

# Hoe moeten we de nieuwe streefwaarden voor bloeddrukverlaging interpreteren?

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# How to interpret treatment targets?

- Option 1: take it literally (or the fundamentalistic approach)
  - Do what the Bible/guideline tells you to do; no thinking required

# Case

- Female patient, 72 years, apparently healthy
- During a routine visit to her GP, the nurse practitioner measures the blood pressure and finds hypertension: 180/92 mmHg
- No complaints, no other risk factors, no medication

# 2018 ESC/ESH Guidelines for the Management of Arterial Hypertension: BP Levels

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 <sup>b</sup>	≥140	and	<90

# 2018 ESC/ESH Guidelines for the Management of Arterial Hypertension: Threshold for Treatment

Age group	Office SBP treatment threshold (mmHg)					Office DBP treatment threshold (mmHg)
	Hypertension	+ Diabetes	+ CKD	+ CAD	+ Stroke/TIA	
18 - 65 years	≥140	≥140	≥140	≥140 <sup>a</sup>	≥140 <sup>a</sup>	≥90
65 - 79 years	≥140	≥140	≥140	≥140 <sup>a</sup>	≥140 <sup>a</sup>	≥90
≥80 years	≥160	≥160	≥160	≥160	≥160	≥90
<b>Office DBP treatment threshold (mmHg)</b>	≥90	≥90	≥90	≥90	≥90	

# 2018 ESC/ESH Guidelines for the Management of Arterial Hypertension: Targets for Treatment

Age group	Office SBP treatment target ranges (mmHg)					Office DBP treatment target range (mmHg)
	Hypertension	+ Diabetes	+ CKD	+ CAD	+ Stroke <sup>a</sup> /TIA	
18 - 65 years	<b>Target to 130</b> <i>or lower if tolerated</i> Not <120	<b>Target to 130</b> <i>or lower if tolerated</i> Not <120	<b>Target to &lt;140 to 130</b> <i>if tolerated</i>	<b>Target to 130</b> <i>or lower if tolerated</i> Not <120	<b>Target to 130</b> <i>or lower if tolerated</i> Not <120	70–79
65 - 79 years <sup>b</sup>	<b>Target to 130-139</b> <i>if tolerated</i>	<b>Target to 130-139</b> <i>if tolerated</i>	<b>Target to 130-139</b> <i>if tolerated</i>	<b>Target to 130-139</b> <i>if tolerated</i>	<b>Target to 130-139</b> <i>if tolerated</i>	70–79
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<b>Office DBP treatment target range (mmHg)</b>	70–79	70–79	70–79	70–79	70–79	

# Case

- Female patient, 72 years, apparently healthy
- During a routine visit to her GP, the nurse practitioner measures the blood pressure and finds hypertension: 180/92 mmHg
- No complaints, no other risk factors, no medication
- Treatment with hydrochlorothiazide 25 mg daily; blood pressure falls to 132/74 mmHg, i.e. a decrease by 48/18 mmHg
- Nurse practitioner strongly advises patient to continue the medication
- Two weeks later: severe head trauma after fall (had light-headedness)

**Table 8** Office blood pressure measurement

Patients should be seated comfortably in a quiet environment for 5 min before beginning BP measurements.

Three BP measurements should be recorded, 1–2 min apart, and additional measurements only if the first two readings differ by >10 mmHg. BP is recorded as the average of the last two BP readings.

Additional measurements may have to be performed in patients with unstable BP values due to arrhythmias, such as in patients with AF, in whom manual auscultatory methods should be used as most automated devices have not been validated for BP measurement in patients with AF.<sup>a</sup>

Use a standard bladder cuff (12–13 cm wide and 35 cm long) for most patients, but have larger and smaller cuffs available for larger (arm circumference >32 cm) and thinner arms, respectively.

The cuff should be positioned at the level of the heart, with the back and arm supported to avoid muscle contraction and isometric exercise-dependant increases in BP.

When using auscultatory methods, use phase I and V (sudden reduction/disappearance) Korotkoff sounds to identify SBP and DBP, respectively.

Measure BP in both arms at the first visit to detect possible between-arm differences. Use the arm with the higher value as the reference.

Measure BP 1 min and 3 min after standing from a seated position in all patients at the first measurement to exclude orthostatic hypotension. Lying and standing BP measurements should also be considered in subsequent visits in older people, people with diabetes, and people with other conditions in which orthostatic hypotension may frequently occur.

Record heart rate and use pulse palpation to exclude arrhythmia.

