

# Increased all-cause mortality with intensive blood-pressure control in patients with a baseline systolic blood pressure of $\geq 160$ mmHg and a Lower Framingham risk score: a cautionary note from SPRINT

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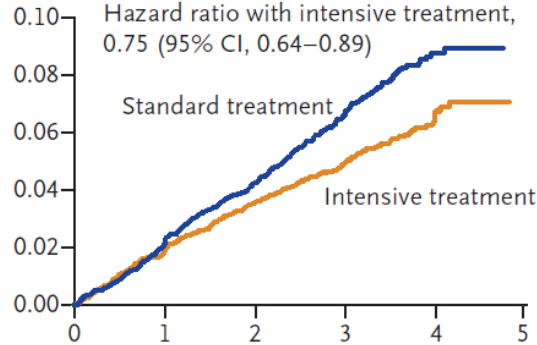
# Declaration of interest

- I have nothing to declare

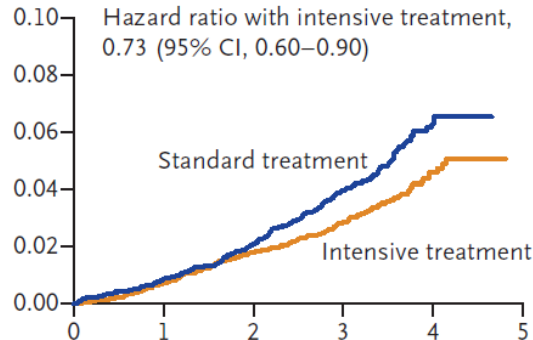
# Background

- J curve: vulnerability to absolute BP value or BP reduction?
- Universal or individualized BP target?

## SPRINT: Primary outcome



## SPRINT: Death from any cause



N Engl J Med 2015;373:2103-2116.

Chiang CE, Wang TD, et al. Acta Cardiol Sin 2017;33:213-225.

Subgroup	HR	P*
Overall	0.75 (0.64,0.89)	
No Prior CKD	0.70 (0.56,0.87)	0.36
Prior CKD	0.82 (0.63,1.07)	
Age < 75	0.80 (0.64,1.00)	0.32
Age ≥ 75	0.67 (0.51,0.86)	
Female	0.84 (0.62,1.14)	0.45
Male	0.72 (0.59,0.88)	
African-American	0.77 (0.55,1.06)	0.83
Non African-American	0.74 (0.61,0.90)	
No Prior CVD	0.71 (0.57,0.88)	0.39
Prior CVD	0.83 (0.62,1.09)	
SBP ≤ 132	0.70 (0.51,0.95)	0.77
132 < SBP < 145	0.77 (0.57,1.03)	
SBP ≥ 145	0.83 (0.63,1.09)	

\*Unadjusted for multiplicity

Greater BP reduction, smaller risk reduction!?

## Purpose and key points about methods

- **Purpose:** To examine whether the ideal targets for SBP to reduce all-cause mortality and cardiovascular events **vary** among persons with **different baseline SBP and cardiovascular risks** (seeing the devil in the details!).
- Access to the **patient-level data** of SPRINT through National Heart, Lung, and Blood Institute BioLINCC data repository after approval from the Institutional Review Board at National Taiwan University Hospital
- Outcomes: (1) Primary outcome (MI, non-MI ACS, stroke, acute decompensated HF, and CV death), (2) all-cause death, (3) primary outcome + all-cause death, and (4) **non-CV death** (all-cause death – CV death, including undetermined/not yet adjudicated cases)

# Results: Step 4, comparing patients with a baseline systolic BP of $\geq 160$ mmHg and a Framingham 10-yr risk score of $\leq 31.3\%$ to the rest of SPRINT participants

SBP-Framingham 10-yr risk score combination

risk score combination	Intensive		Standard			HR (95% CI)*	P <sub>int</sub> †	
	no. of patients (%)	% per year	no. of patients (%)	% per year				
Primary outcome								
SBP ≥160/risk ≤31.3%	8/244 (3.3)	1.06	9/236 (3.8)	1.19		0.95 (0.37-2.46)	0.648	
All others	235/4434 (5.3)	1.68	310/4447 (7.0)	2.24		0.75 (0.63-0.89)		
All-cause death								
SBP ≥160/risk ≤31.3%	12/244 (4.9)	1.55	4/236 (1.7)	0.52		3.12 (1.00-9.69)	0.009	
All others	143/4434 (3.2)	1.00	206/4447 (4.6)	1.44		0.69 (0.56-0.86)		
Primary outcome and all-cause death								
SBP ≥160/risk ≤31.3%	16/244 (6.6)	2.11	11/236 (4.7)	1.45		1.53 (0.71-3.29)	0.075	
All others	316/4434 (7.1)	2.26	412/4447 (9.3)	2.98		0.76 (0.66-0.88)		
Non-cardiovascular death								
SBP ≥160/risk ≤31.3%	10/244 (4.1)	1.29	4/236 (1.7)	0.52		2.60 (0.81-8.31)	0.036	
All others	108/4434 (2.4)	0.75	141/4447 (3.2)	0.99		0.76 (0.59-0.98)		
					0.1	1.0	10.0	
					Intensive Better		Standard Better	

