Table- 1

Blood Pressure categories

Systolic, Diastolic Blood Pressure (mm Hg)	JNC 7	2017/ACC/AHA	Indian Hypertension Guidelines
< 120 and < 80	Normal BP	Normal BP	Optimal
120-129 and <80	Prehypertension	Elevated BP	Normal
130-139 or 80-89	Prehypertension	Stage 1 hypertension	High Normal
140-159 or 90-99	Stage 1 hypertension	Stage 2 hypertension	Stage 1 hypertension
≥ 160 or ≥ 100	Stage 2 hypertension	Stage 2 hypertension	Stage 2 hypertension

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Table-2

European classification of office BP and definitions of hypertension grade

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	< 120	and	< 80
Normal	120–129	and/or	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	≥ 140	and	< 90

Williams, Mancia et al., J Hypertens 2018 and Eur Heart J 2018, in press

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BP Thresholds for and Goals of Pharmacological Therapy in Patients With Hypertension According to Clinical Conditions

Clinical Condition(s)	BP Threshold, mm Hg	BP Goal, mm Hg
General		
Clinical CVD or 10-year ASCVD risk ≥10%	≥130/80	<130/80
No clinical CVD and 10-year ASCVD risk <10%	≥140/90	<130/80
Older persons (≥65 years of age; noninstitutionalized, ambulatory, community-living adults)	≥130 (SBP)	<130 (SBP)
Specific comorbidities		
Diabetes mellitus	≥130/80	<130/80
Chronic kidney disease	≥130/80	<130/80
Chronic kidney disease after renal transplantation	≥130/80	<130/80
Heart failure	≥130/80	<130/80
Stable ischemic heart disease	≥130/80	<130/80
Secondary stroke prevention	≥140/90	<130/80
Secondary stroke prevention (lacunar)	≥130/80	<130/80
Peripheral arterial disease	≥130/80	<130/80

ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults, Hypertension Nov 13, 2017

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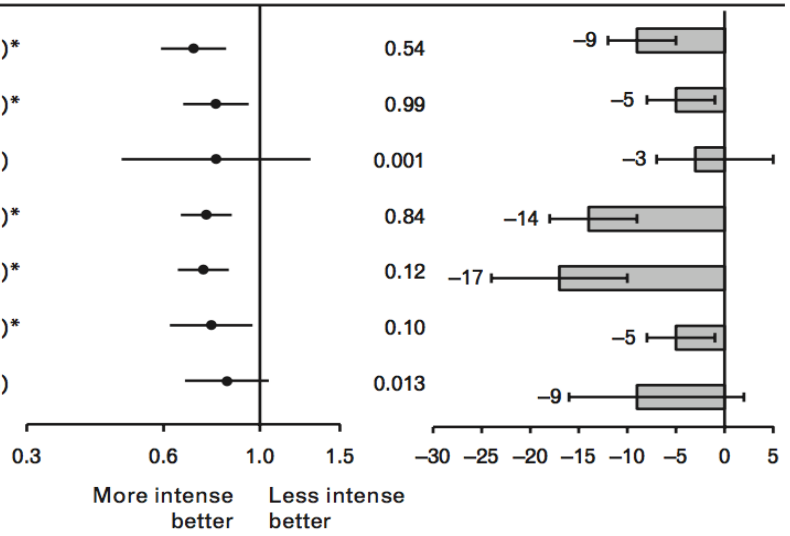
Meta Analysis of Trials of Intensive BP Targets

Outcome	Trials (*n*)	Difference SBP/DBP (mmHg)	Events (*n*/patients) More intense	Events (*n*/patients) Less intense	Standardized RR (95% CI)	Standardized RR (95% CI)	*P*-value (heterogen)	Absolute risk reduction 1000 pts/5 years (95% CI)
Stroke	13	–8.2/–3.5	476/21959	682/27993	0.71 (0.60–0.84)*		0.54	–9
CHD	14	–8.1/–3.4	514/22517	617/28546	0.80 (0.68–0.95)*		0.99	–5
HF	10	–7.9/–3.2	239/18222	289/24126	0.80 (0.49–1.31)		0.001	–3
Stroke + CHD	13	–8.2/–3.5	986/21959	1297/27993	0.75 (0.68–0.85)*		0.84	–14
Stroke + CHD + HF	9	–8.0/–3.3	1012/17664	1326/23573	0.75 (0.66–0.83)*		0.12	–17
CV death	15	–8.2/–3.5	396/22557	512/28567	0.79 (0.63–0.97)*		0.10	–5
All-cause death	16	–8.1/–3.4	963/23115	1186/29120	0.83 (0.69–1.03)		0.013	–9



Adapted from Thomopolus, Parati, and Zanchetti Journal pf Hypertension 2016

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Association between SBP/DBP and CVD risk

- Several meta-analyses have reported a gradient of progressively higher CVD risk going from normal BP to elevated BP to hypertension.

	Systolic/Diastolic blood pressure, mm Hg		
Outcome	**<120/80**	**120-129/80-84**	**130-139/85-89**
Cardiovascular mortality	Ref	1.24 (1.10 – 1.39)	1.56 (1.36 – 1.76)
Stroke	Ref	1.35 (1.10 – 1.66)	1.95 (1.69 – 2.24)
Coronary heart disease	Ref	1.11 (0.87 – 1.42)	1.33 (0.96 – 1.83)
Myocardial infarction	Ref	1.43 (1.10 – 1.86)	1.99 (1.59 – 2.50)

Guo et. al. Current Hypertension Reports 2013; 15: 703-716.

Guo et. al. PLoS One, 2013; 8e61796. Huang et. al. Neurology, 2014; 82: 1153-1161.
Huang et. al. American Journal of Kidney Diseases, 2014; 63: 76-83. Lee et. al., Neurology 2011; 77: 1330-1337.
Shen, American Journal of Cardiology, 2013; 112: 266-271.