## Orthostatic intolerance in the elderly

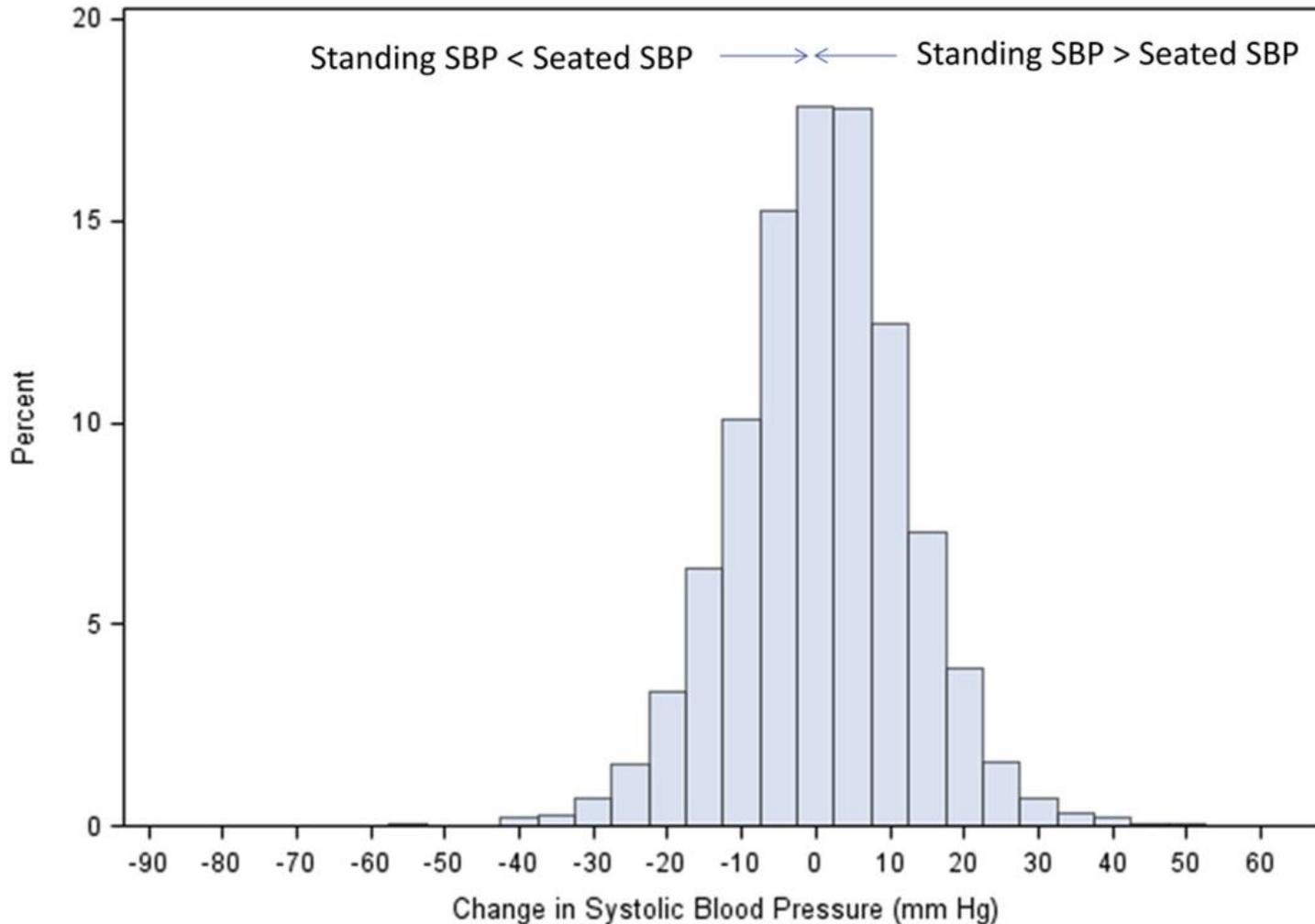
- Prevalence varies from 8% (HYVET) to 30% (unselected populations)
- May be as high as 60% in hospitalized/institutionalized patients
- Greater prevalence during beta-blocker or HCT treatment. Volume depletion is a risk factor!
- Risk of falls, ischemic episodes etc.

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Measure BP 1 min and 3 min after standing from a seated position in all patients at the first measurement to exclude orthostatic hypotension. Lying and standing BP measurements should also be considered in subsequent visits in older people, people with diabetes, and people with other conditions in which orthostatic hypotension may frequently occur.

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# Orthostatic BP fall in SPRINT (baseline)



Orthostatic falls associated with

- age
- female sex
- use of
- beta-blockers,
- calcium channel blockers and
- combined alpha-beta blockers

# Lesson 1

- Beware of orthostatic hypotension
- Strict adherence to the guidelines may cause (sometimes serious) problems

# How to interpret treatment targets?

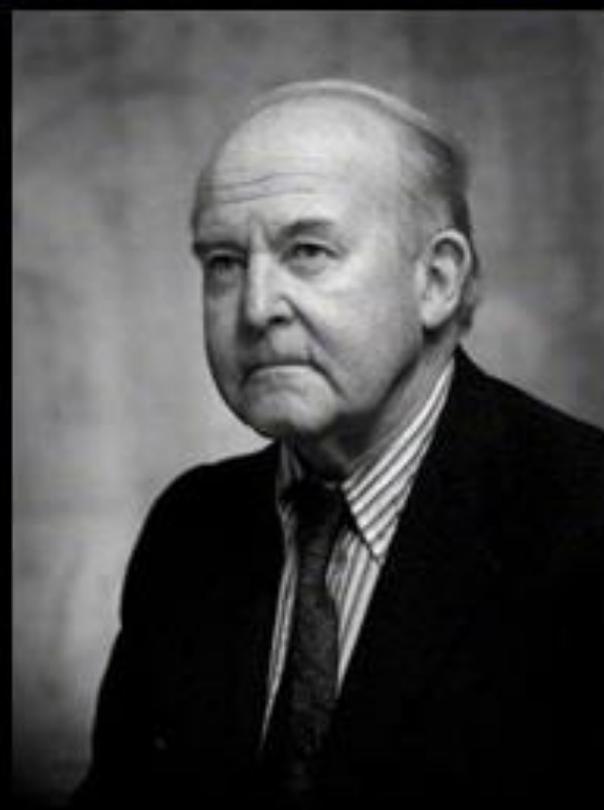
- Option 1: take it literally (or the fundamentalistic approach)
  - Do what the Bible/guideline tells you to do; no thinking required
- Option 2: handle with care (or the philosophical approach)
  - Use judiciously as adjunct

