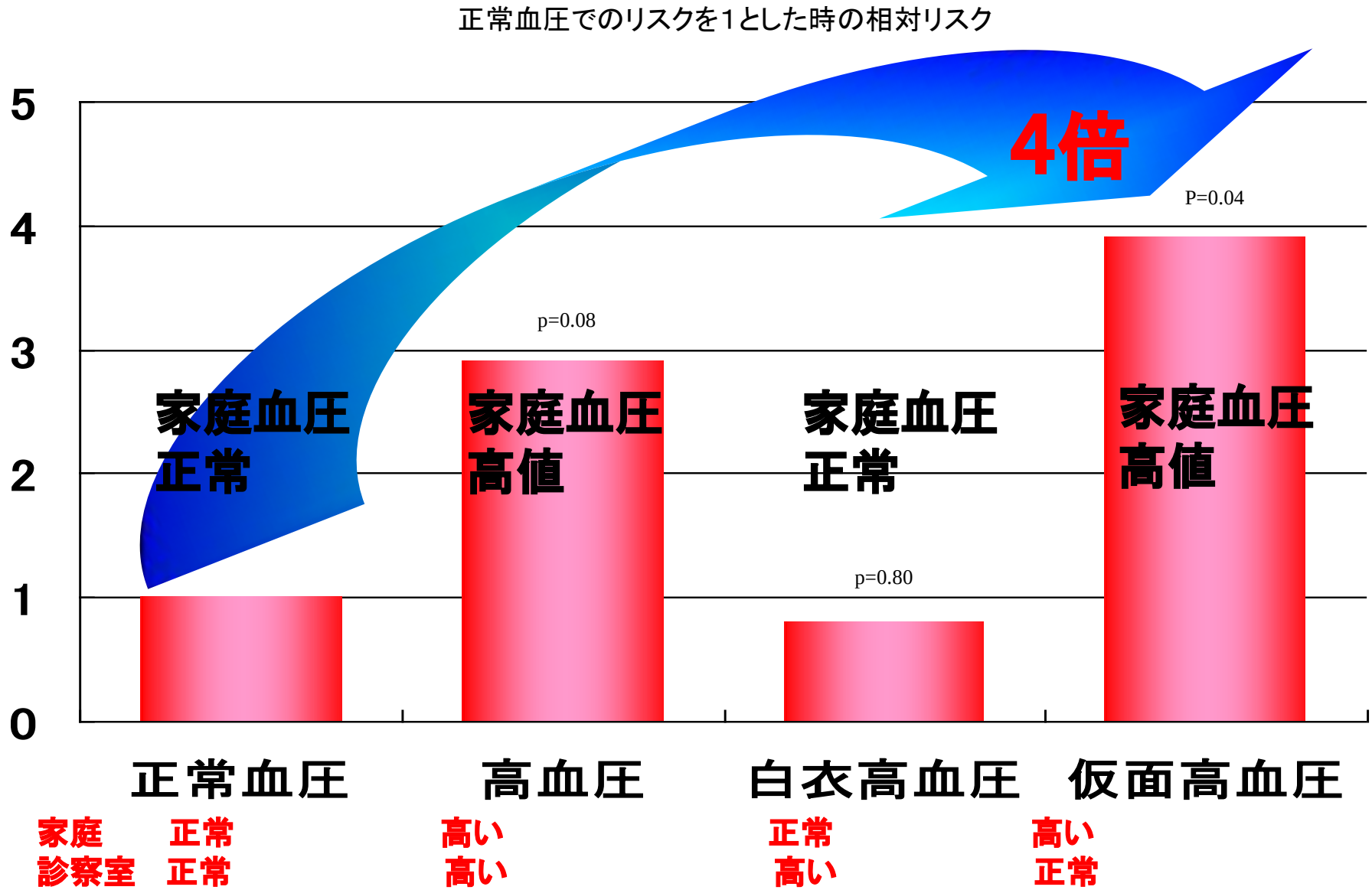
1日の血圧は変動する



仮面高血圧

仮面高血圧は脳卒中や心筋梗塞が起きやすい

T.G. Pickering, ISH, 2002



家庭血圧　国際データベース (IDHOCO)

International Database of HOme blood pressure in relation to Cardiovascular Outcome

(4か国　6470人　追跡期間中央値 8.3年)

	致死性・非致死性エンドポイント		
収縮期血圧 (10mmHg上昇)	総イベント	脳卒中	心疾患
外来	1.09 (1.05-1.13)	1.12 (1.06-1.17)	1.05 (1.00-1.11)
家庭	1.19 (1.14-1.25)	1.28 (1.20-1.37)	1.10 (1.03-1.18)
拡張期血圧 (5mHg上昇)			
外来	1.07 (1.04-1.11)	1.09 (1.04-1.14)	1.04 (0.99-1.10)
家庭	1.13 (1.08-1.17)	1.19 (1.13-1.25)	1.05 (0.99-1.12)

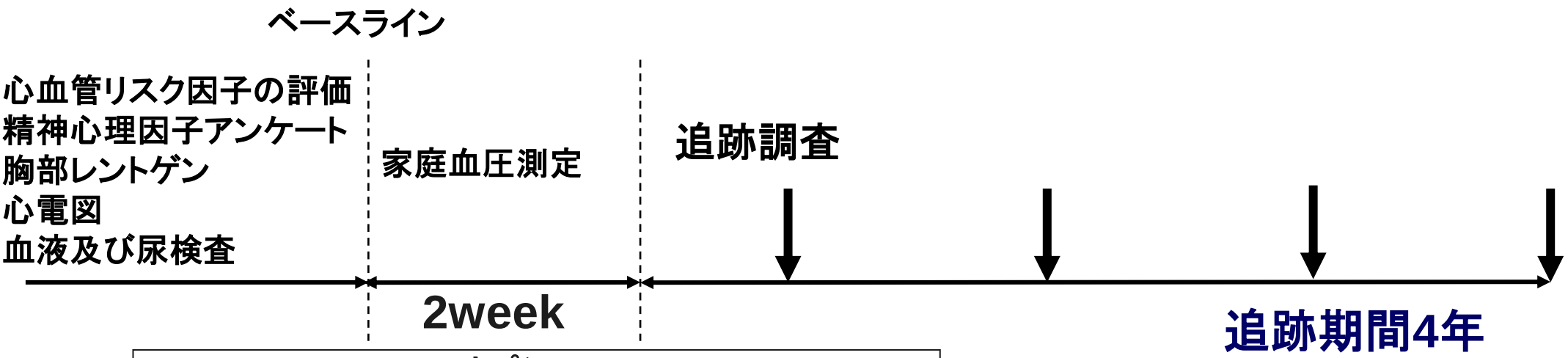
Niiranen et al. Hypertension 2012 Nov (online)

日本人における家庭血圧の心血管予後推定能に関する研究
COE プログラム
Japan Morning Surge - Home Blood Pressure : J-HOP研究