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LATEST HYPERTENSION GUIDELINES 2017/2018

U.S	EUROPEAN
Diuretics	Diuretics
CCBs	CCBs
ARBs	ARBs
ACEIs	ACEIs
	ß-blockers

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Diuretics

CTD
(ACC/AHA)

CTD/Indapamide
(ESC/ESH)

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ACC / AHA 2017

"Chlorthalidone is preferred on the basis of prolonged half-life and proven trial reduction of CVD"

TOMHS, HDFP, MRFIT, SHEP, SHEP EXTN, ALLHAT, SPRINT

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Hypertension: Different Definitions:
Same Blood Pressure Goal

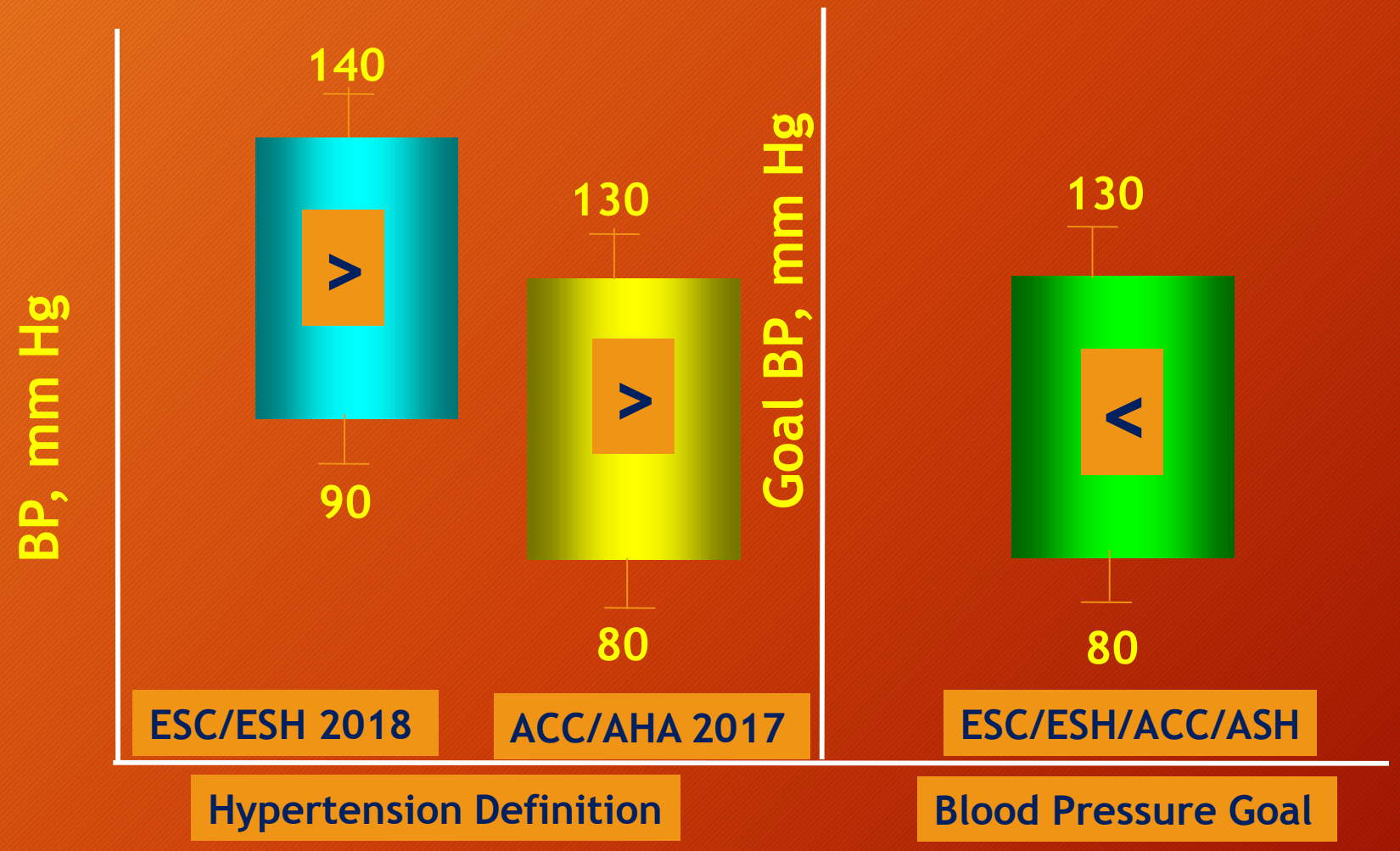

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Figure- 1

Financial burden from CVD - INDIA

2005 → 2015 = USD 236.6 billion !!

2000 → 2003 = 10.5 million deaths from CVD

HTN → 57 % of Stroke deaths

HTN → 24% of CVD deaths

Adapted from J.Human HTN 2004;18:73-78

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WHAT IS NEW IN THE ESC/ESH 2018 GUIDELINES

RELEASE DATE, JUNE 9, 2018

Apollo HOSPITALS

CV Risk assessment

Score = Systemic Coronary Risk Evaluation

- Usual risk factors
- HMoD (ToD)
- South Asians – Multiply by 1.4

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2019 ACC / AHA
Primary Prevention of CVD

- Assessment of CV risk.
- Pooled Cohort Equation.
- 40 - 79 years.
- BP > 130/80 mm Hg.
- "Higher" in "Asians".
- BP target <130/80 mm Hg.
- ↑ BP = ↓ Sleep < 6 hours, poor quality of sleep.

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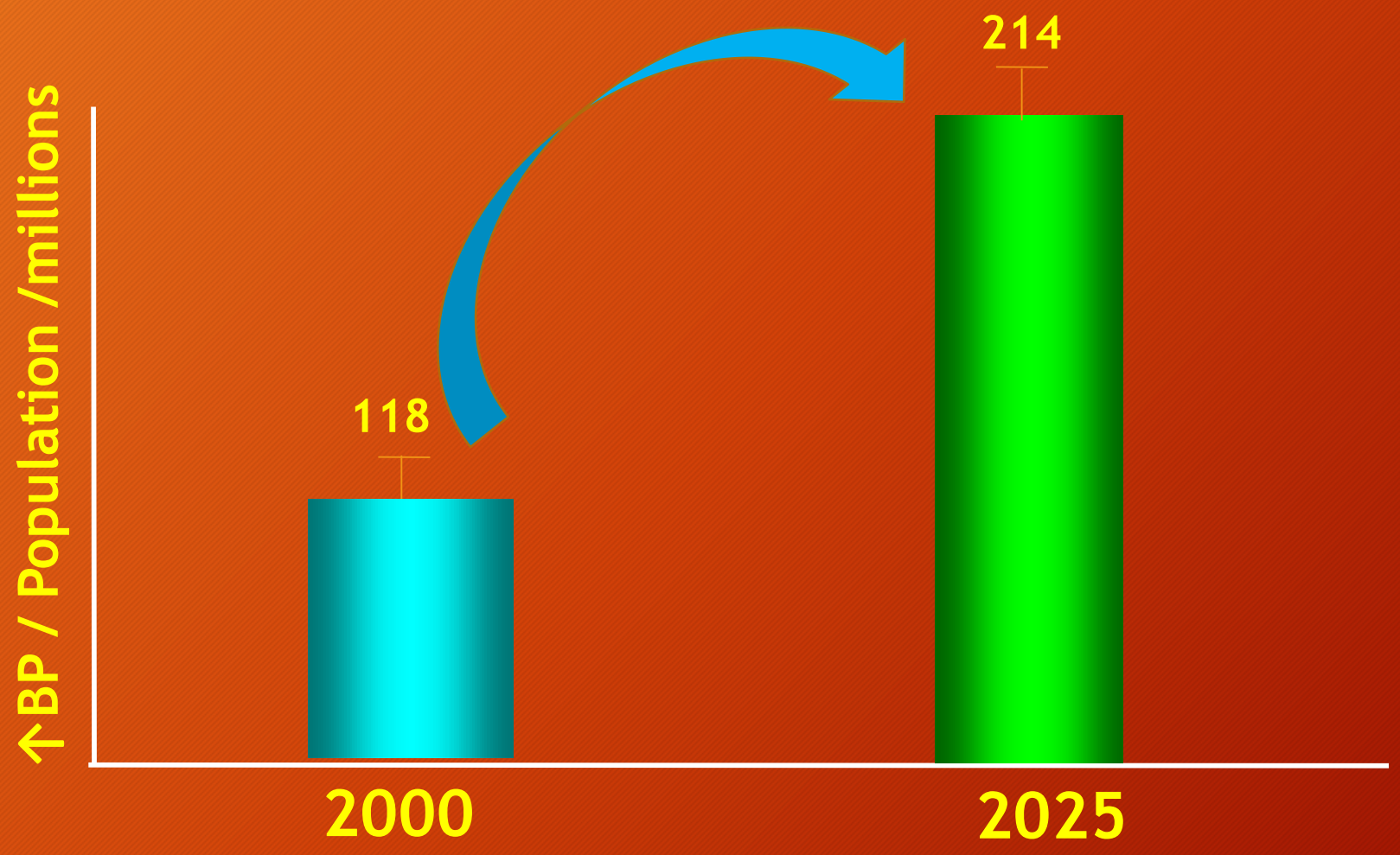
CVD - INDIA