# Platt-Pickering Debate (1955-1968)

**Lord Robert Platt (1900-1978)**



**George W. Pickering (1904-1980)**



# Is hypertension a qualitative or a quantitative trait?

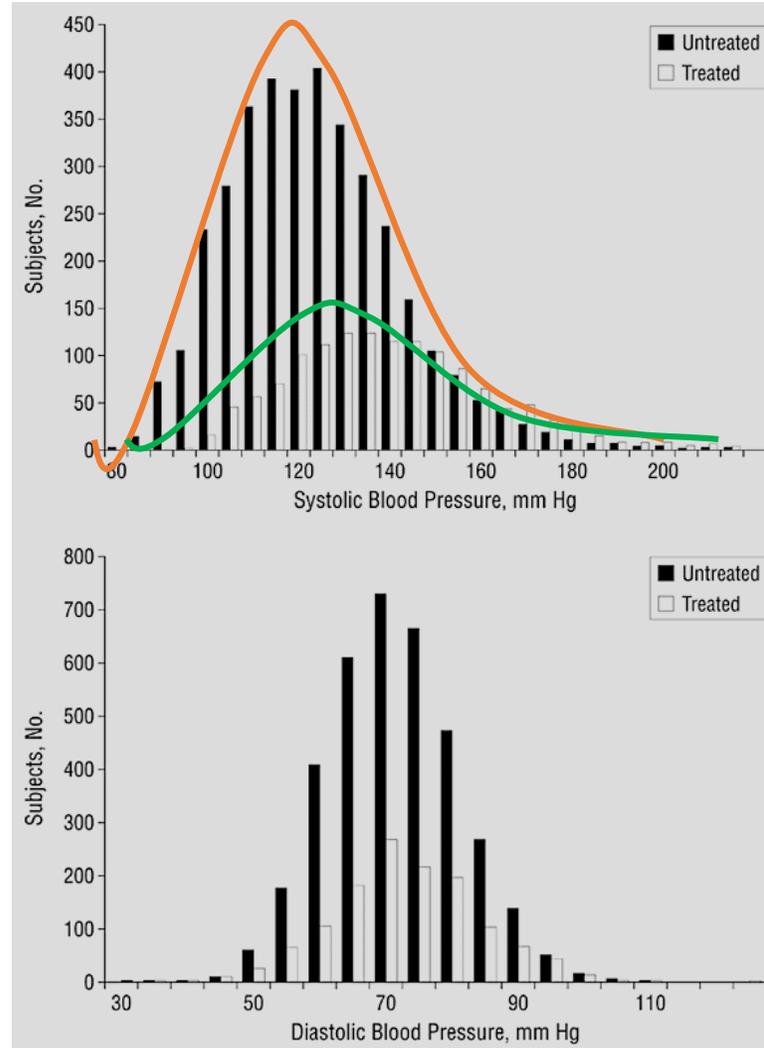
## The old Platt-Pickering debate (1940-1960):

- *Platt: hypertension is an inherited tendency to develop high blood pressure in middle life; bimodal BP distribution (NT and HT)*
- *Pickering: hypertension is a quantitative deviation from the norm: unimodal distribution of blood pressure*

# Consequences of the debate

- If Platt was right: treat only those with the 'disease'
- If Pickering was right: 'treat' the risk, thus all people above a certain threshold

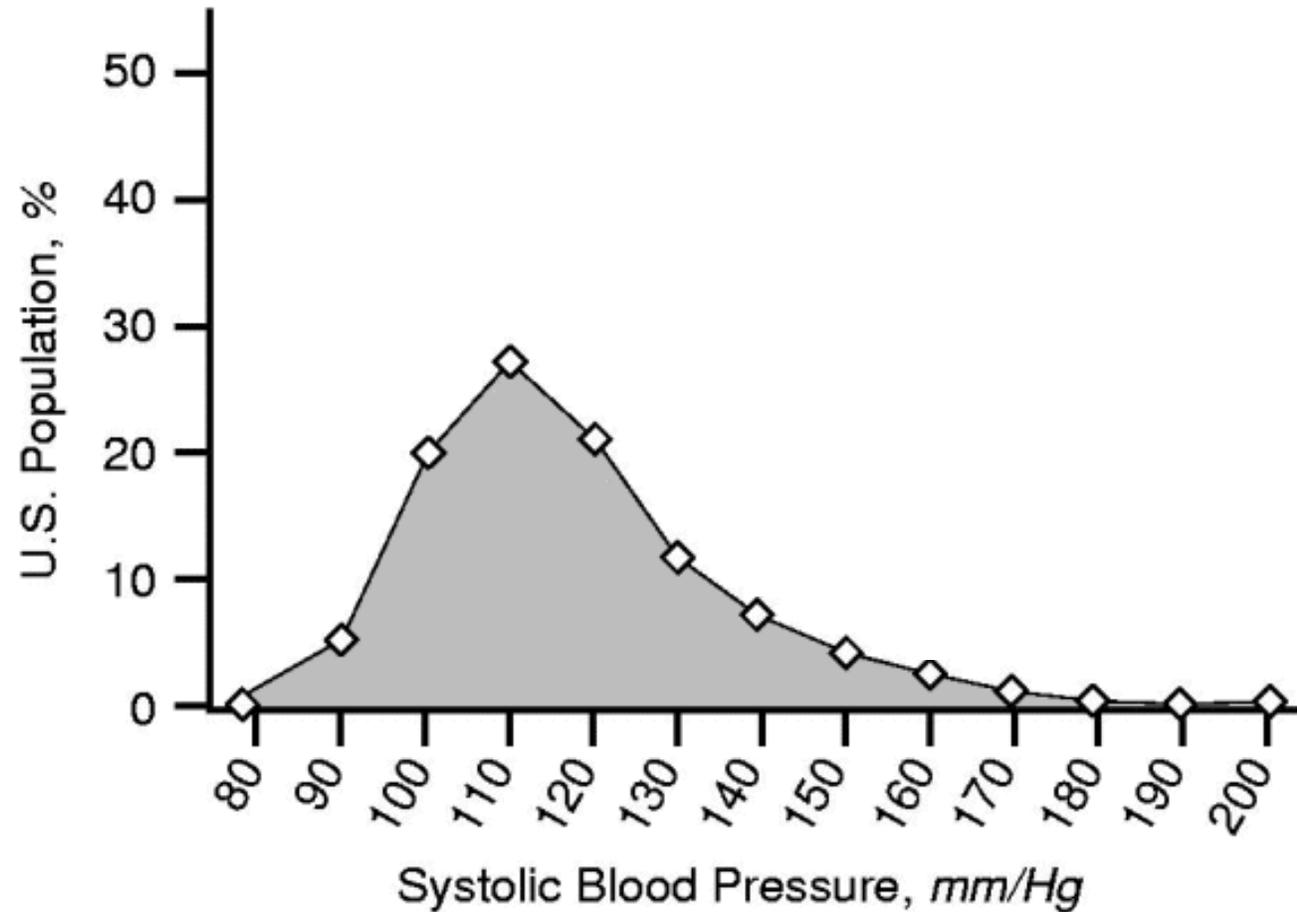
# Unimodal distribution of blood pressure in the population



