



Thomas Giles, MD

**Hypertension: Further
Learning from SPRINT**

**Hector O Ventura, MD, FACC,
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Ochsner Health System

**Nothing to Disclose except that I
have never been in Guideline
Committee but I have been a peer
reviewer of all the Cardiovascular
Guidelines**



1943



1945

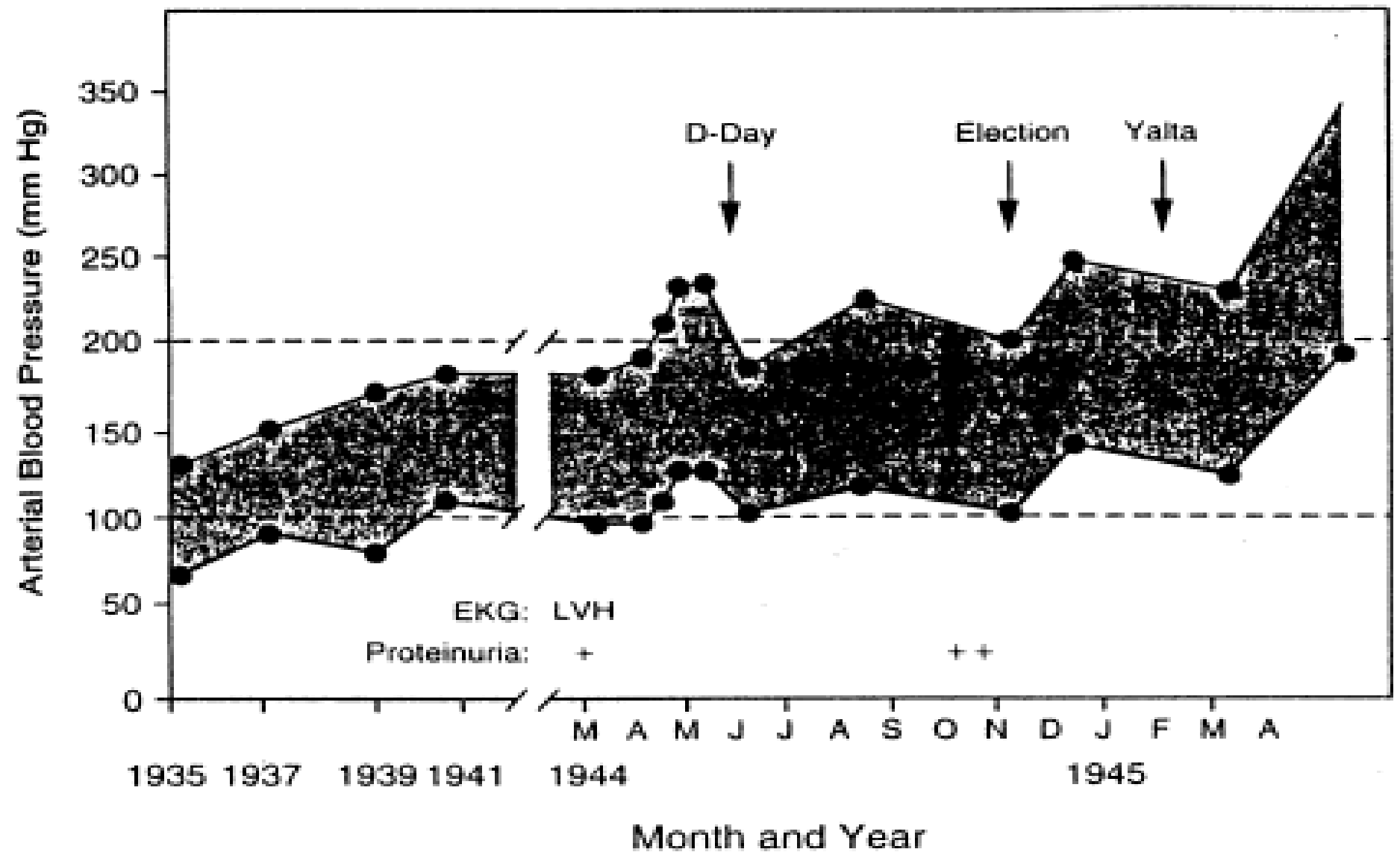


Figure 2. Diastolic and Systolic Arterial Pressure of Franklin D. Roosevelt from 1935 until His Death on April 12, 1945. EKG denotes electrocardiogram, and LVH left ventricular hypertrophy. Data are from the diary of Dr. Howard G. Bruenn.²