対象患者
- 心血管ハイリスク患者5000例
- 心血管リスク因子*を少なくとも1つ有する患者

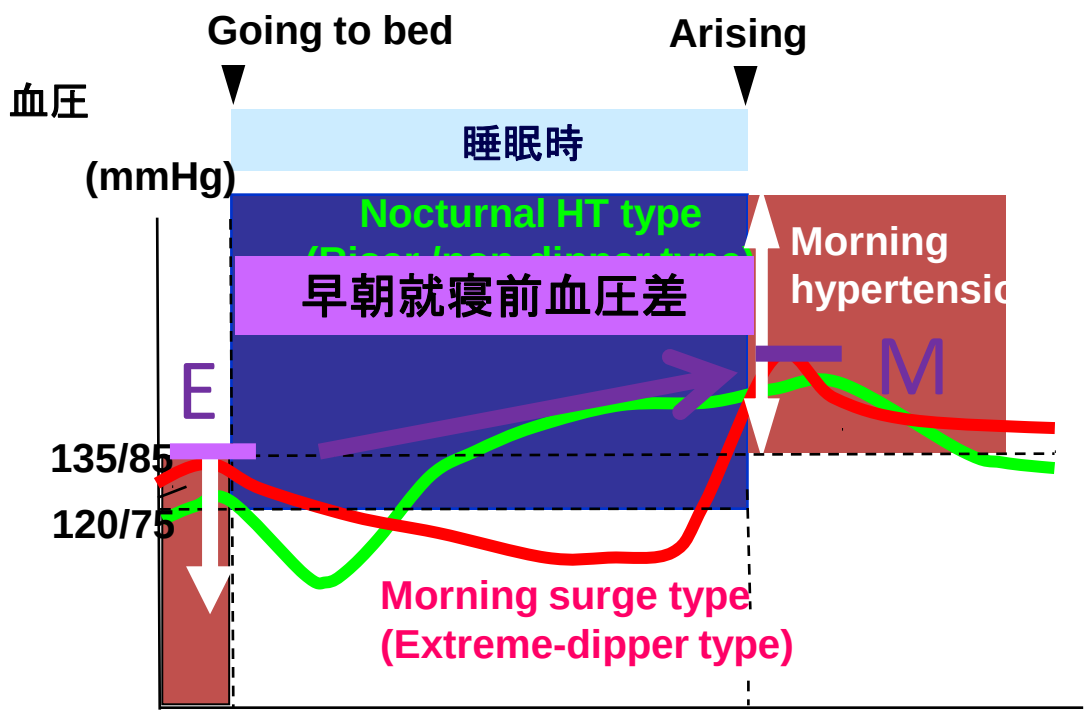
1次エンドポイント：
総死亡、心血管死亡、突然死
虚血性心疾患、脳血管障害

＊心血管リスク因子：糖尿病または耐糖能障害、高脂血症、高血圧、喫煙、腎疾患、心房細動、メタボリックシンドローム、慢性閉塞性肺疾患、睡眠時無呼吸症候群

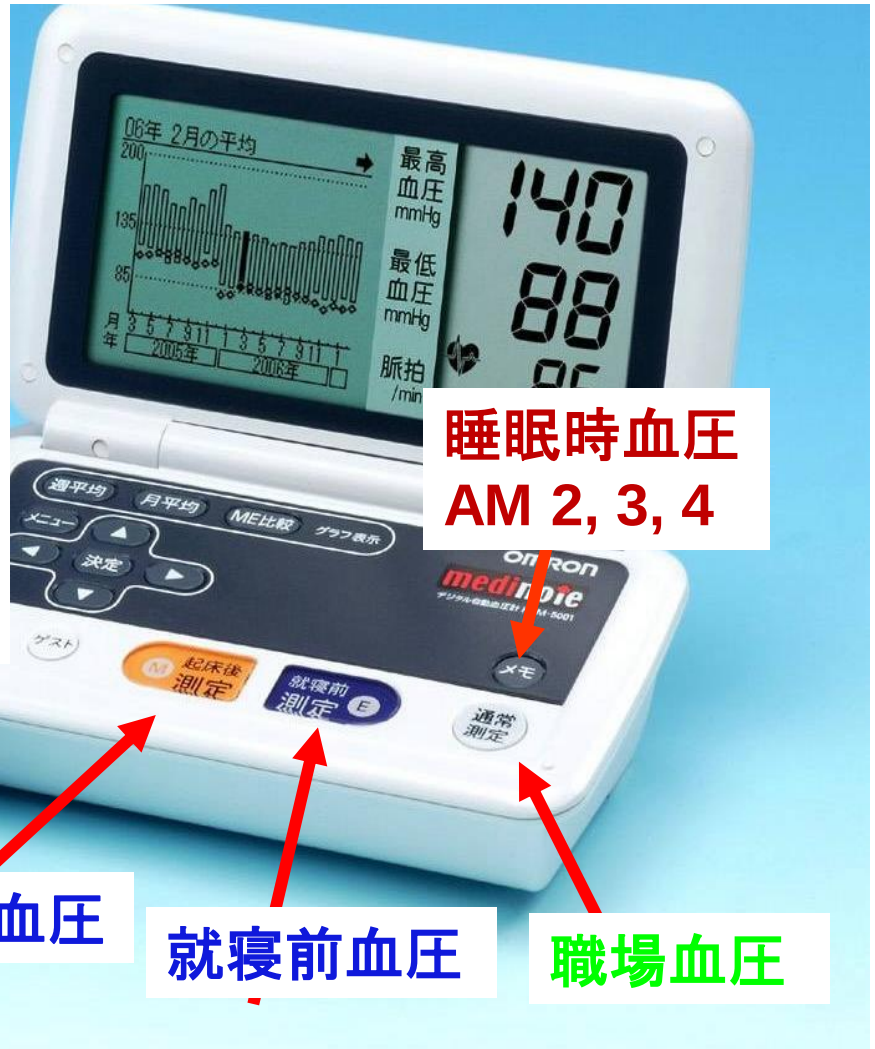


オプション：
24hrABPM、酸素飽和度モニタリング、心臓超音波検査、
頚動脈超音波検査、PWV、Augmentation index、
肺機能検査、腹部CT（脂肪定量）、睡眠ポリグラフィー

家庭血圧： J-HOP



HEM-5001 (Medinote)



Self-measured BP (14 days)
Morning BP - 3 times
Evening BP - 3 times
Sleep - 3 times
(AM 2:00, 3:00, 4:00)

これまでの家庭血圧のコホート研究

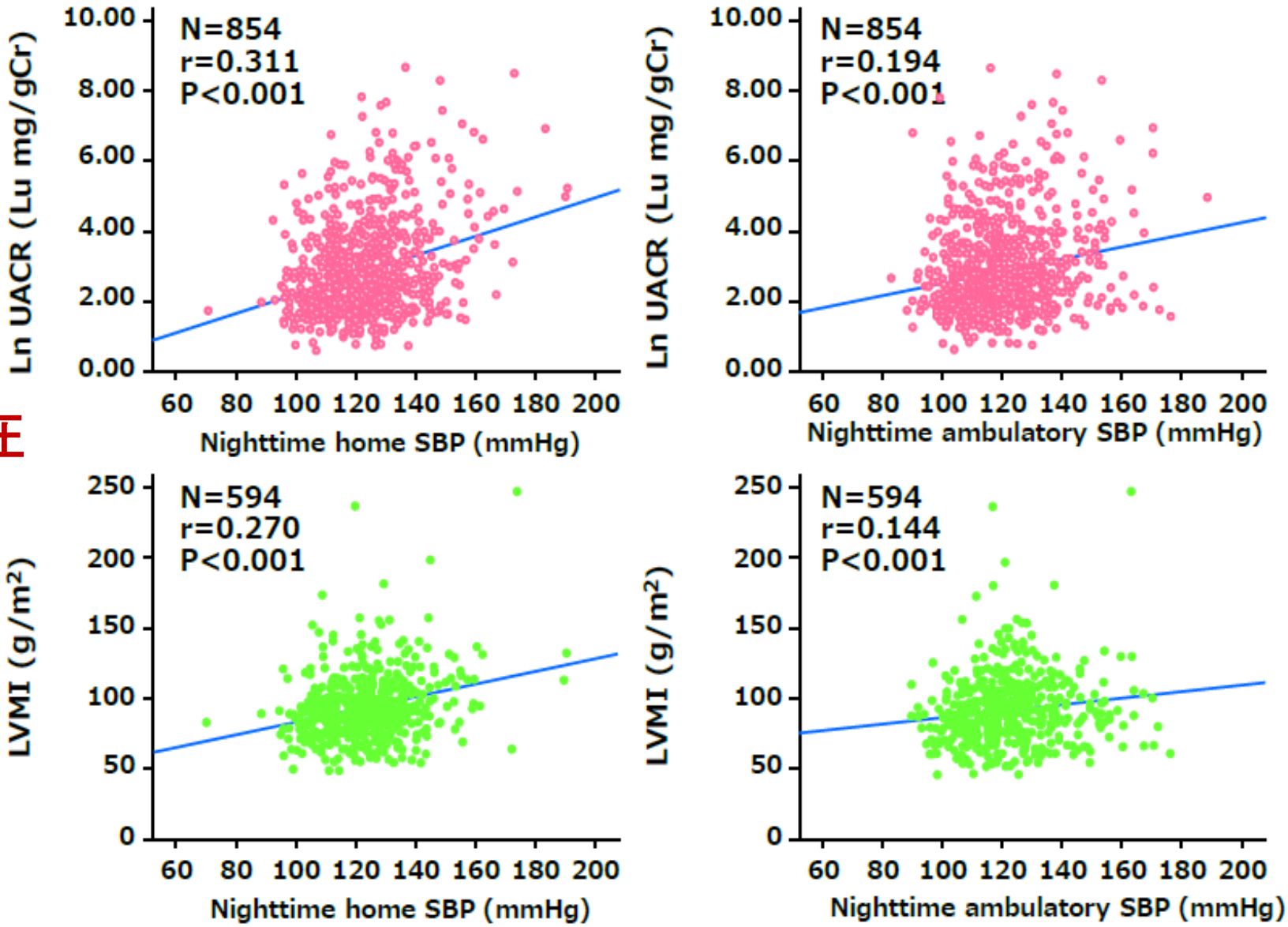
			Home Blood Pressure Monitoring Schedule				
	Number of patients	Study Based	No. of Days	No. of Measurements on Each Occasion	Morning and Evening Measurements	Total reading	Data recording
Ohasama	1789	single rural community population	28	1	No/Yes	28	Log book
SHEAF	4938	general practice	4	3	Yes	24	Printer-equipped
Fin-home	2081	nationwide dwelling population	7	2	Yes	28	Log book
JHOP	4310	nationwide general practice	14	3	Yes	84	Memory-equipped