Systolic and diastolic blood pressure in the Framingham population

*Arch Intern Med 1999;159:2206*

# What is still normal?



# Paul-Michel Foucault (1926-1984)



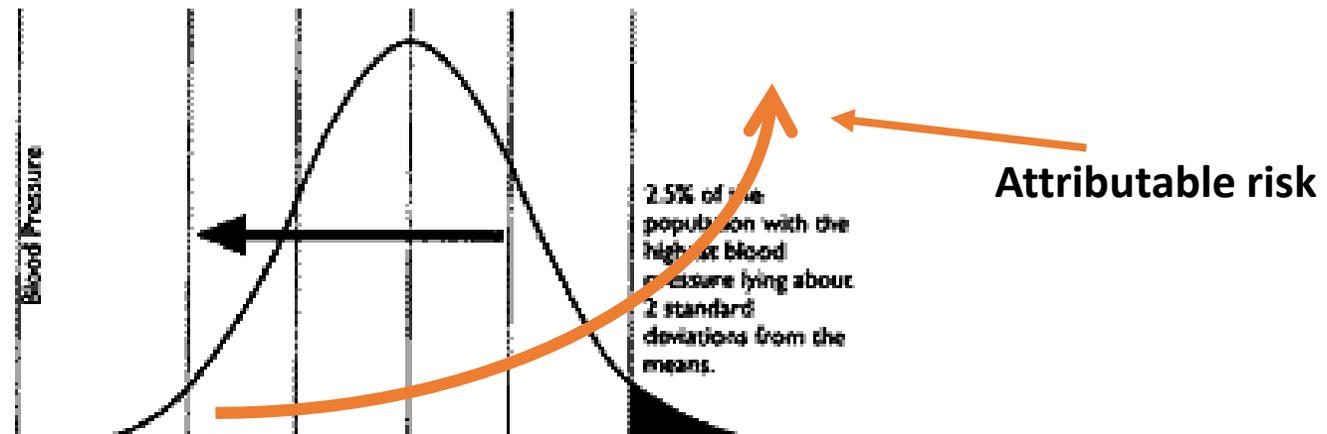
# Paul-Michel Foucault (1926-1984)

- Surveiller et punir
- Naissance de la clinique
- Naissance de la biopolitique
  
- Modern (medical) science and statistics are a way to exert power and to regulate biological and social life

# Differences between Guidelines for the Management of Arterial Hypertension: BP Levels

ESC/ESH vs. ACC/AHA Hypertension Guideline							
ESC/ESH 2018 (June)				ACC/AHA 2017 (Nov)			
Category	Systolic (mmHg)	Diastolic (mmHg)		Category	Systolic (mmHg)	Diastolic (mmHg)	
Optimal	<120	and	<80	Normal	<120	and	<80
Normal	120-129	and	80-84	Elevated BP	120-129	and	<80
High Normal	130-139	and/or	85-89	Stage 1	130-139	or	80-89
Grade 1	140-159	and/or	90-99	Stage 2	≥140	or	≥90
Grade 2	160-179	and/or	100-109	Hypertensive crisis	≥180	or	≥120
Grade 3	≥ 180	and/or	≥ 110				