Hypertension

“...for aught we know
**hypertension might an
important compensatory
mechanism**, which we should
not tampered with even if we
know how to control it”

Paul D White, MD

SPRINT Highlights

- **The optimal target for BP during treatment of high BP has been controversial.**
- **Observational studies identify a direct, continuous relationship between BP and risk of CVD.**
- **SPRINT provides strong support for intensive treatment of high BP, especially in those with a profile similar to those included in the trial. (50 and older who had a systolic blood pressure between 130 and 180) Those under 75 needed to have evidence of heart disease, kidney disease or other risk factors**

SPRINT Highlights

- **Experience in other BP lowering trials is consistent with SPRINT and the benefit of intensive BP probably applies to other categories of patients at high risk for CVD who were not studied in SPRINT.**
- **Intensive BP management warrants careful monitoring for adverse effects of treatment.**

Blood Pressure Treatment and the Use of ASCVD risk estimation to Guide Drug Treatment of Hypertension

Recommendations for BP Treatment Threshold and Use of ASCVD Risk Estimation* to Guide Drug Treatment of Hypertension

COR	LOE	Recommendations
I	SBP: A	1. Use of BP-lowering medications is recommended for secondary prevention of recurrent CVD events in patients with clinical CVD and an average SBP of 130 mm Hg or higher or an average DBP of 80 mm Hg or higher, and for primary prevention in adults with an estimated 10-year atherosclerotic cardiovascular disease (ASCVD) risk of 10% or higher and an average SBP 130 mm Hg or higher or an average DBP 80 mm Hg or higher.
	DBP: C-EO	
I	C-LD	2. Use of BP-lowering medication is recommended for primary prevention of CVD in adults with no history of CVD and with an estimated 10-year ASCVD risk <10% and an SBP of 140 mm Hg or higher or a DBP of 90 mm Hg or higher

* ACC/AHA Pooled Cohort Equations to estimate 10-y risk of ASCVD. ASCVD was defined as a first nonfatal MI or CHD death, or fatal or nonfatal stroke among adults free of CVD.

According to New Hypertension Guidelines

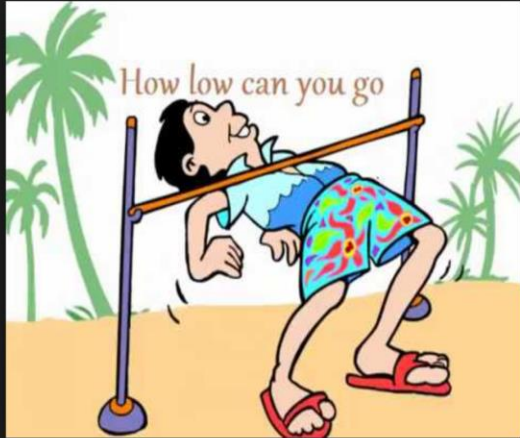
- Prevalence (BP level $\geq 130/80$ mmHg) 45.4% or 105.3 million of US adults
- Proportion of Individuals that require treatment 35.9%
- Achieving 2017 BP goals will reduce 610,000 CV events and 334,000 total deaths in USA
- Implementing 2017 guideline is estimated to increase 62,000 hypotension and 79,000 acute kidney injury

JAMA Cardiol. 2018;3(7):572-581

How Low Can You Go???
Or Hypertension according
to Chubby Checker

**Hector O Ventura, MD, FACC,
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**“...Jack be limbo, Jack be quick
Jack go unda limbo stick
All around the limbo clock
Hey, let's do the limbo rock
Limbo lower now
Limbo lower now
How low can you go...”**

What is a Normal Blood Pressure?

**The Answer is:
DEPENDS**

Animal	Systolic	Diastolic	MAP
Dogs *	110-160	85-120	85-120
Cats	110-160	85-120	85-120
Mice	120	71	
Rats	129	91	
Giraffe	280	180	
Horse	112±14	70±14	
Elephant	178.6 +/- 2.94	118.7 +/- 3.10	



1200 x 646



450 x 650

**Yanomami
BP 95/65**



**Kuna BP
110/70**

What is a Normal Blood Pressure

- 1970 JCN-1 < 160/95
- After many trials <140/90
- ESC/ESH Guidelines <140/90 and in diabetics <130/90
- Hypertension Guidelines <130/80



Blood Pressure

“The normal blood pressure is the one which keeps out of shock”