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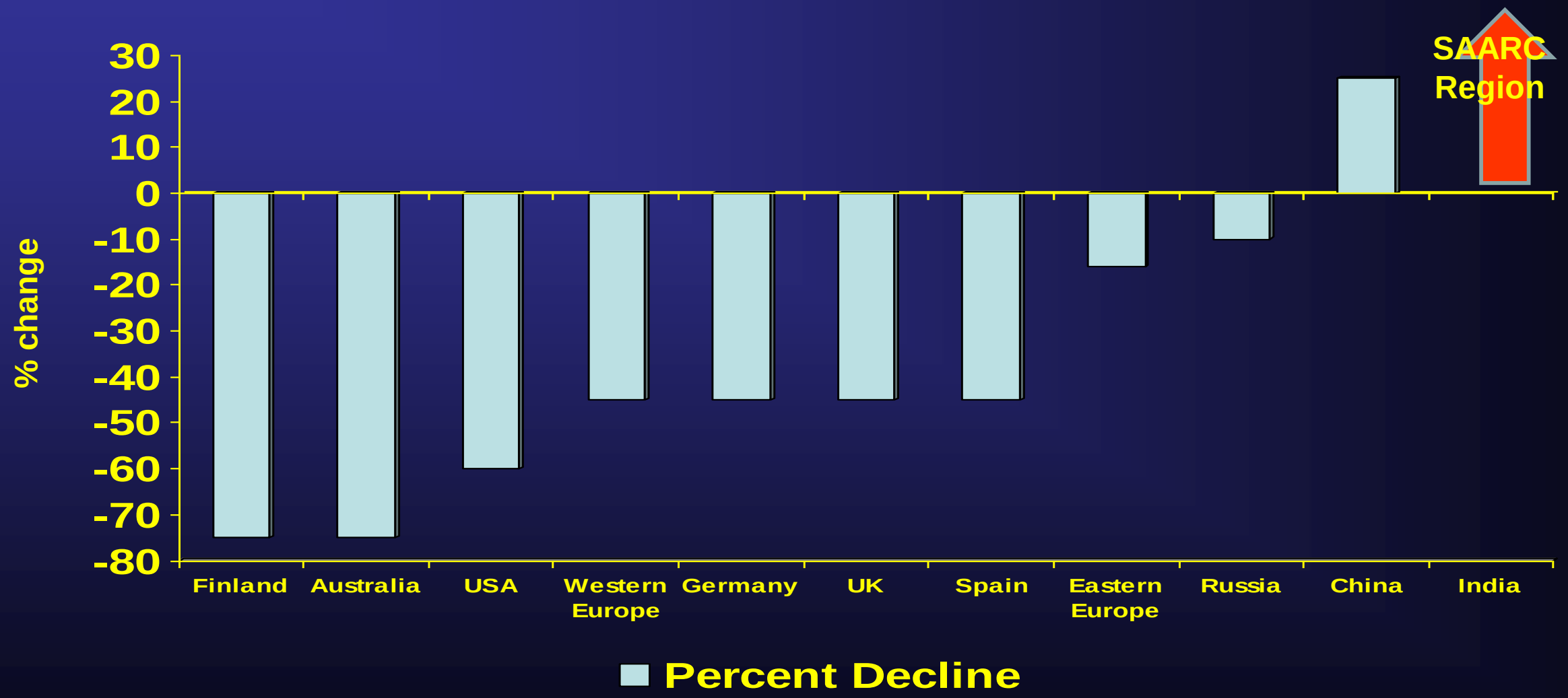
Declining CVD in Developed Countries

Mortality Decline from 1970s to 2000s



Gupta R, Guptha S, Joshi R, Xavier D. Health Res Pol Syst 2011; 9:8

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Hypertension is Out of Control in India (142 Articles)

Of known cases of hypertension, only "one-tenth" of rural and 'one-fifth' of urban population have blood pressure under control