# Attributable risk



**A shift in the distribution towards the left will lower the number of attributable deaths**

# Attributable risk: treatment or prevention?

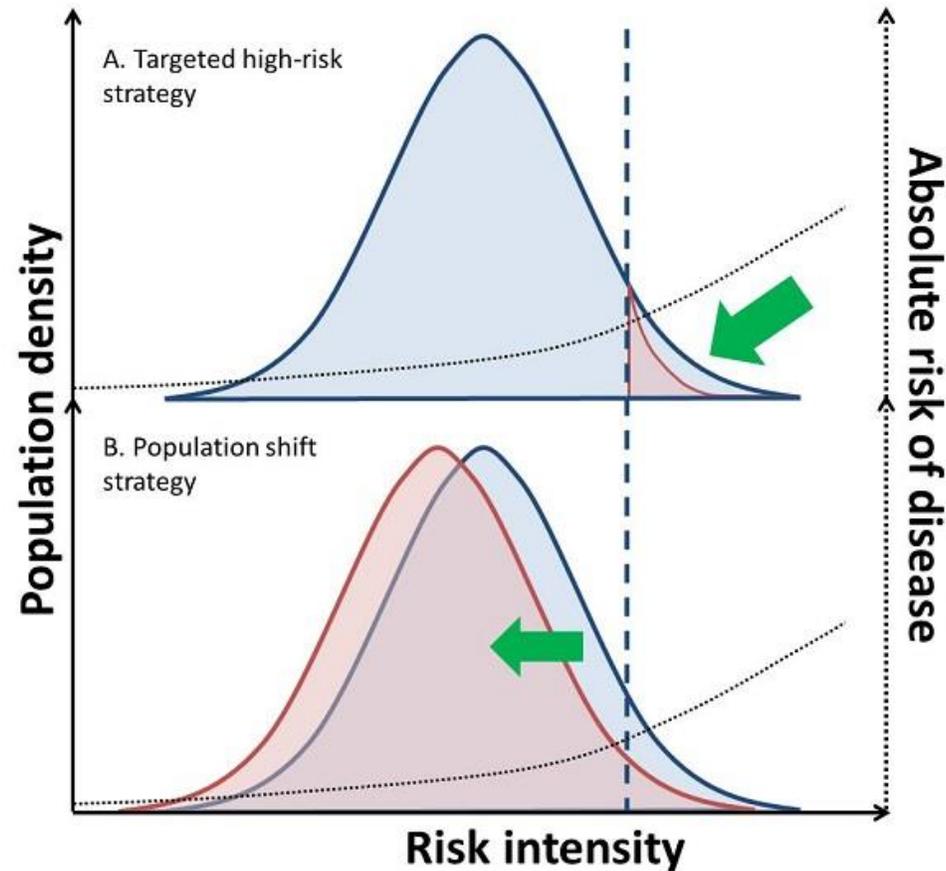
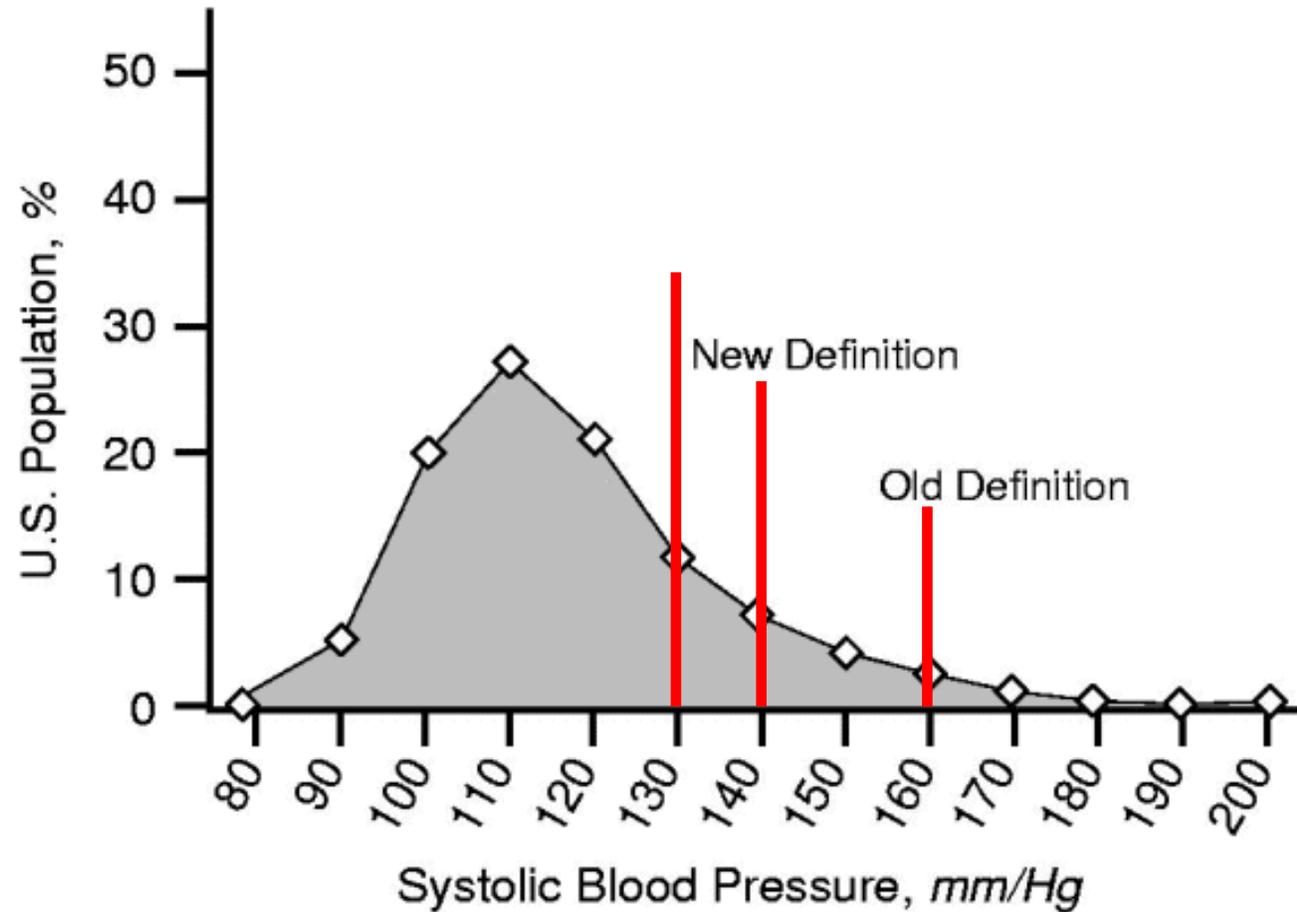
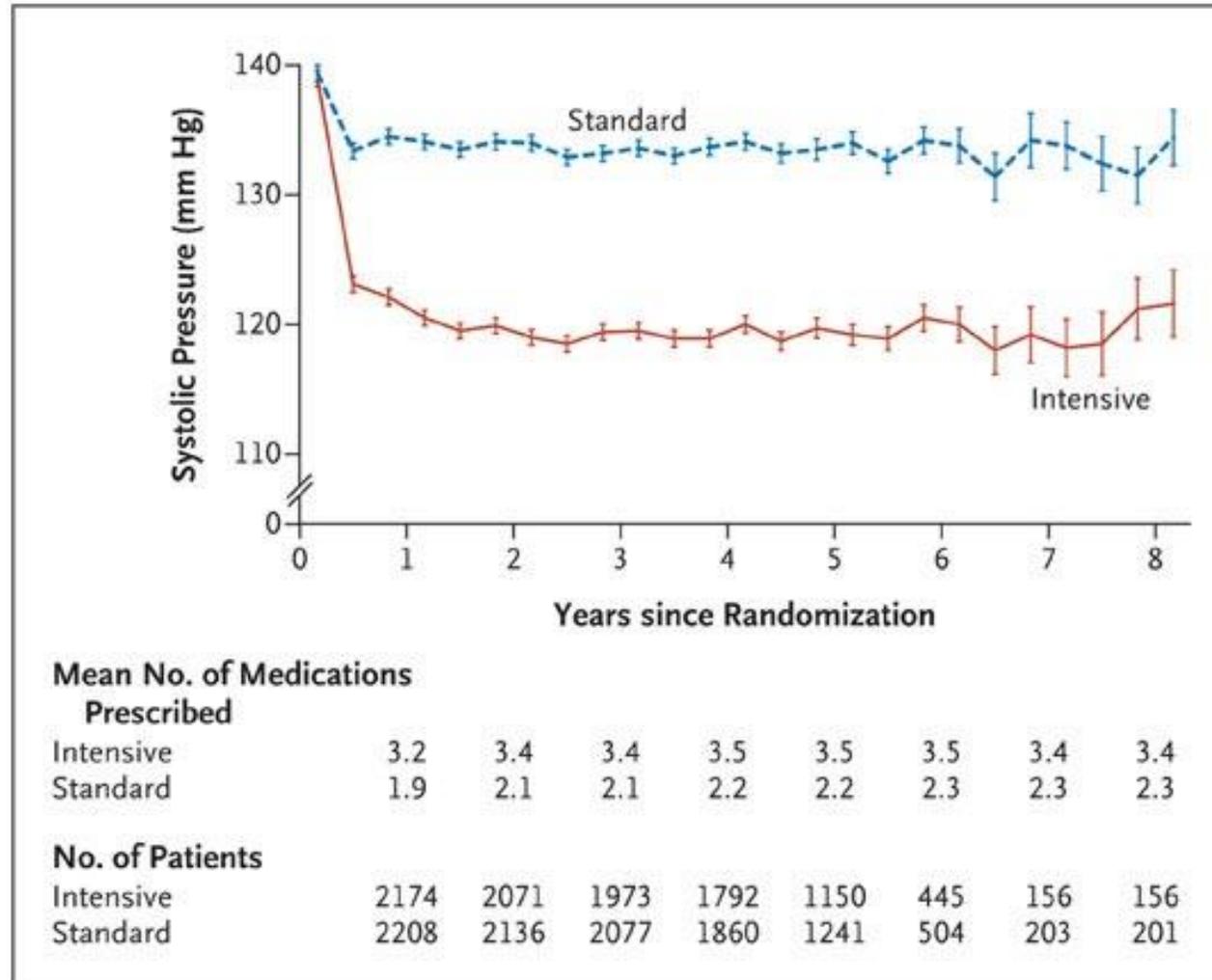