Sir George Pickering

EFFECTS OF TREATMENT ON MORBIDITY IN HYPERTENSION V.A. COOPERATIVE STUDY (DIASTOLIC BP 90-114 mm Hg)

Hypertensive Complication

CVA

Coronary Artery Disease

CHF

Accelerated Hypertension

**Placebo
(n=194)**

20

13

11

4

48 *

**Treated
(n=186)**

5

11

0

0

16 *

*** Statistically Significant Benefit Derived At Diastolic BP
Levels Of 105 mm Hg And Greater**

**V.A. Cooperative Study Group:
JAMA 1970; 213: 1143.**

EFFECTS OF TREATMENT ON MORBIDITY IN HYPERTENSION

V.A. COOPERATIVE STUDY

(DIASTOLIC BP 115-129 mm Hg)

<u>Hypertensive Complications</u>	Placebo (n=70)	Treated (n=73)
Retinopathy (Gr.III/IV)	7	0
Accelerated Hypertension	3	0
Renal Failure	3	0
Dissecting Aneurysm	3	0
Retinopathy With CHF	2	0
Stroke	2	0
Sudden Death	1	0
Drug Reaction	0	1
	<hr style="width: 50px; margin: 0 auto;"/> 21	<hr style="width: 50px; margin: 0 auto;"/> 1

V.A. Cooperative Study Group:
JAMA 1967; 202: 116.

Controversies or Further Learnings

After Sprint

- **The results should not be considered a mandate for people to run out and get treated so their blood pressures are below 120**
- **The potential benefits of lowering blood pressure must be weighed against harms**
- **There is a need of more information about the balance of risks and benefits for each person so that the choice can be personalized**

Table 2. Primary and Secondary Outcomes and Renal Outcomes.*

Outcome	Intensive Treatment		Standard Treatment		Hazard Ratio (95% CI)	P Value
	<i>no. of patients (%)</i>	<i>% per year</i>	<i>no. of patients (%)</i>	<i>% per year</i>		
All participants	(N=4678)		(N=4683)			
Primary outcome†	243 (5.2)	1.65	319 (6.8)	2.19	0.75 (0.64–0.89)	<0.001
Secondary outcomes						
Myocardial infarction	97 (2.1)	0.65	116 (2.5)	0.78	0.83 (0.64–1.09)	0.19
Acute coronary syndrome	40 (0.9)	0.27	40 (0.9)	0.27	1.00 (0.64–1.55)	0.99
Stroke	62 (1.3)	0.41	70 (1.5)	0.47	0.89 (0.63–1.25)	0.50
Heart failure	62 (1.3)	0.41	100 (2.1)	0.67	0.62 (0.45–0.84)	0.002
Death from cardiovascular causes	37 (0.8)	0.25	65 (1.4)	0.43	0.57 (0.38–0.85)	0.005