Nighttime BP and Target Organ Damage

J-HOP

家庭血圧

ABPM



Home BP

Ishikawa, Hoshide, Kario, Hypertension 2012; 60: 912-928.

家庭血圧が正常でもABPMの睡眠時血圧が高値の場合は臓器障害の進行を認める
-地域一般住民　みより研究-

	正常血圧 N=77	仮面夜間高血圧 N=17	P
家庭血圧, mmHg	<135/85	<135/85	
ABPM 睡眠時, mmHg	<120/75	≥120/75	
家庭血圧　SBP, mmHg	114±11	119±8.6	NS
ABPM 睡眠時SBP, mmHg	102±7.7	134±14	<0.01
頸動脈IMT, mm	0.64±0.14	0.76±0.20	<0.05
心臓　相対的壁肥厚	0.40±0.10	0.71±0.11	<0.05

Hoshide . Kario et al.　Hypertens Res. 2007; 30:143-9.

J-TOP Study

Japan Morning Surge – Target Organ Protection Study

The first RCT in which titration of antihypertensive medication was only judged by self-measured home BP, to study the effect of bedtime dosing vs morning dosing of candesartan on microalbuminuria.

Effect of dosing time of angiotensin II receptor blockade titrated by self-measured blood pressure recordings on cardiorenal protection in hypertensives: the Japan Morning Surge-Target Organ Protection (J-TOP) study

Kazuomi Kario[a], Satoshi Hoshide[a], Motohiro Shimizu[a], Yuichiro Yano[a], Kazuo Eguchi[a], Joji Ishikawa[a], Shizukiyo Ishikawa[b] and Kazuyuki Shimada[a]

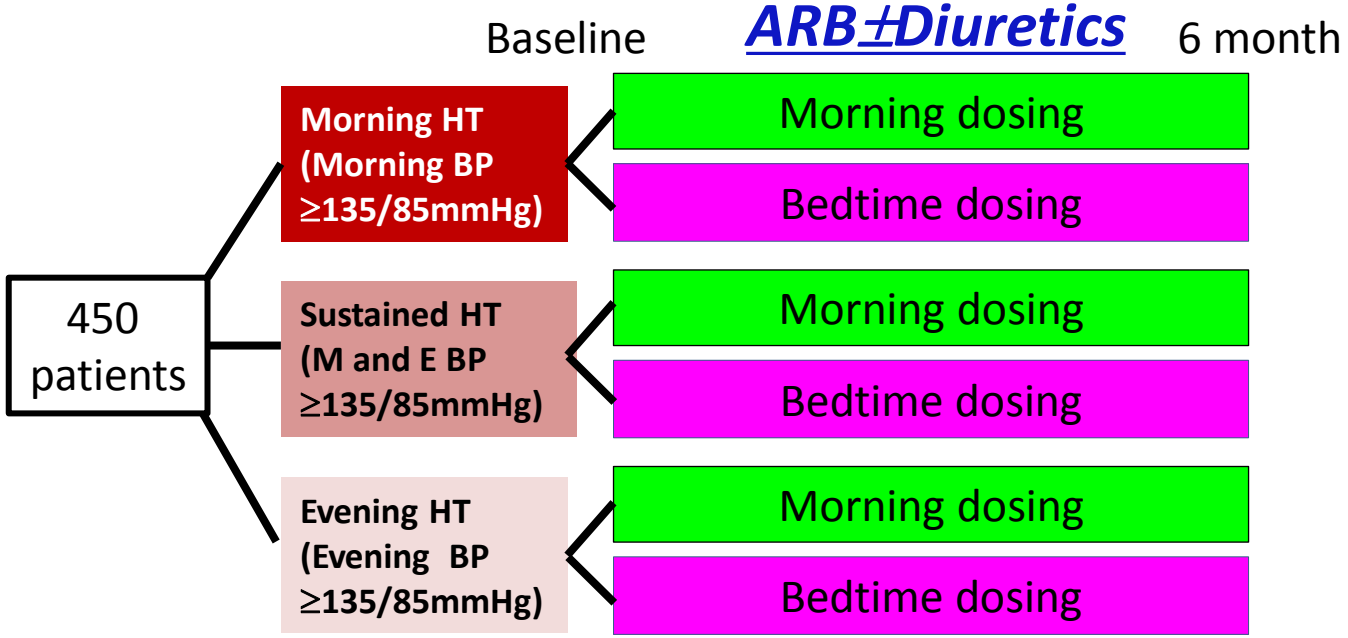
Objectives To study the impact of the dosing time of an angiotensin II receptor blocker (ARB) titrated by self-measured home blood pressure (HBP) on cardiorenal

difference in the UACR reduction between the bedtime-dosing and awakening-dosing groups was only significant in the morning hypertension group (−50.6 vs. −31.3%, $P = 0.02$).

Conclusion In HBP-guided antihypertensive treatment in hypertensives, bedtime dosing of an ARB may be superior to awakening dosing for reducing microalbuminuria.

J Hypertens 28:1574–1583 © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins.

Journal of Hypertension 2010, 28:1574–1583



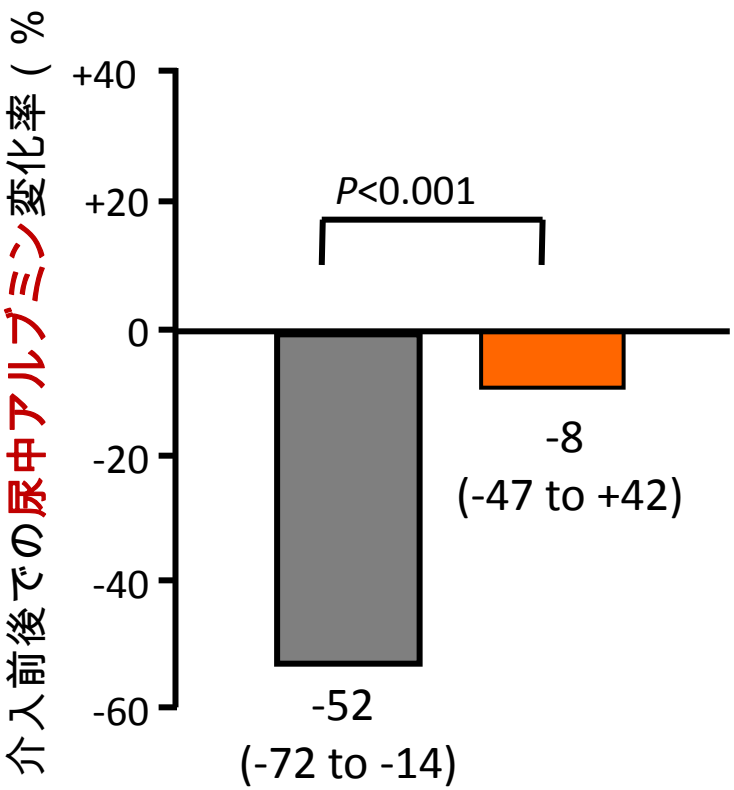
Kario, Hoshide, et al. J Hypertens 2010, 28:1574-1583.