Figure 1. Illustration of disease prevention strategies.  
Inspired by Rose 1985 *IJE*.

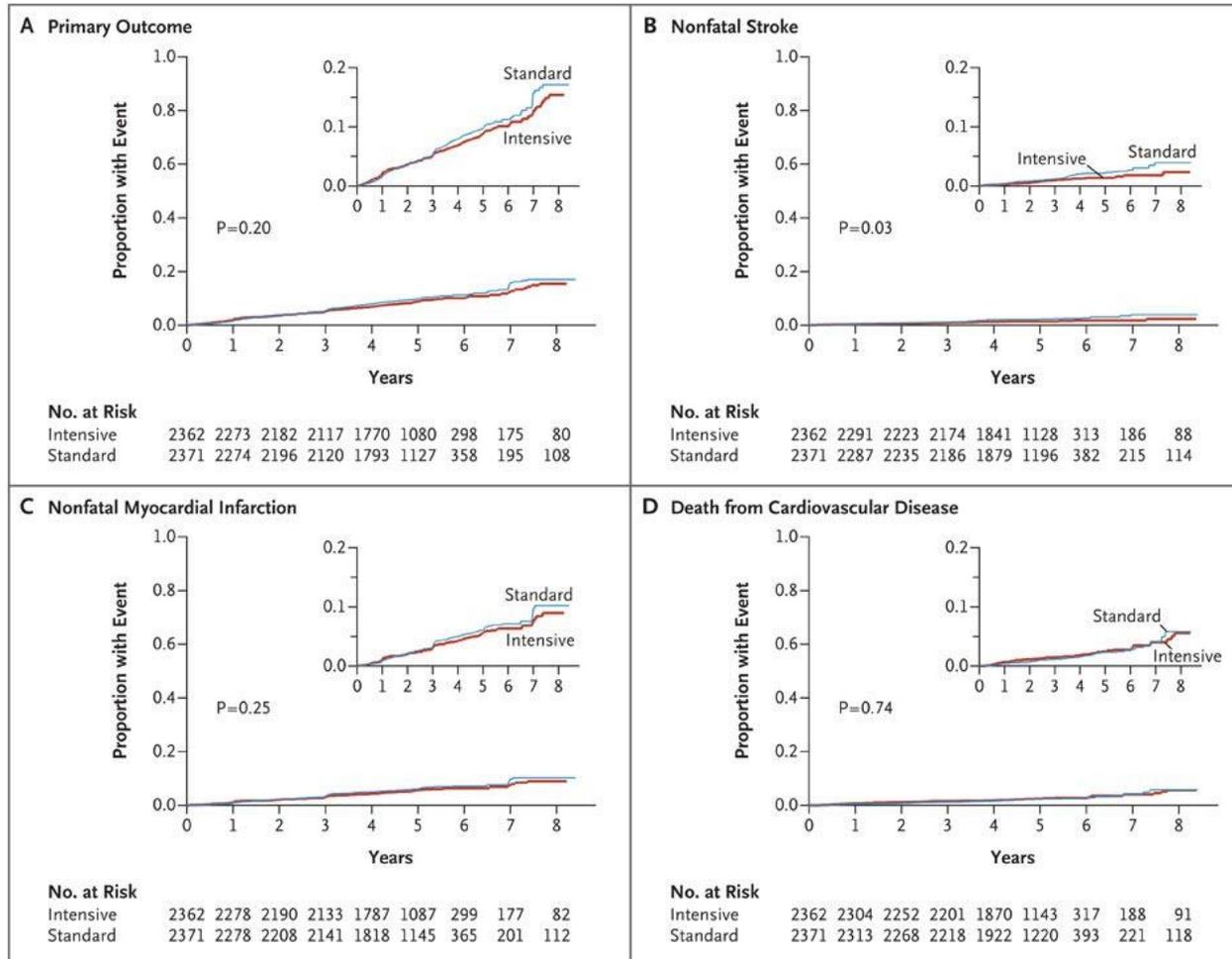
# Changing limits of normality



# ACCORD study: intensive vs less intensive BP control in DM



# ACCORD study: intensive vs less intensive BP control in DM



# SPRINT: intensive vs standard Rx

## Original Article

OPEN

### Impact of cumulative SBP and serious adverse events on efficacy of intensive blood pressure treatment: a randomized clinical trial

Oscar L. Rueda-Ochoa<sup>a,b</sup>, Lyda Z. Rojas<sup>a,b,c</sup>, Shahzad Ahmad<sup>a</sup>, Cornelia M. van Duijn<sup>a</sup>, Mohammad A. Ikram<sup>a</sup>, Jaap W. Deckers<sup>d</sup>, Oscar H. Franco<sup>a,e</sup>, Dimitris Rizopoulos<sup>f,\*</sup>, and Maryam Kavousi<sup>a,\*</sup>

# SPRINT: SAEs

**TABLE 2. Association of intensive treatment with serious adverse events during follow-up**

Characteristic	Intensive treatment, <i>N</i> = 4552	Standard treatment, <i>N</i> = 4516	HR (CI 95%)	<i>P</i> value
All serious adverse events <sup>a</sup> <i>n</i> (%)	1748 (38.40)	1676 (37.11)	1.04 (0.98–1.12)	0.210
Specific conditions of interest				
Hypotension	110 (2.42)	64 (1.42)	1.71 (1.26–2.33)	0.001
Syncope	104 (2.28)	80 (1.77)	1.29 (0.96–1.73)	0.087
Bradycardia	86 (1.89)	70 (1.55)	1.22 (0.89–1.67)	0.222
Electrolyte abnormality	142 (3.12)	102 (2.26)	1.38 (1.07–1.79)	0.012
Injurious fall <sup>b</sup>	104 (2.29)	105 (2.33)	0.98 (0.75–1.29)	0.887
Acute kidney injury or acute renal failure <sup>c</sup>	192 (4.22)	114 (2.52)	1.68 (1.33–2.12)	0.000

# SPRINT: Effect of intensive Rx

- Initially decrease of risk but this effect loses its significance after 3.4 years of follow-up
- Less sustained benefit in women, blacks, patients younger than 75 years, and in those with baseline SBP above 132 mmHg, those with prevalent CKD, CVD, and those who suffered SAEs

# SPRINT: a low DBP offsets benefit of low SBP

Minimum Baseline Diastolic (mm Hg)	Sample Size	Hazard Ratio of Treatment-Induced Diastolic Hypotension	95% Confidence Interval
55	9012	1.53	1.21-1.95
65	8046	1.67	1.24-2.26
70	7046	1.75	1.24-2.48
75	5639	1.89	1.23-2.90
80	4159	2.22	1.30-3.79