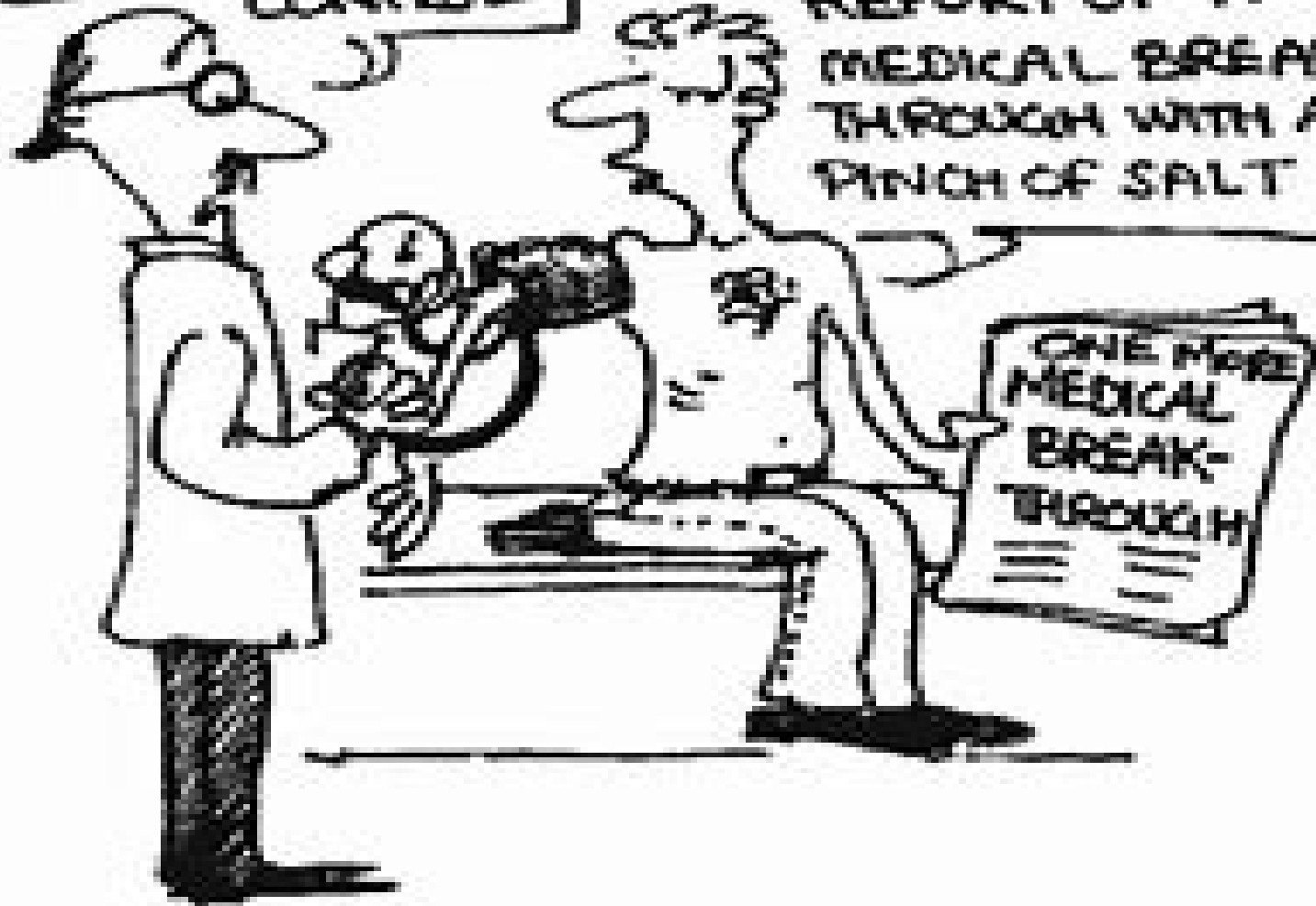
- Only 2 subgroups that were statistically significant
 - Heart failure with ARR 0.84%
 - Death from CV cause with ARR 0.63%
- Once pooled, primary outcome becomes significant
 - ARR 1.6%
- Cannot conclude death from any cause a result of BP lowering (Remember older population, mean age 68)
- Few patients were untreated at baseline, about 9%,| so SPRINT provides little if any insight regarding BP lowering medication initiation for untreated people with SBP 130-139

Life Style Modifications

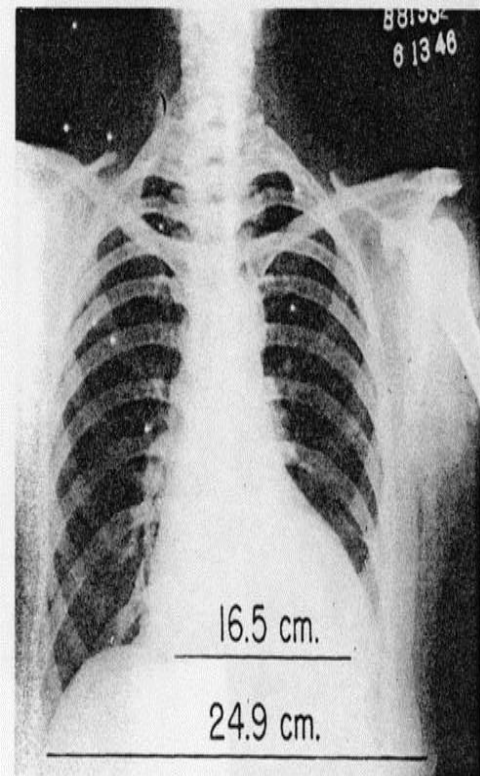
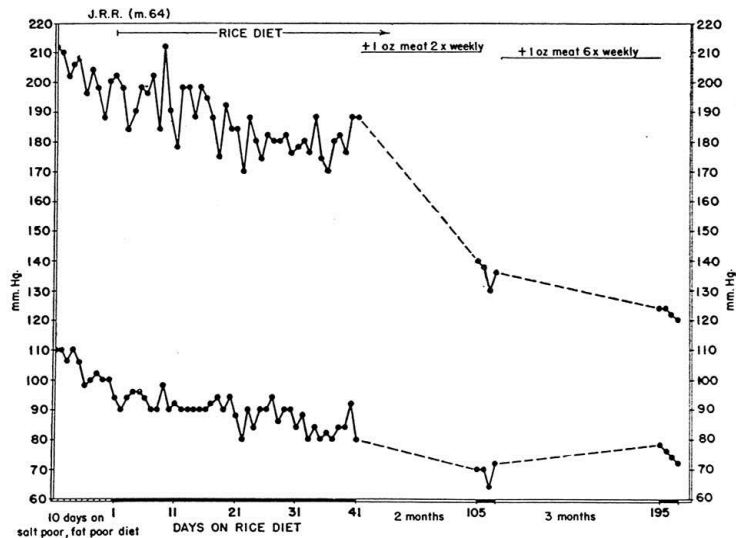
MY GOD,
YOUR HYPERTENSION
IS OUT OF
CONTROL