---- Achala. R. J of HTN 2014;32

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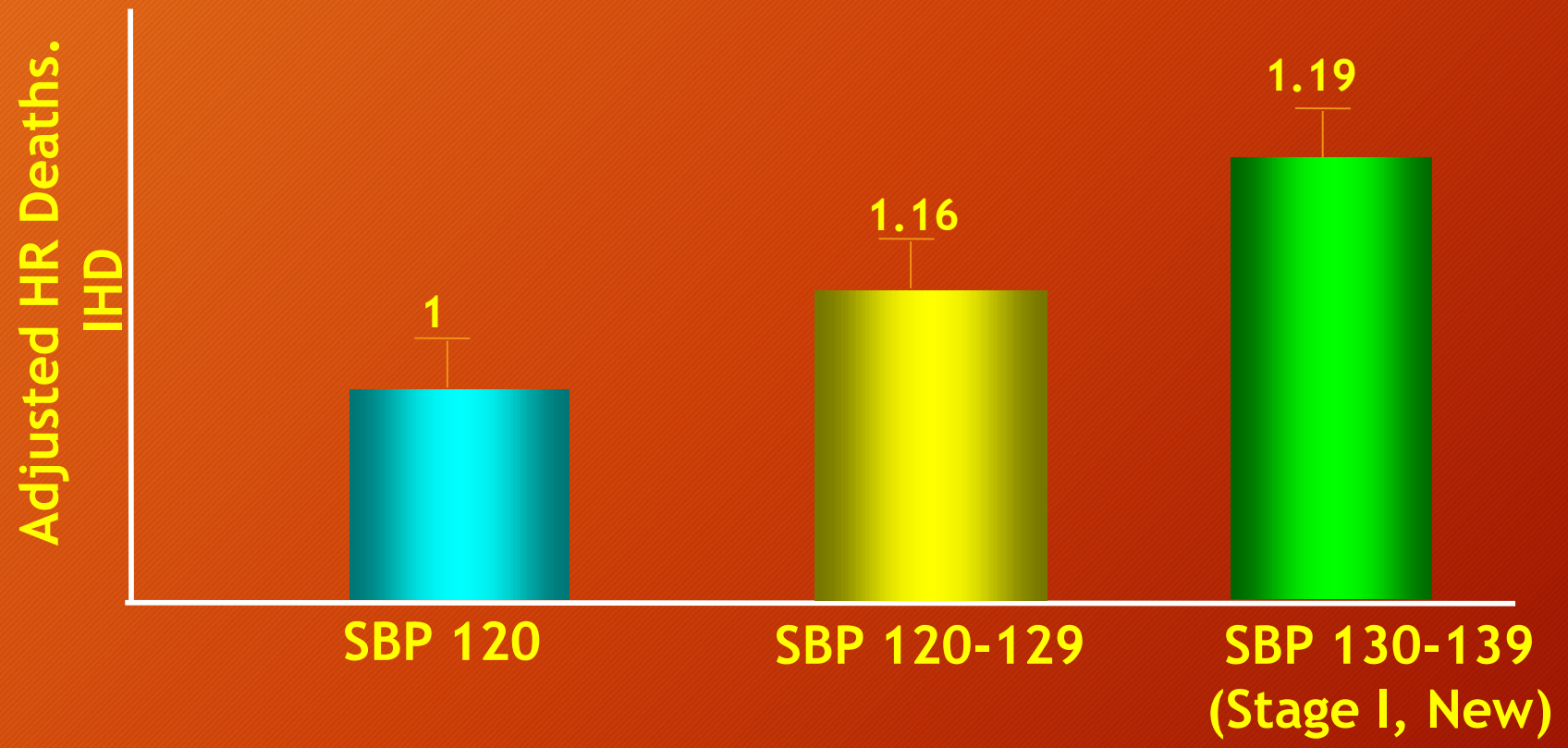
New Hypertension Guidelines

(BP levels, Indian Data)

(Pednekar MS; AJH 2009 Mumbai Cohort Study 148,173 persons >35 yrs 70 Months/IHD)



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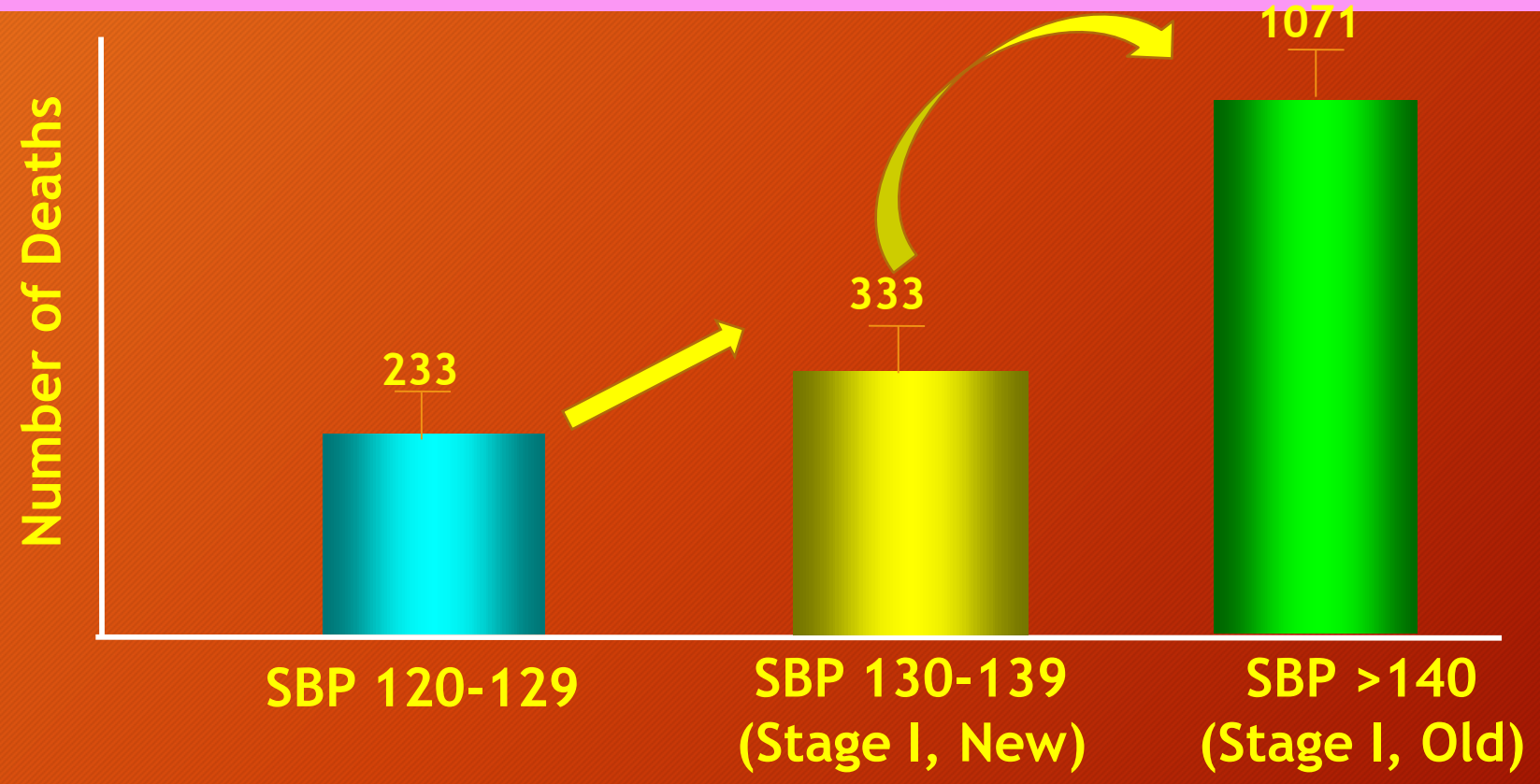
New Hypertension Guidelines

(BP levels, Indian Data)

(Pednekar MS; AJH 2009 Mumbai Cohort Study 148,173 persons >35 yrs 70 Months/Circulatory Death)