0.1 1.0 10.0

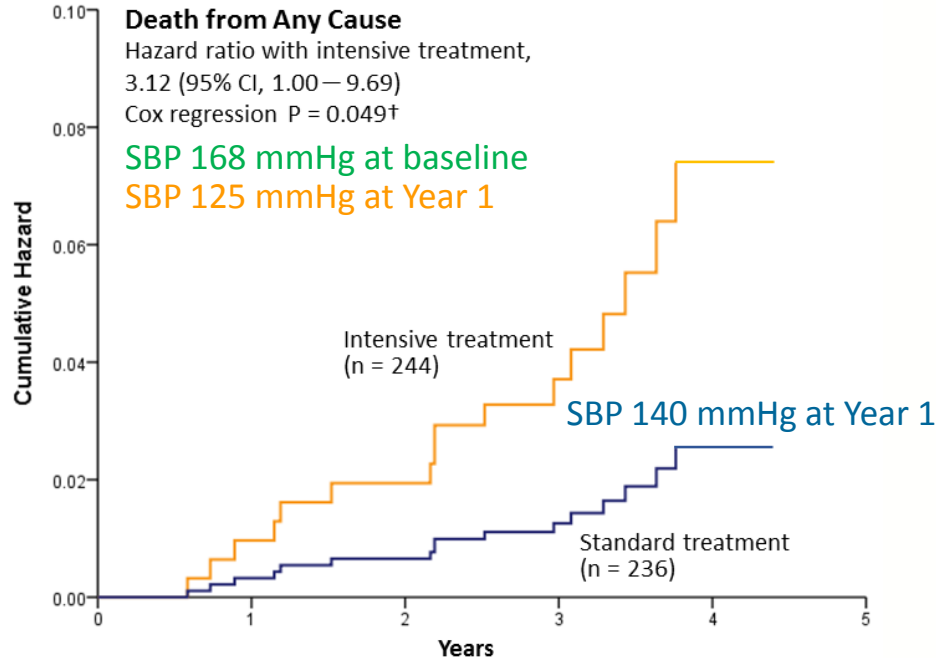
Intensive Better Standard Better

\*Adjusted for age (treated as quintile) and sex in the subgroup of SBP  $\geq 160$  mmHg and 10-yr risk score of  $\leq 31.3\%$

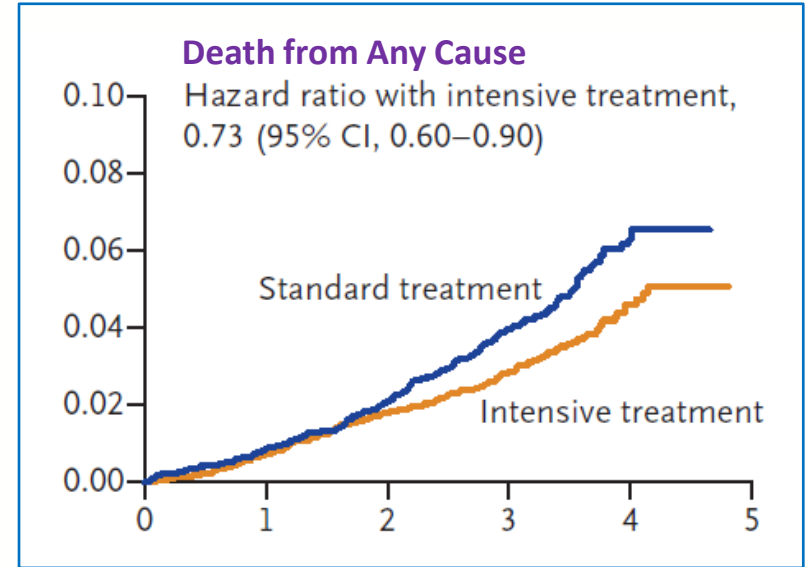
†Adjusted for age (treated as quintile) and sex and assuming common baseline hazard across clinic

# Results: Step 4, comparing patients with a baseline systolic BP of $\geq 160$ mmHg and a Framingham 10-yr risk score of $\leq 31.3\%$ to the rest of SPRINT participants

## SPRINT-subgroup: Baseline SBP $\geq 160$ mmHg & 10-yr Framingham risk score $\leq 31.3\%$



## SPRINT-original



$^\dagger$  Adjusted for age (treated as quintile) and sex, and assuming common baseline hazard across clinic site due to small sample size

## Conclusions

- Among the SPRINT participants with a baseline systolic BP of  $\geq 160$  mmHg and a lower 10-year Framingham risk score ( $\leq 31.3\%$ , median), targeting a systolic BP of  $< 120$  mmHg compared with  $< 140$  mmHg resulted in an approximate **3-fold risk of death from any cause**  
**Seeing the devil in the details!**
- Despite of the hypothesis-generating nature, it seems prudent to recommend **targeting an SBP of  $< 140$  mmHg** rather than  $< 120$  mmHg in patients with stage 2 hypertension and a 10-year Framingham risk score of  $\leq 30\%$  (close to 31.3%)
- There was an intricate interaction between each individual's **baseline blood pressure**, their **inherent cardiovascular risk**, and their **degree of blood pressure reduction**. We have to consider all three of these elements in managing hypertensive patients