THAT'S BECAUSE,
DOC, YOU TOLD ME
TO TAKE EVERY
REPORT OF A
MEDICAL BREAK-
THROUGH WITH A
PINCH OF SALT

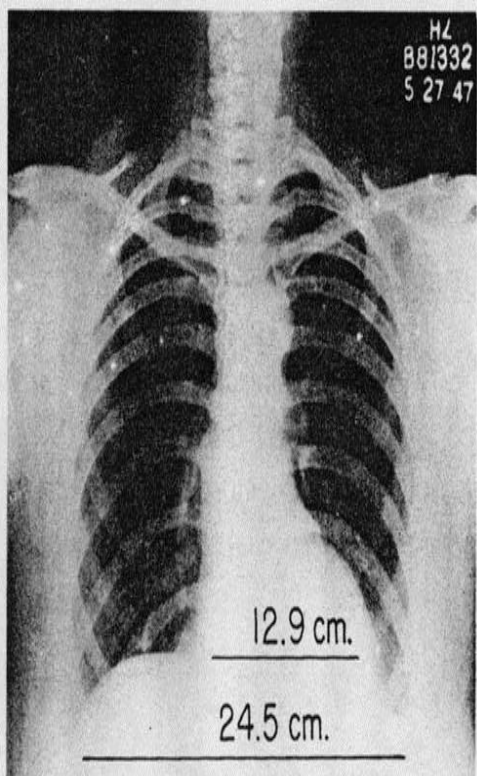
ONE MORE
MEDICAL
BREAK-
THROUGH



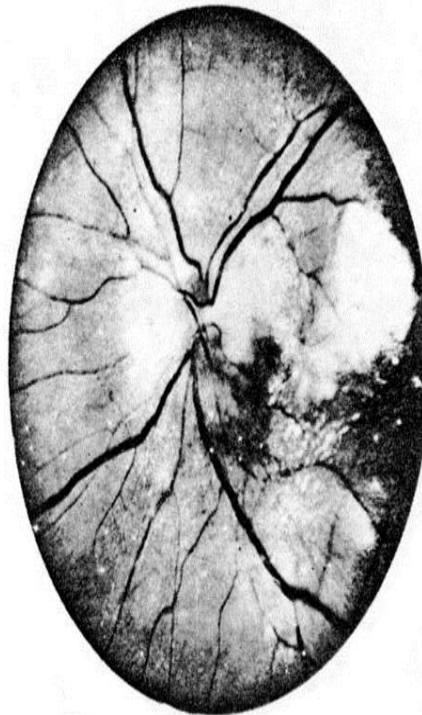
Rice Diet in Hypertension—Kempner



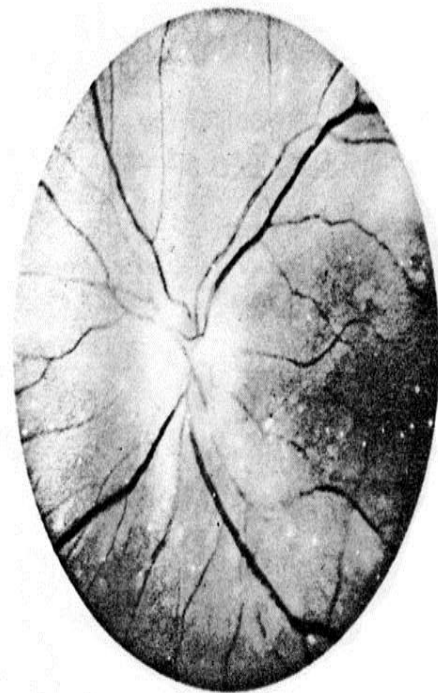
A



B



2-21-47



Left

9-23-47



“It is insipid, unappetizing and monotonous and demands great care in its preparation. Even the, its deadly monotony tends to make it intolerable unless the physician can infuse into the patient some of the aestheticism of the religious zealot”