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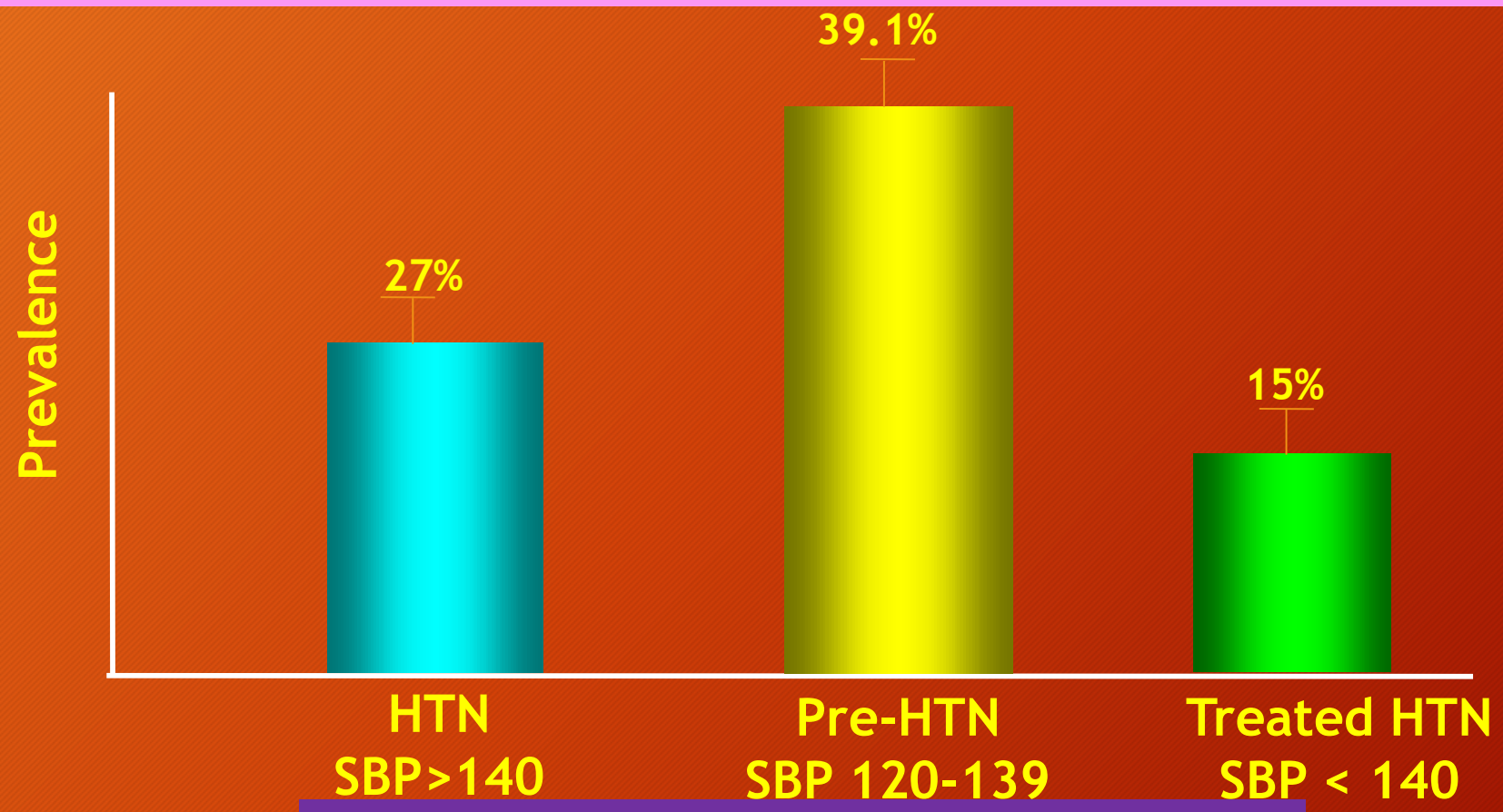
Hypertension India: Semi- Rural

(J Human HTN, Nov 17. Ram CVS)

Aragonda, Chittoor Dist, A.P, 16,636 persons > 15 yrs of age



50 % of Pre-HTN → HTN

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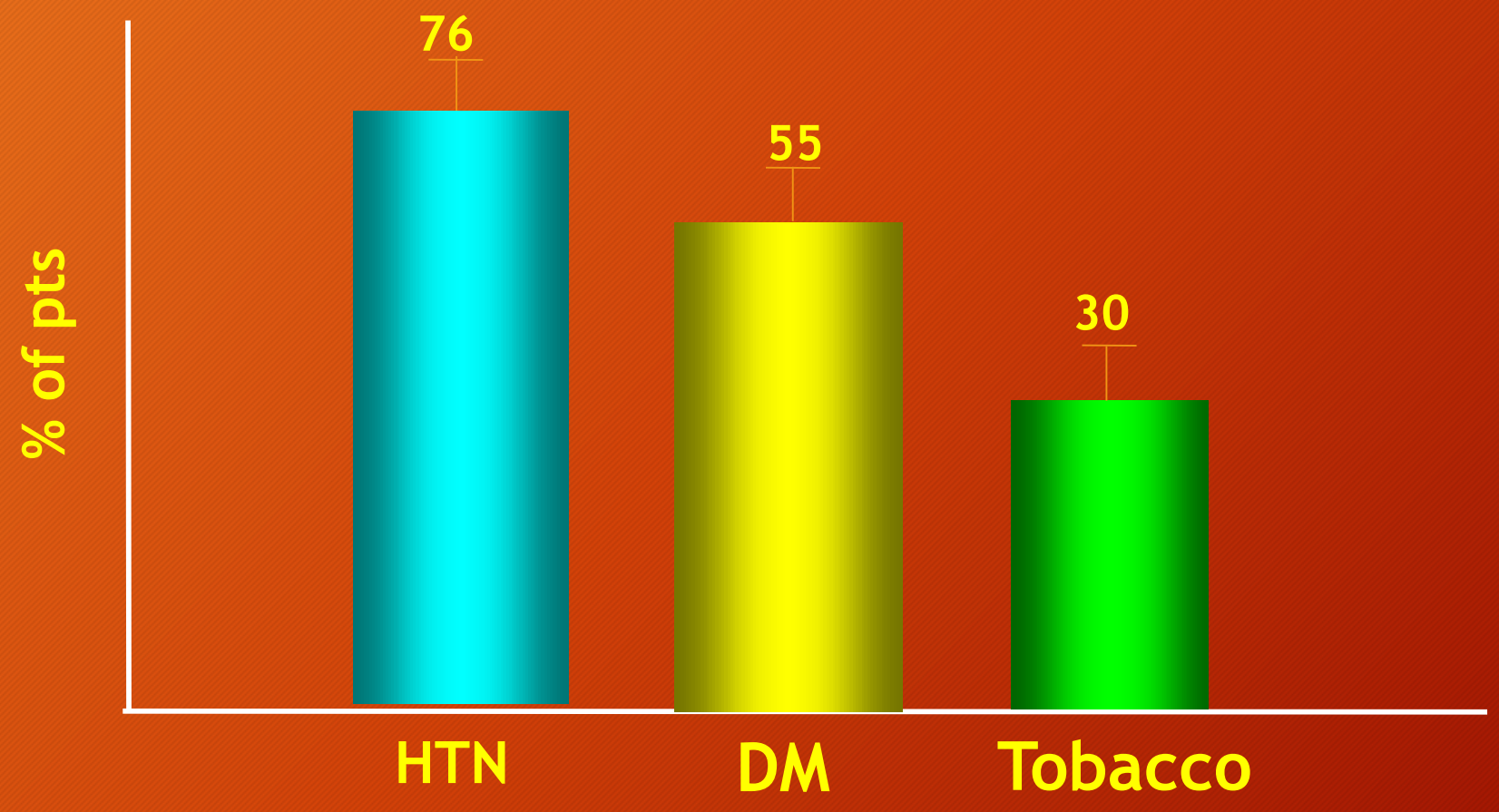
Stroke India / Apollo (In Press)

530 pts, with acute stroke



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1. Wander GS, Ram CVS. Optimal Blood Pressure Goals recommended by the Latest Hypertension Guidelines. India may benefit the most. European Heart J. 2018;33:3016-3017.