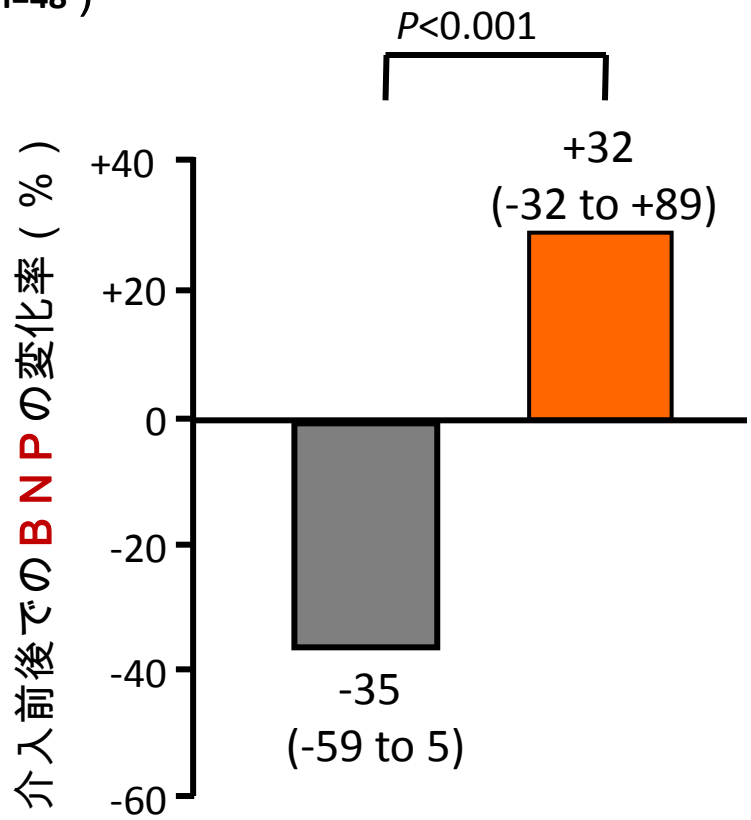
降圧治療は家庭血圧を下げるだけで十分か？　＋α　夜間血圧を下げることも必要か
―J-TOP 研究[1)]サブ解析[2)]より―

オムロン
HEM-5001
(Medinote)

介入で前後で家庭血圧・夜間血圧ともに低下する（n=163）

介入で前後で家庭血圧は低下したが夜間血圧は下がらない（n=48）





変化率計算式；（6か月後尿中アルブミン　または　ＢＮＰ－登録時尿中アルブミン　またはＢＮＰ）×100 /　登録時尿中アルブミン　またはＢＮＰ。表には中央値（4分位）を表示した。

1)　Kario K, Hoshide S, Yano Y , et al. J Hypertens. 2010

2)　Yano Y, Hoshide S, Kario K, et al. Am J Hypertens. 2012より改変引用

Cardiac Overload in Normotensive Non-dippers

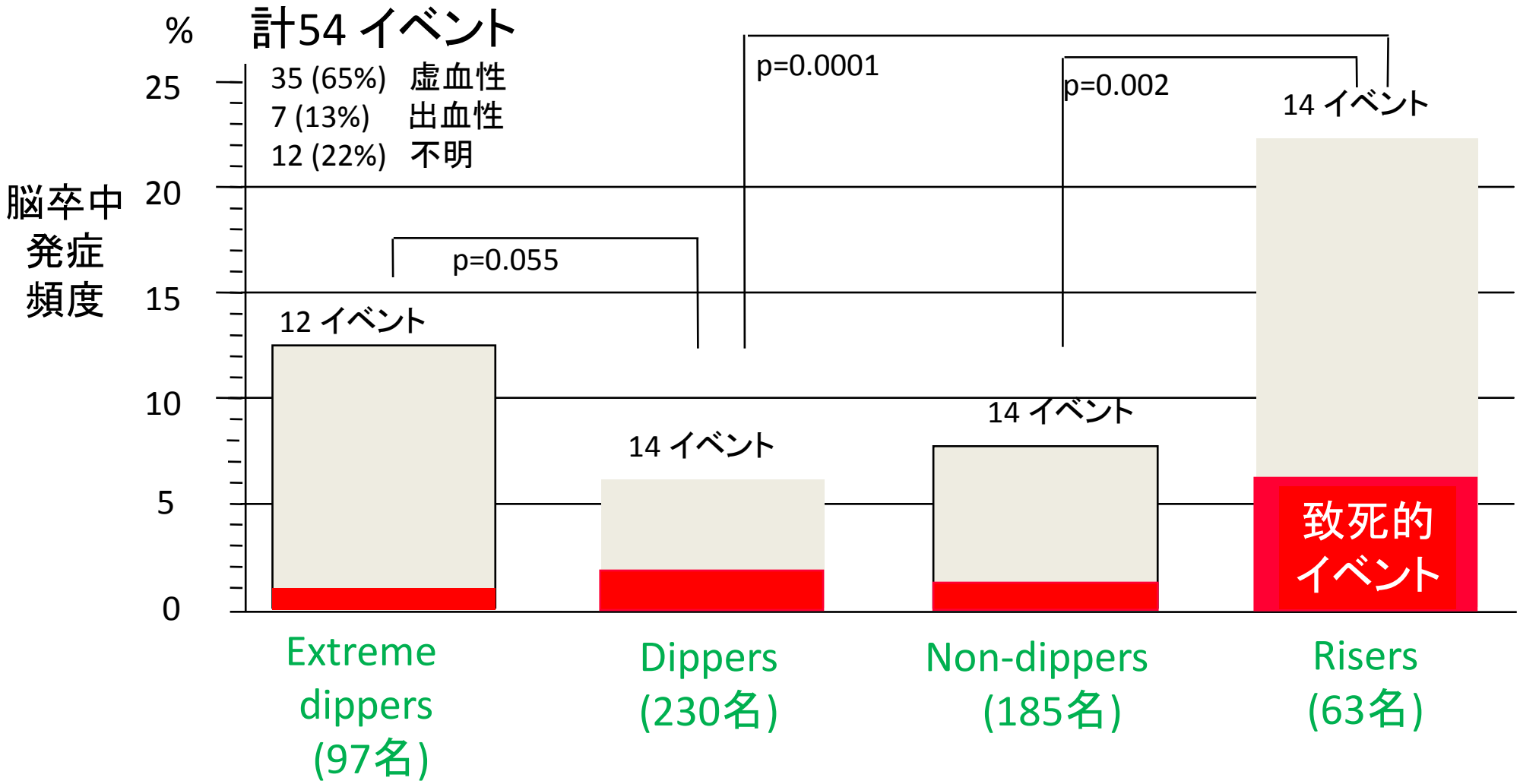
(Clinic BP <140/90 mmHg, 24-hr BP <125/80 mmHg)

Community-dwelling population (n=74)

	Dipper N=49	Non-dipper +Riser N=25	P
Clinic SBP (mmHg)	122±14	123±10	NS
24-hr SBP (mmHg)	112±7.1	111±6.1	NS
LV mass index (g/m2)	103±26	118±34	<0.05
LV relative wall thickness	0.38±0.07	0.43±0.09	<0.01
Concentric hypertrophy (%)	10	28	<0.05
ANP (pg/ml)	14±10	36±63	<0.01
BNP (pg/ml)	16±12	62±153	<0.05