Lee et al. Am J Med 2018;  
131:1228-1233.e1

# Application of SPRINT and ACCORD-BP to the population (NHANES)

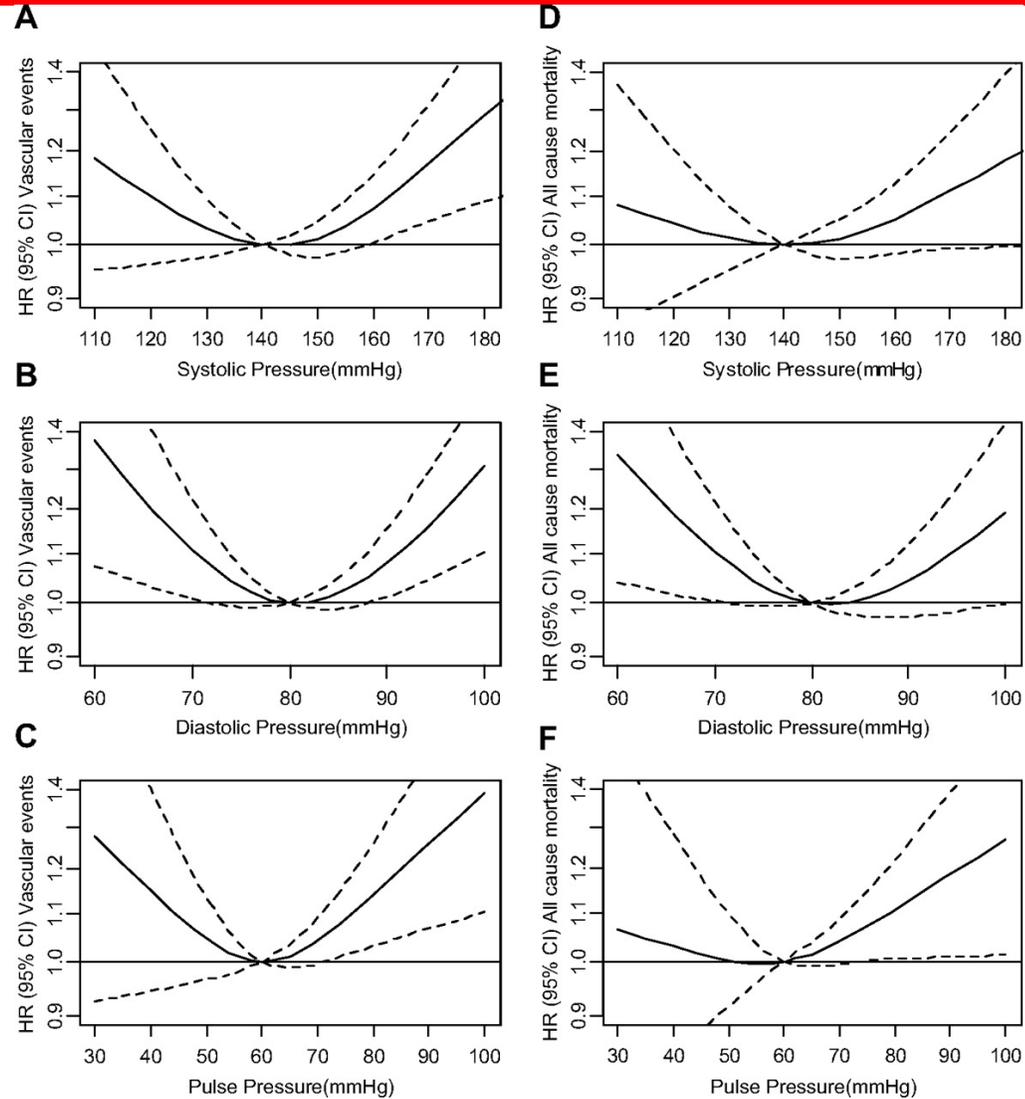
Lowering the threshold for the definition of blood pressure:

- *will substantially increase the prevalence of hypertension and*
- *the number of adults who qualify for antihypertensive treatment*

Yet:

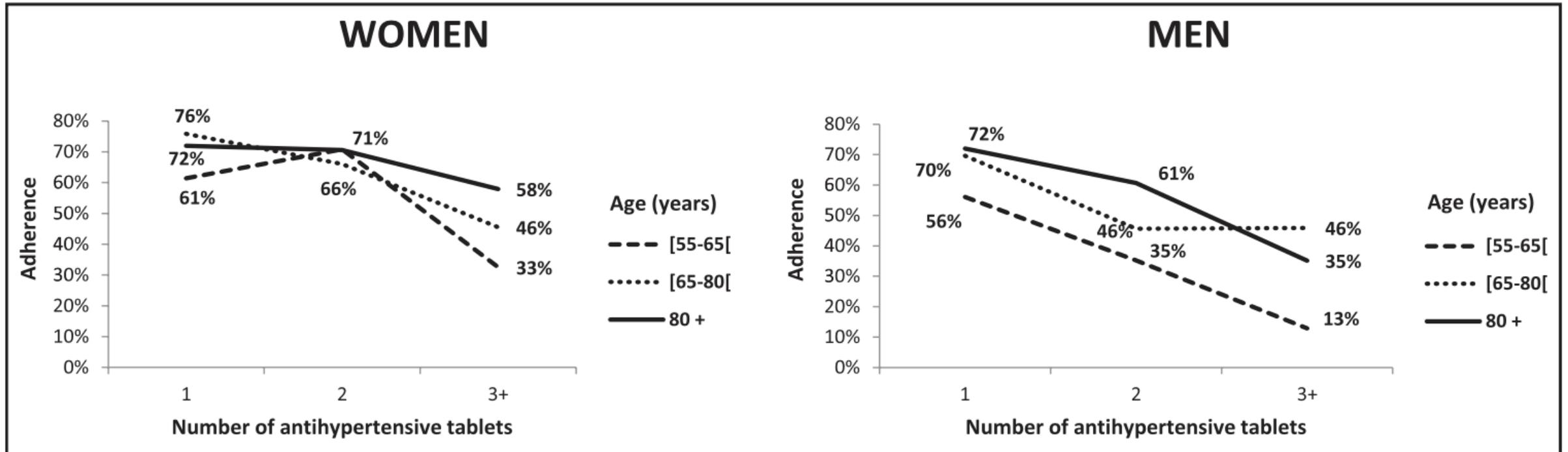
- *these individuals have a markedly lower cardiovascular risk*

# Relationship between blood pressure and the occurrence of vascular events and all-cause



# Treatment Adherence in Men and Women

Sex differences in adherence to antihypertensive treatment in patients aged above 55:  
The French League Against Hypertension Survey (FLAHS)



# Lesson 2

- Foucault-ism drives our targets to lower levels
- Benefits become progressively less when we lower the targets
- Lower targets require more medication, leading to less adherence

# Overall conclusion

- The current tendency to set lower levels for the definition of hypertension and the threshold for treatment may, in the long run, do more harm than good
- The new guidelines regarding treatment targets should be applied with great caution