2. Ram CVS. European and American Hypertension Guidelines and Goal Blood Pressure: Relevance to India. Indian Heart J. 2018;70:465-468.

3. Chopra HK Ram CVS; “Recent Guidelines for Hypertension: A Clarion Call for Blood Pressure Control in India. Circulation Research/AHA, 2019, in press”.

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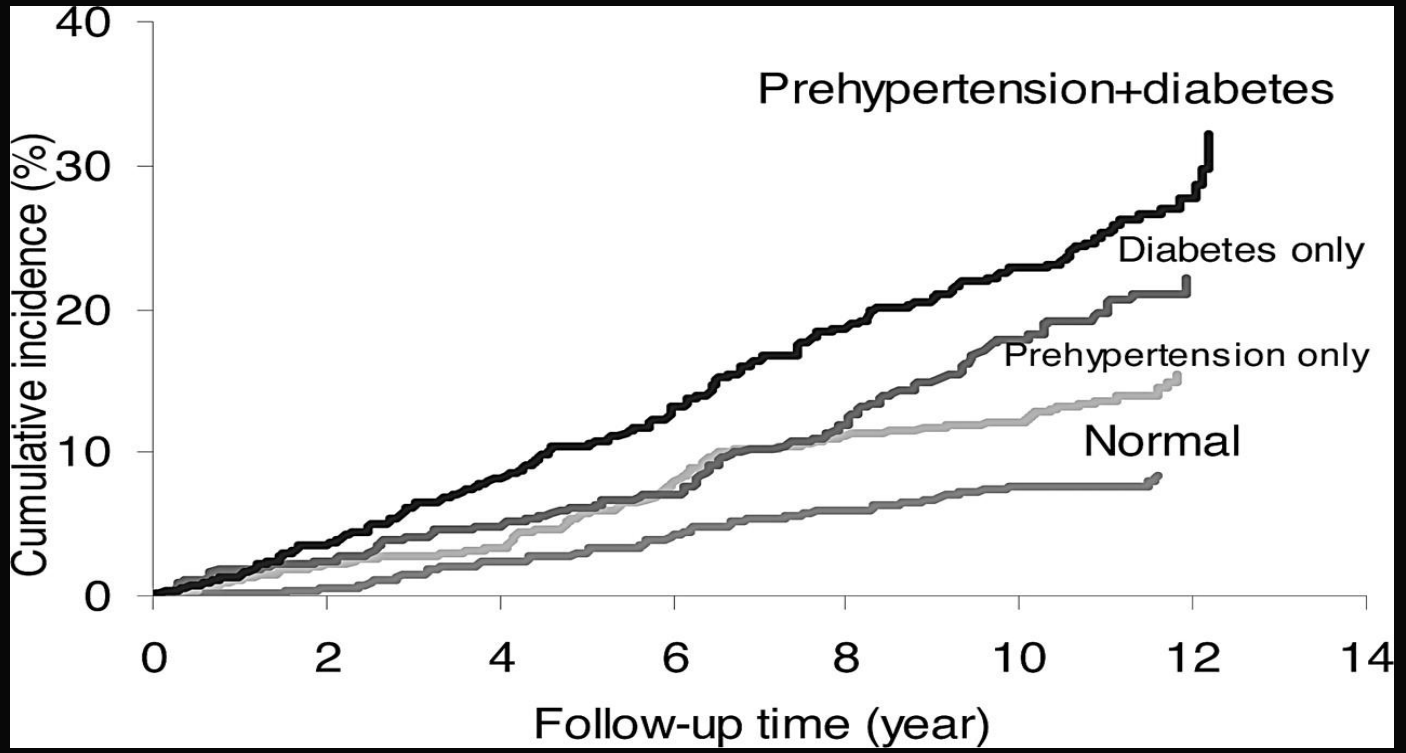
BP and CVD Risk in Prehypertension

Strong Heart Study



Zhang, Y. et al. Hypertension 2006;47:410-414

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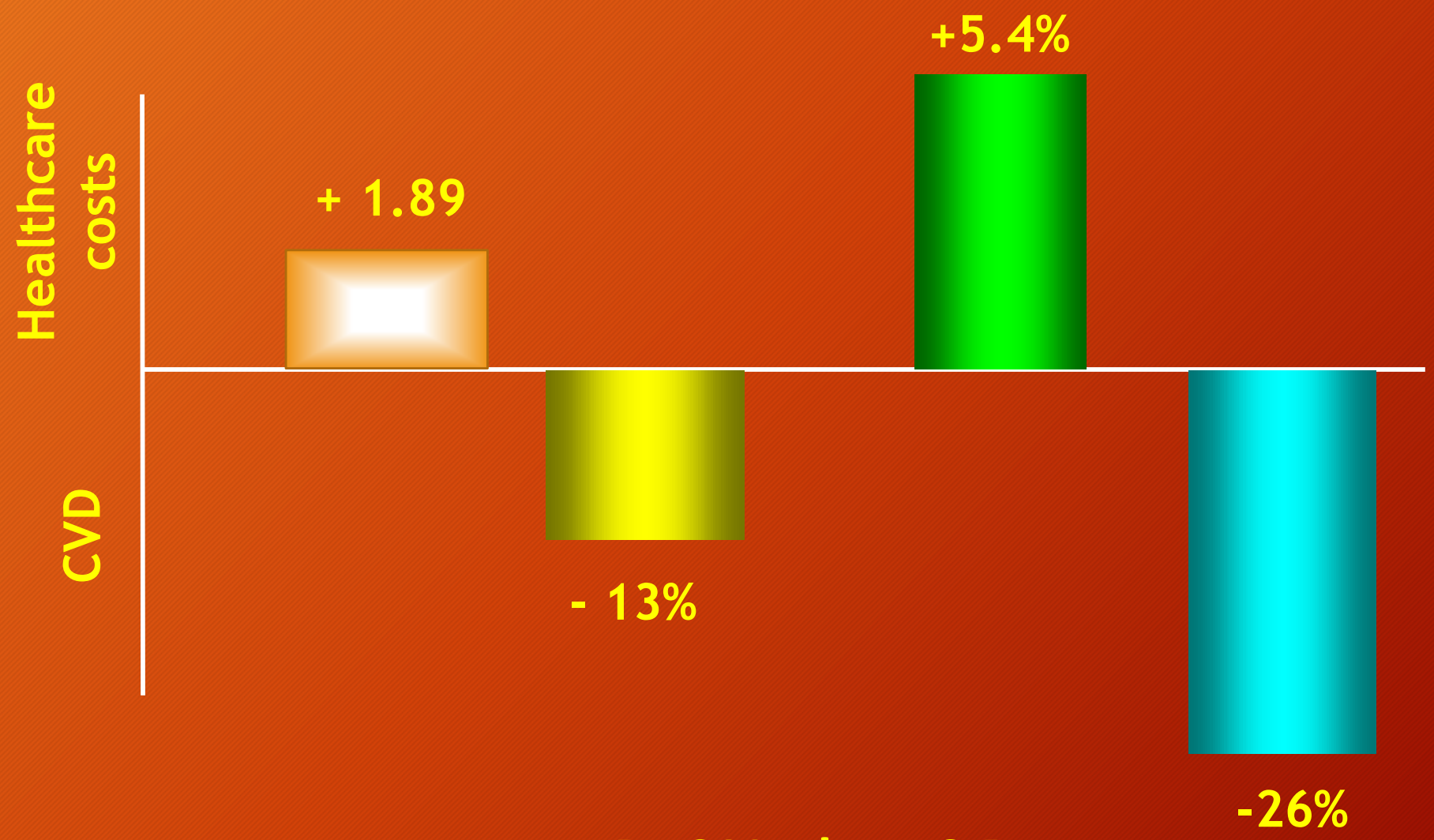
CVD - INDIA