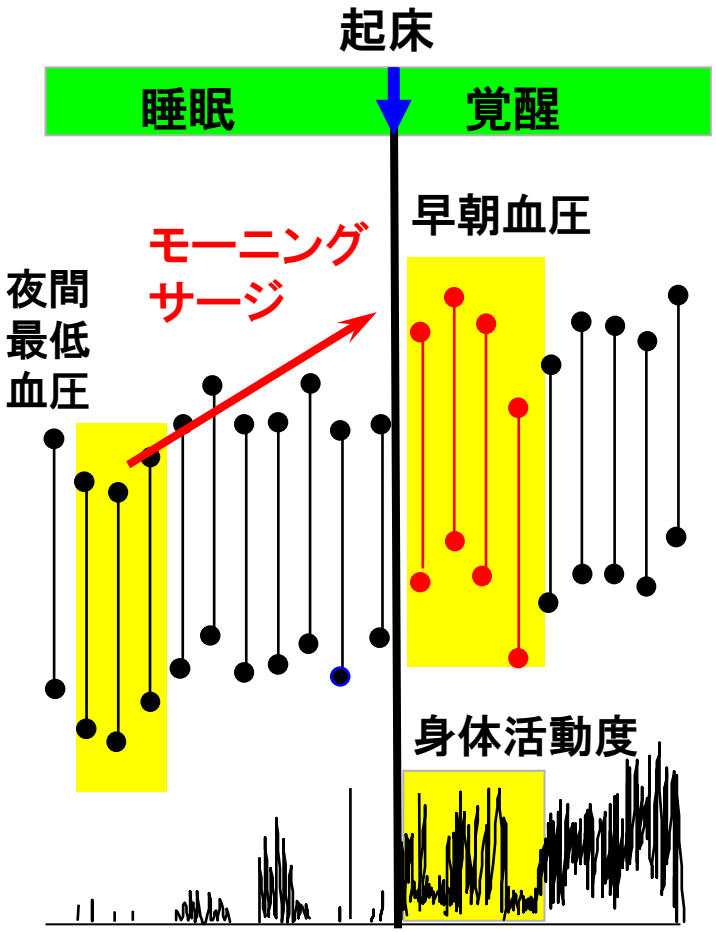
Hoshide, Kario, et al. Am J Hypertens 2003;16:434-438.

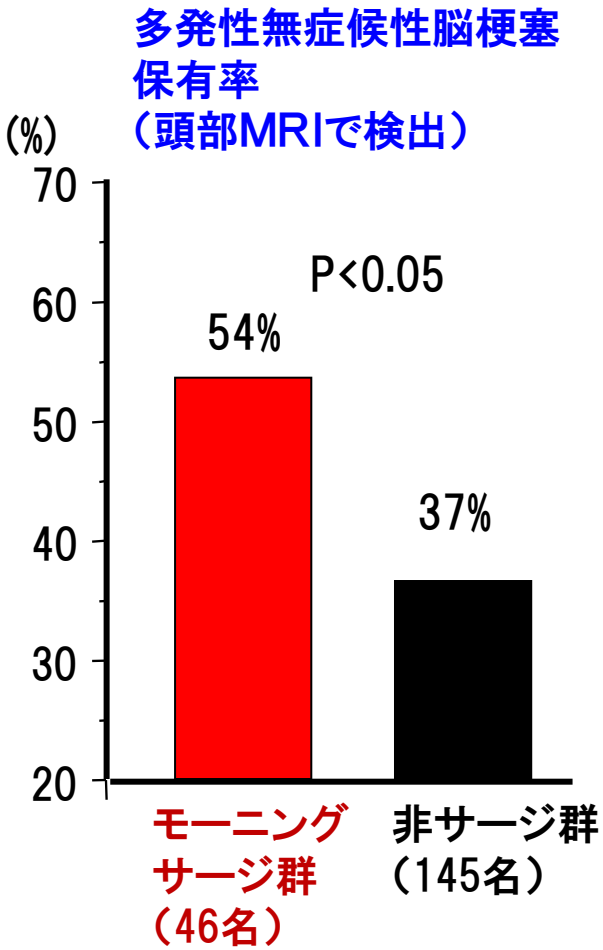
高齢者高血圧の夜間血圧下降と脳卒中
自治医科大学ABPM研究 Wave 1
(575名、平均追跡期間43か月)

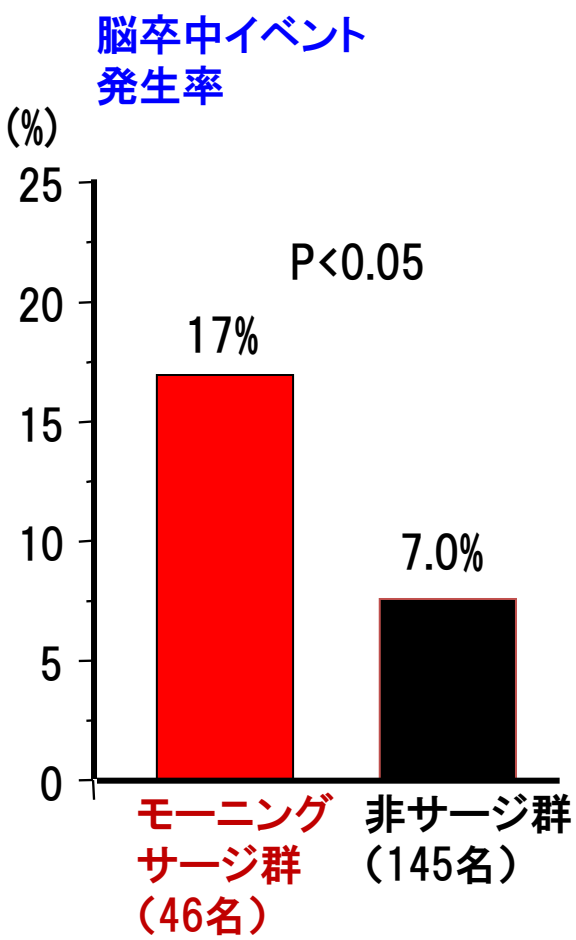


Kario K, Hoshide S et al. Hypertension 2001;38:852-7.

日本人高血圧患者の血圧モーニングサージと脳血管障害
（自治医科大学ABPM研究Wave 1：　年齢と血圧を補正）







血圧モーニングサージ　＝ 早朝血圧－夜間最低血圧（収縮期）
モーニングサージ群　　＝ 血圧モーニングサージが上位10%（55mmHg以上の上昇）

Kario K, et al. Circulation 2003;107:1401-1406.