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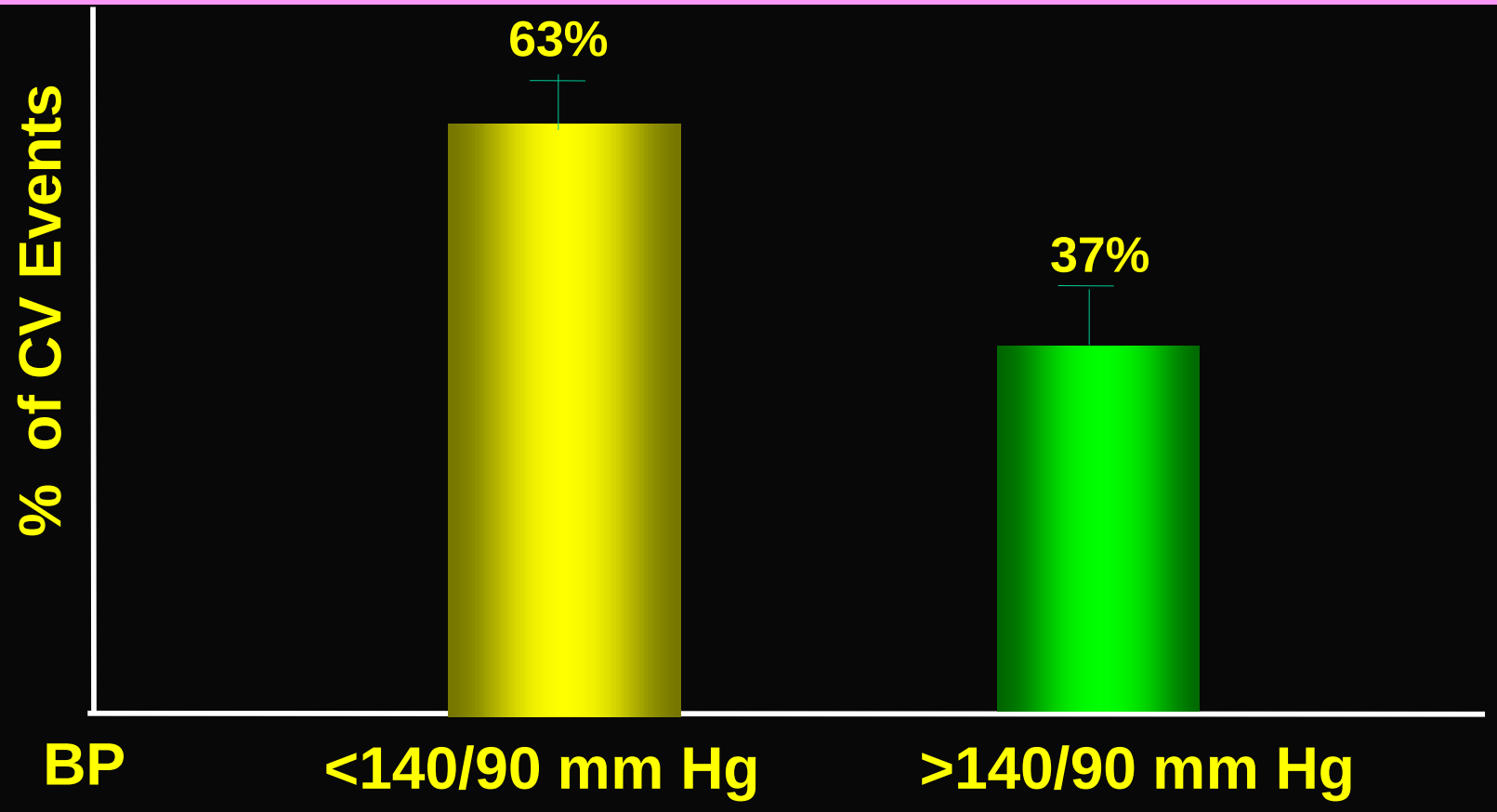
"Majority of CV Events occur with Blood Pressure <140/90 mm Hg"