日本人における自由行動下血圧追跡研究

Japan Ambulatory Blood Pressure Prospective Study

JAMP研究　参加のご案内

2009年　1月～
スタート

全国ABPMデータバンク（5000名）を作成し、

・血圧コントロール状態の地域特性を把握し、

・24時間血圧の構成成分が、どの心血管疾患の発症リスクとなるかを明らかにする、

5年間の観察研究です。

全国５千人ABPM
データバンクの作成

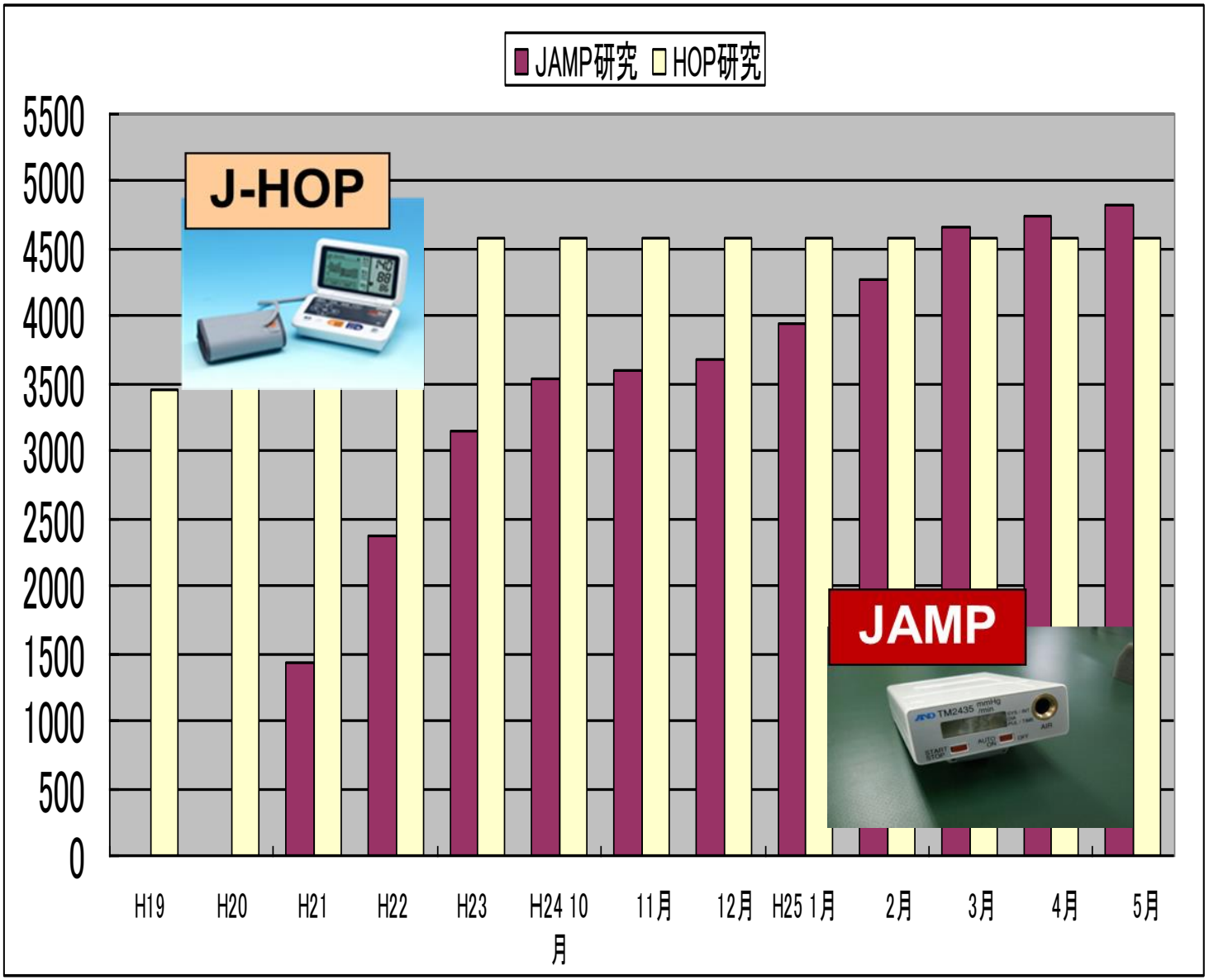
謝金

データ作表1件あたり
￥1,000

追跡1回（1年毎）あたり
￥500

J-HOP, JAMP, CARE Asia Projects (2013)

登録月	JAMP	J-HOP
H19		3459
H20		4157
H21	1430	4414
H22	2369	4500
H23	3155	4585
H2410月	3543	4575
11月	3601	4575
12月	3676	4575
1月	4153	4575
2月	4270	4575
3月	4663	4575
4月	4747	4575
H25 5月	4824	4575



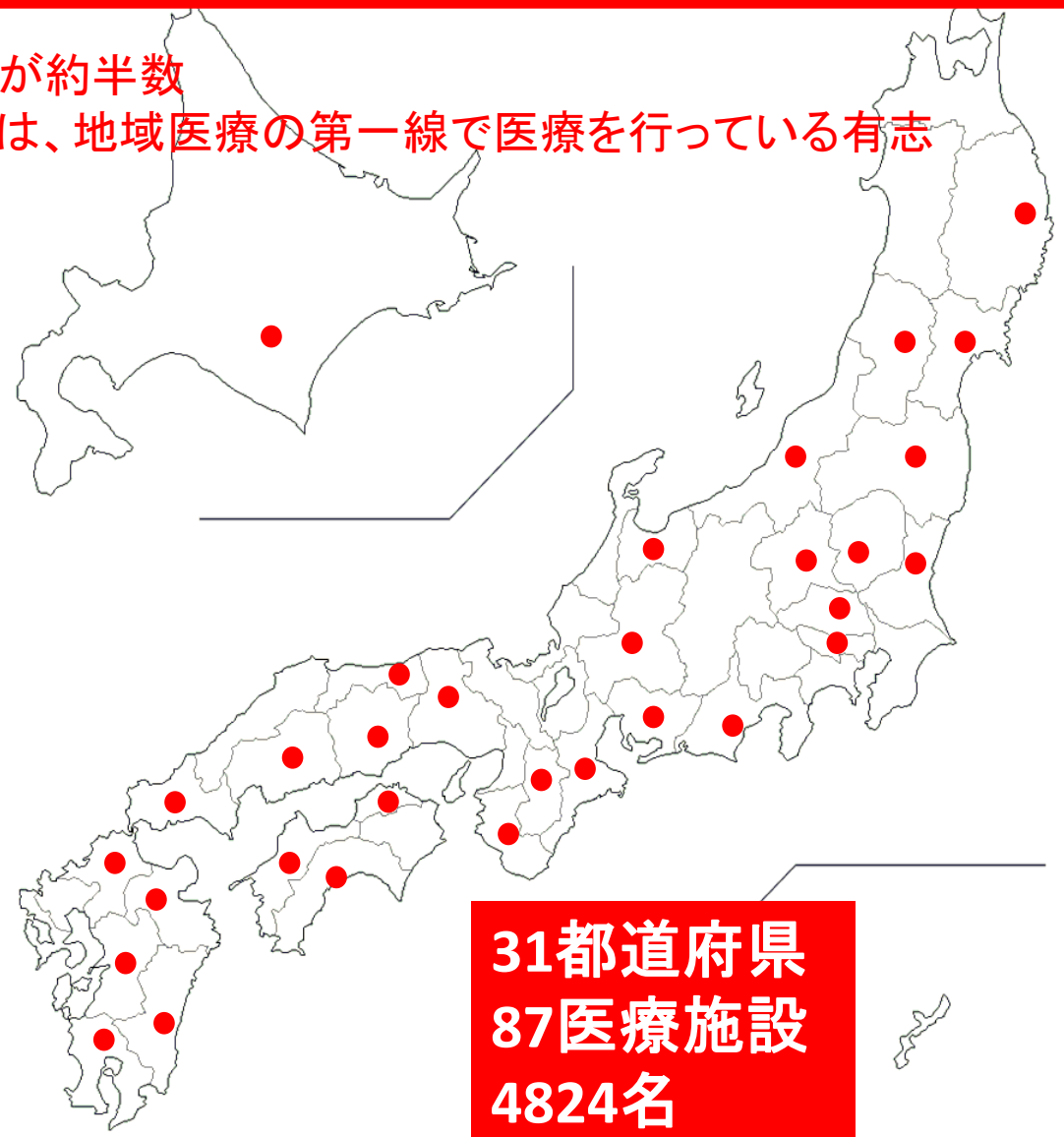
JAMP

		施設数	登録数（データ数）
		6	1444
2	宮崎	15	1015
3	福岡	5	328
4	大分	4	249
5	宮城	2	477
6	東京	8	141
7	新潟	2	136
8	愛知	2	117
9	福島	3	87
10	山口	5	100
11	兵庫	5	176
12	香川	2	86
13	高知	1	57
14	三重	1	48
15	山形	3	47
16	広島	2	93
17	岐阜	1	50
18	鳥取	1	20
19	北海道	3	43
20	愛媛	1	17
21	茨城	3	16
22	熊本	2	19
23	和歌山	2	13
24	鹿児島	1	10
25	岩手	1	10
26	静岡	1	8
27	埼玉	1	6
28	岡山	1	5
29	富山	1	4
30	奈良	1	1
31	群馬	1	1
	総数	87	4824

JAMP研究登録施設　散布図　2013.05.31現在

血圧コントロール状態の地域特性を明らかにする

卒業生が約半数
その他は、地域医療の第一線で医療を行っている有志

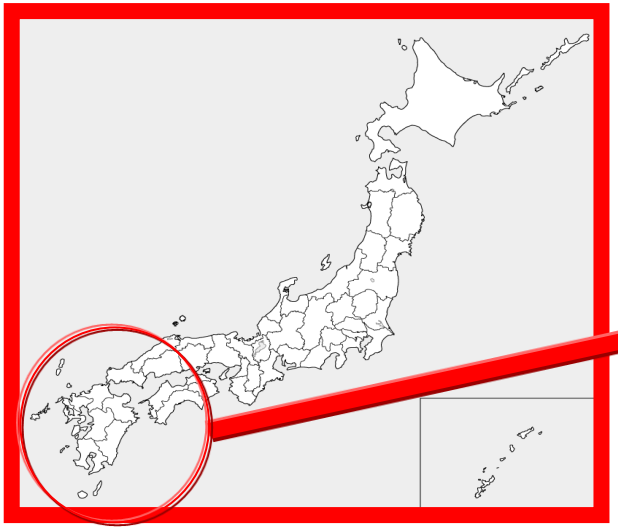


31都道府県
87医療施設
4824名

Regional Difference in BP and Target Organ Damage in Japan

mackerel

horse mackerel

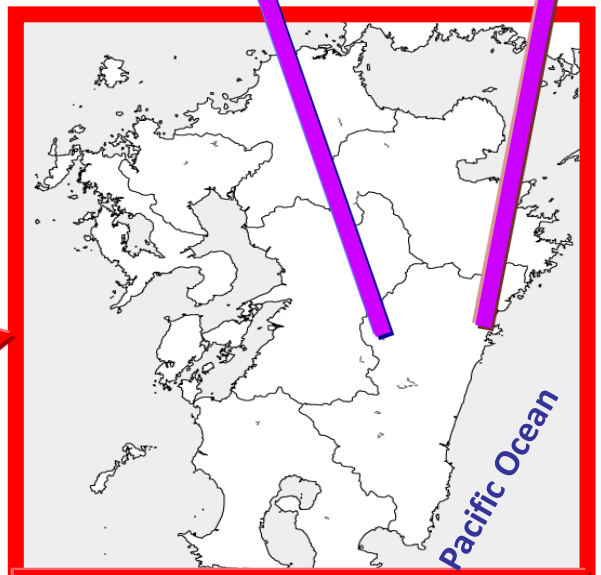


Farm Village

N=333

Fishing Village

N=263



Miyazaki Prefectoure

Yano, Hoshide, Kario et al. Am J Hypertens 2011;24:437-443.

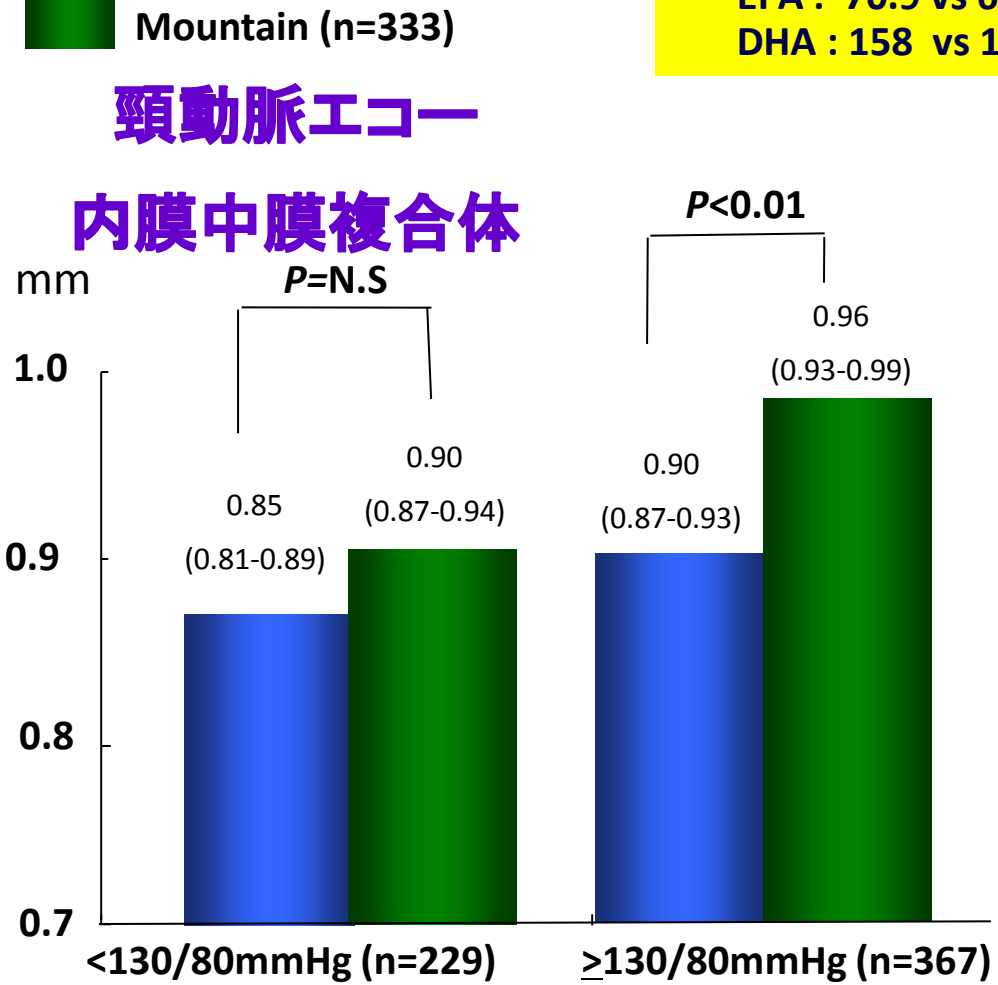
Regional Difference in Impact of 24-hr BP Control on Cardiovascular Remodeling（n=596）

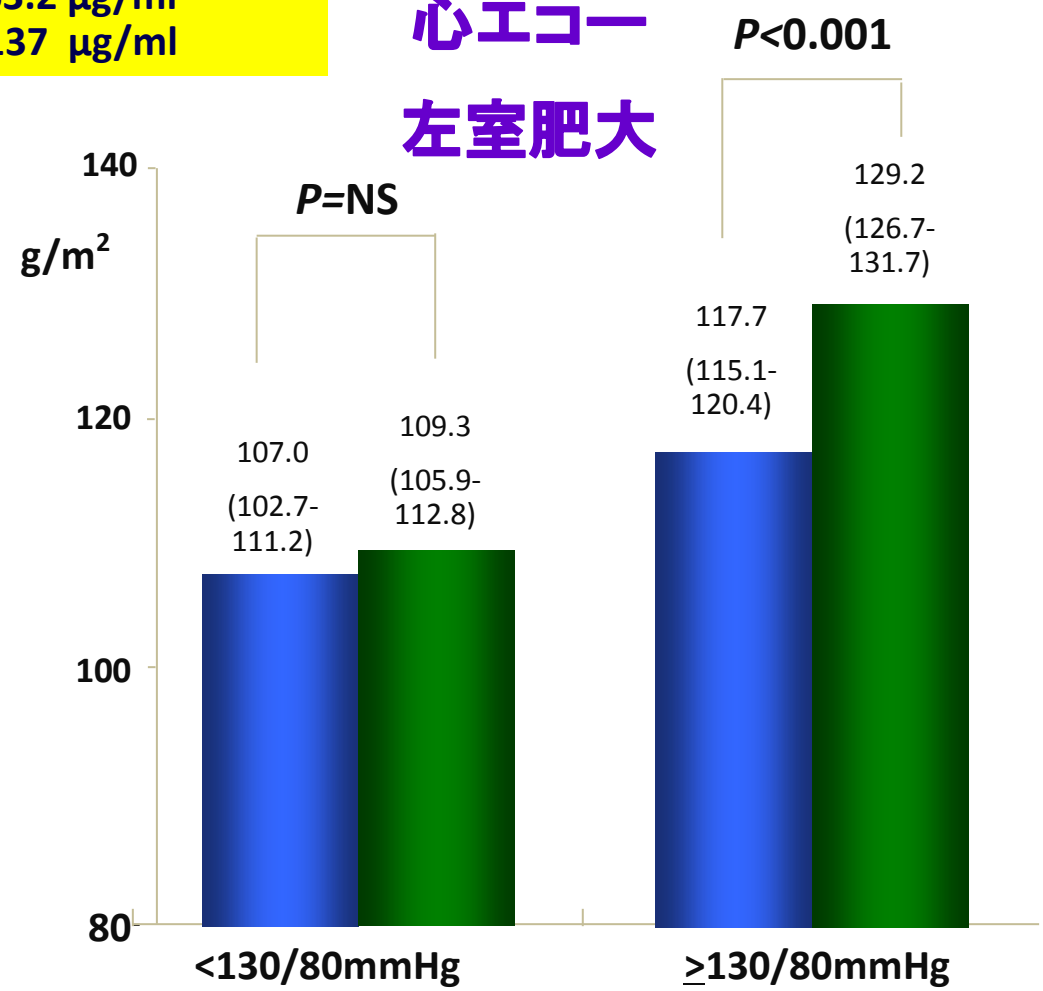
24-hr BP control diminishes the regional difference in CV remodeling

Seashore (n=263)

Mountain (n=333)

ω3-Polyunsaturated free fatty acid
EPA : 70.9 vs 63.2 μg/ml
DHA : 158 vs 137 μg/ml





Yano, Kario et al. Am J Hypertens 2011;24:437-443.