Editorial, JASH, BLOCH, 12/2017

2584 Adults HTN follow-up 7.7 yrs



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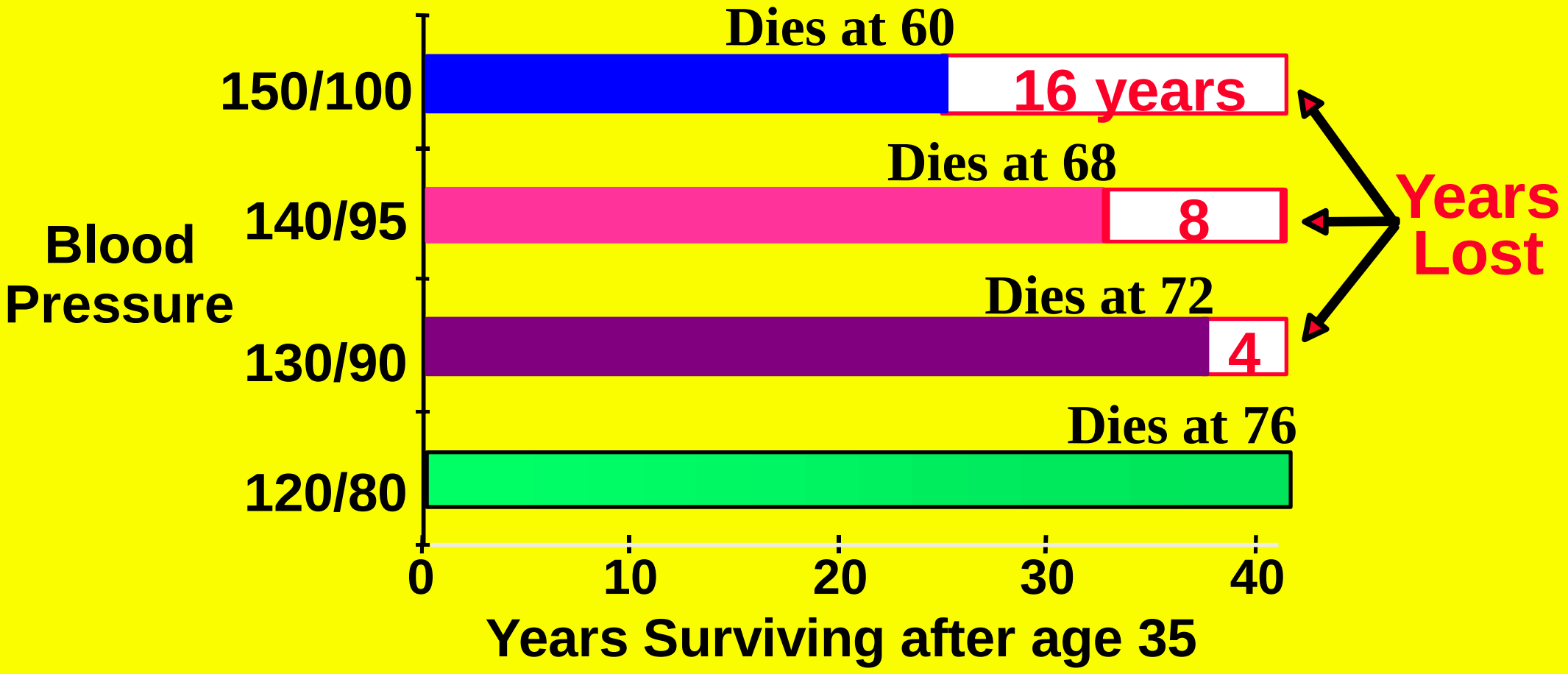
"Natural History" of a 35 year old white man with untreated high blood pressure.



Build and BP Study: 1935-1954, Metro Life 1991

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- “ In collective wisdom, India is likely the ultimate receptacle for the challenges, solutions, and benefits from tighter BP goals for the nation.

“Circulation Research, 2019 Chopra and Ram

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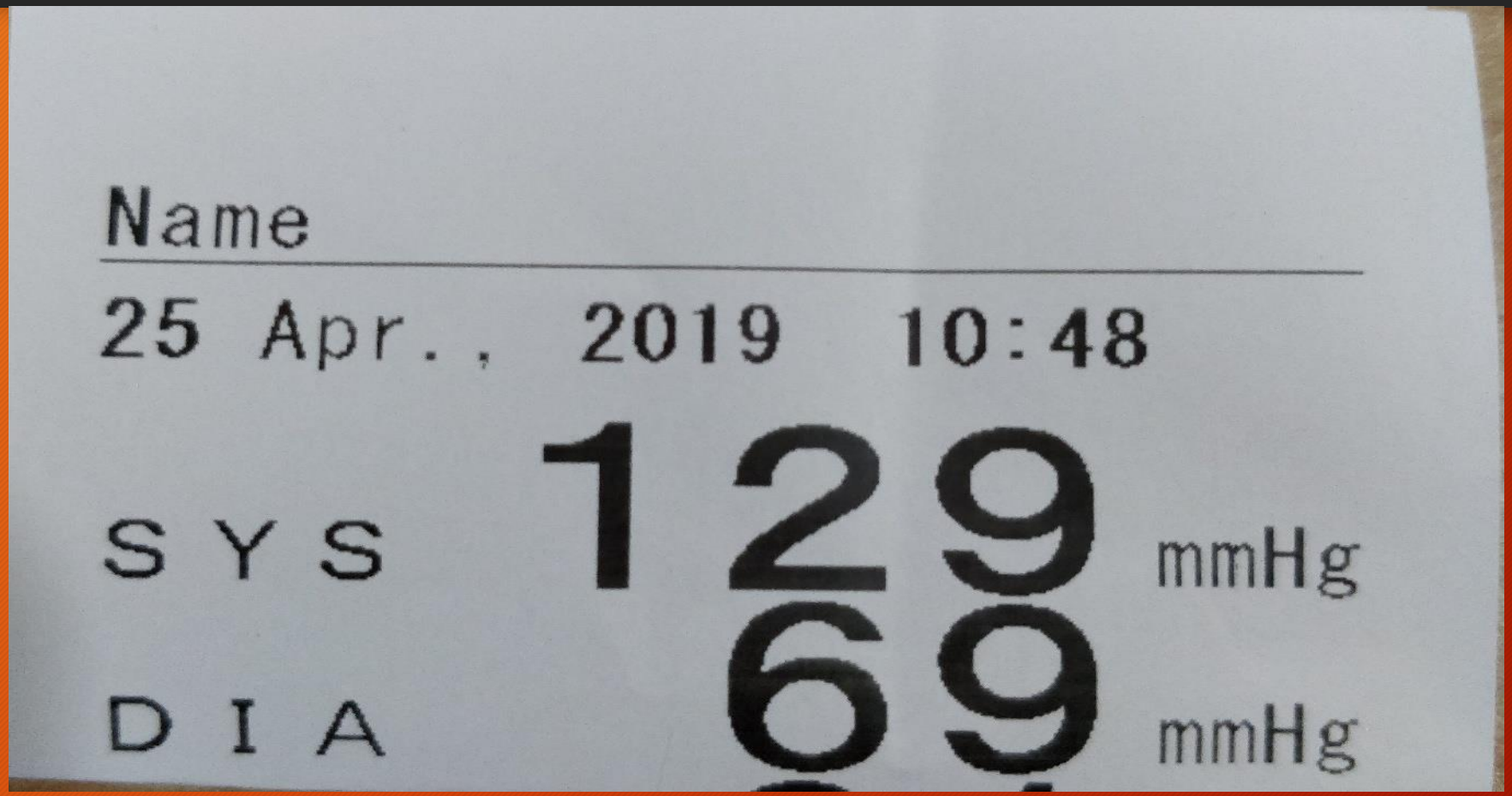

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