栃木超高齢者研究

宇都宮内科医会・自治医科大学循環器内科

523人、平均年齢 84歳、平均34ヶ月追跡

Original Article

Cognitive Dysfunction and Physical Disability Are Associated with Mortality in Extremely Elderly Patients

Satoshi HOSHIDE[1)], Joji ISHIKAWA[1)], Kazuo EGUCHI[1)], Tsuneo OOWADA[2)], Kazuyuki SHIMADA[1)], and Kazuomi KARIO[1)]

A few reports have demonstrated that cognitive or physical dysfunction is associated with increased mortality in very elderly patients, those over 80 years of age. Using simple clinical tests, we evaluated the impact of cognitive or physical dysfunction on future total and cardiovascular deaths. We conducted a multicenter
ely elderly outpatients, aged ≥80 years (mean±SD age: 84±5.3 years).
ities of daily living at baseline. They were followed for an average of 34
er which the total and cardiovascular deaths were evaluated. Cognitive and
d by a short-term memory test using visual working memory and the get-
enty-five deaths, including 36 cardiovascular deaths, occurred during the
sion analysis model controlling for age, sex, body mass index (BMI), dias-
sterol level, and history of cardiovascular diseases, cognitive dysfunction
risk factor for total death ($p<0.001$), and cognitive dysfunction ($p<0.001$)
) were independent risk factors for cardiovascular death. The determinants
sociated with a lower diastolic BP ($p=0.04$) adjusted for age, BMI, and a his-
ognitive function, which was associated with lower BP levels, and physical
edictors of total and cardiovascular mortality among all cardiovascular risk
at least 80 years of age. (*Hypertens Res* 2008; 31: 1331–1338)

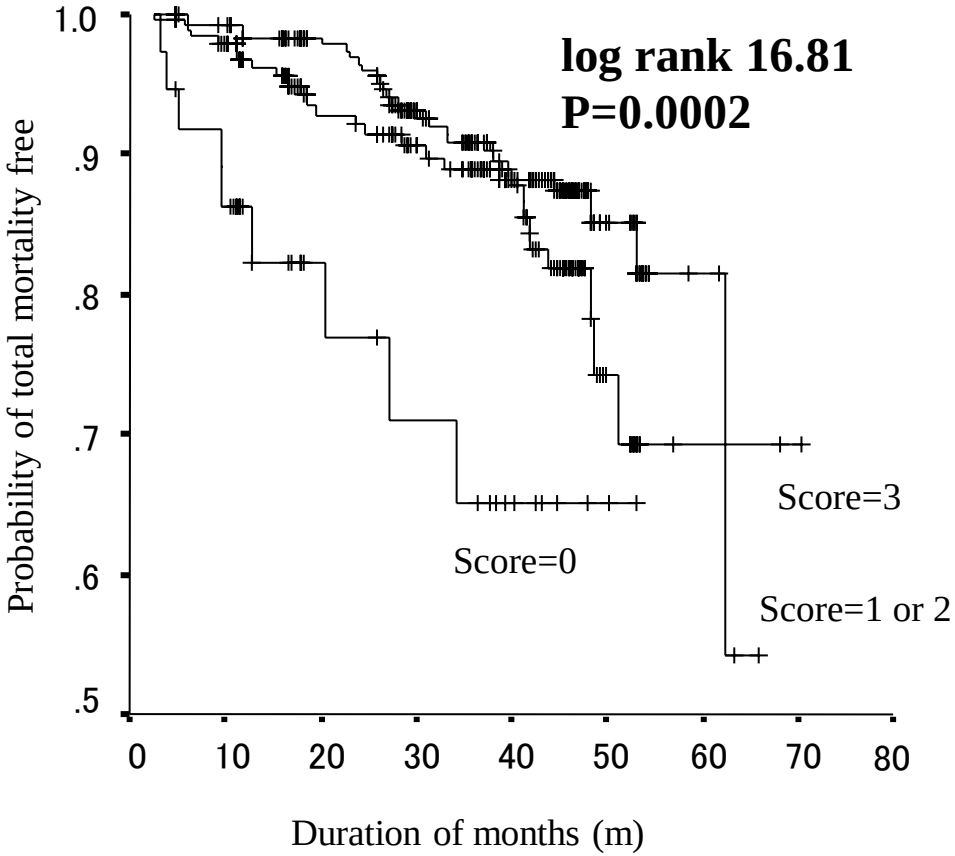
スプーン

ペ ン

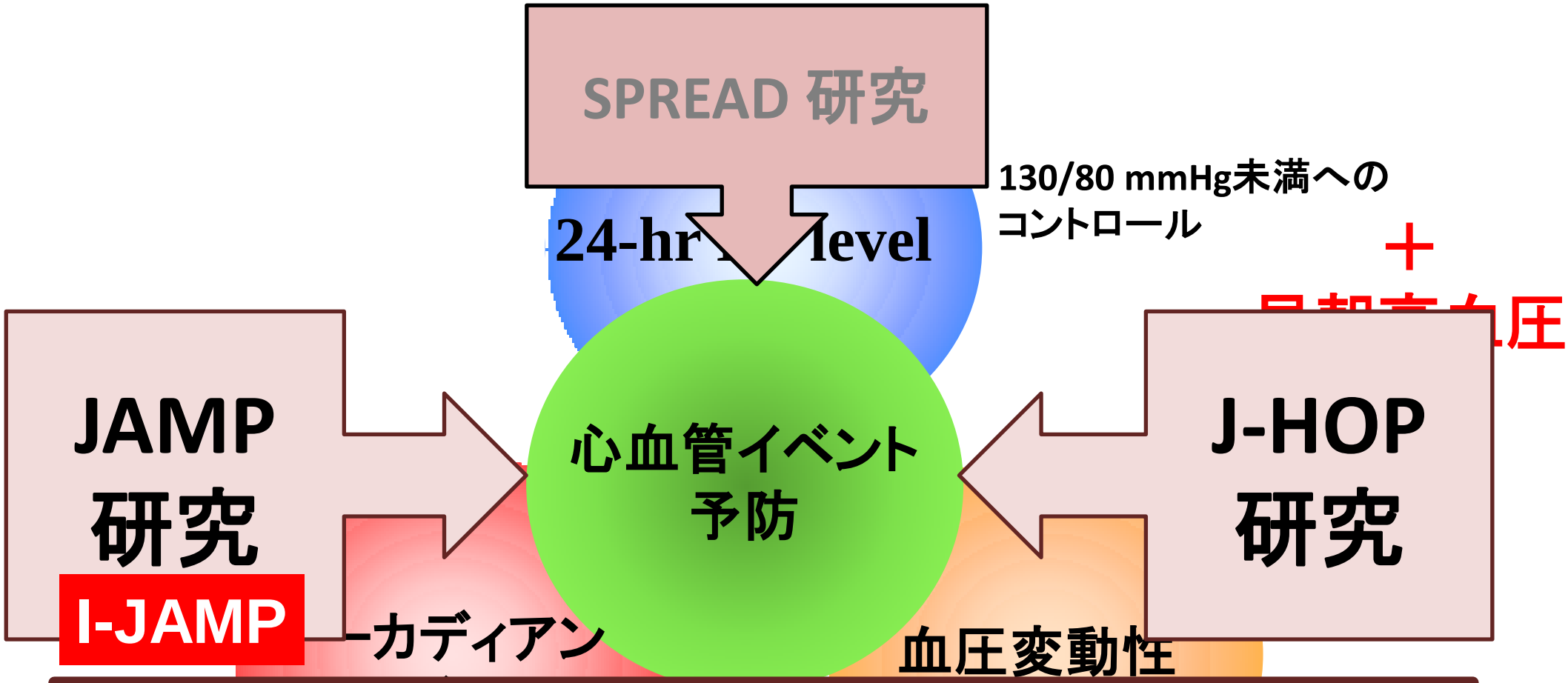
とけい

Hoshide, Kario. Hypertens Res 2008; 31: 1331-1338.

総死亡



Out-of-clinic 血圧コントロール



CARE ASIA

エビデンス構築・ガイドライン作成

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