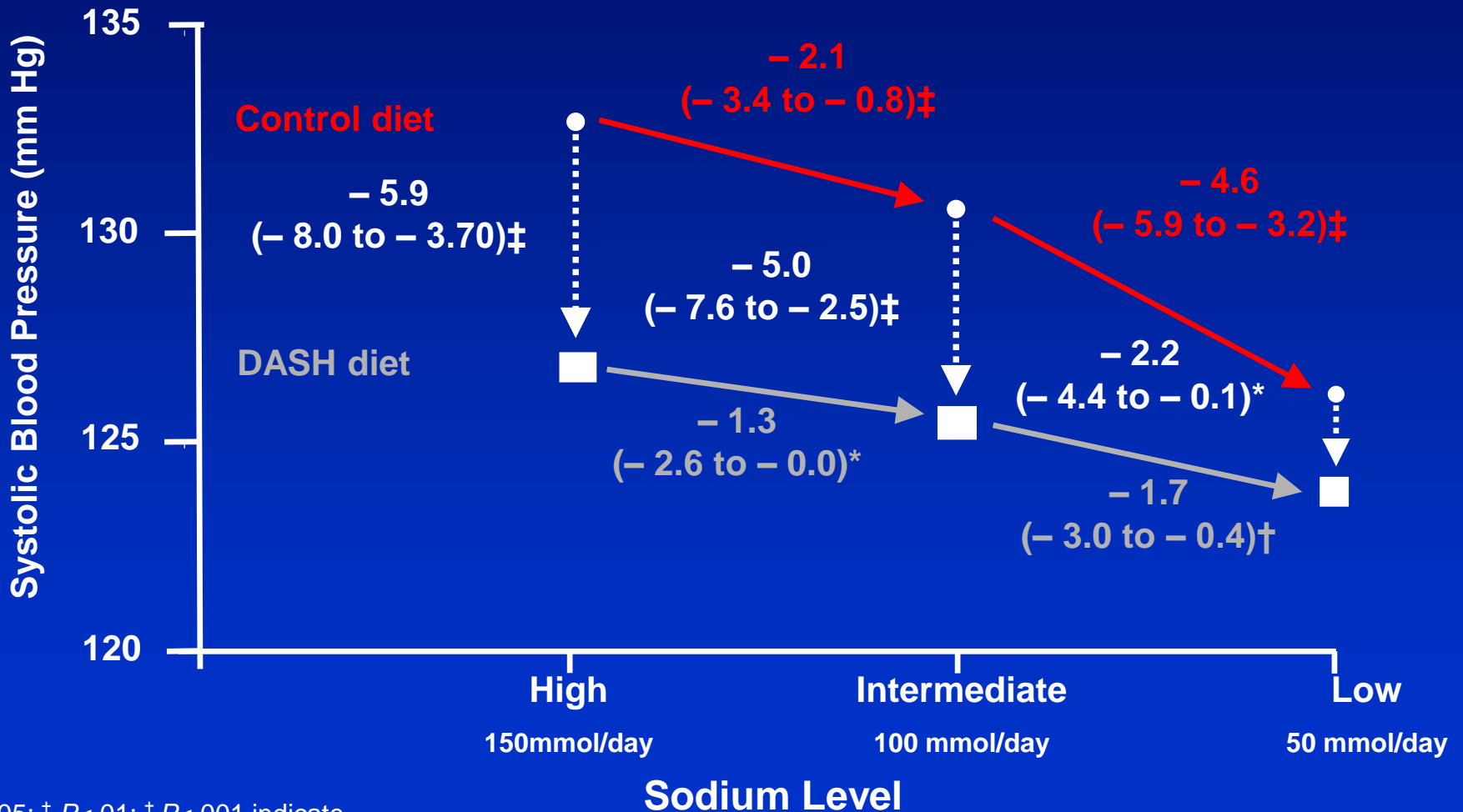
“I say quite remarkable! But it is rather difficult to tell what is due to the rice and what is due to Kempner”

DASH Diet: Effects on SBP

High in Fruits, Vegetables, Non-fat Dairy, Non-meat Protein

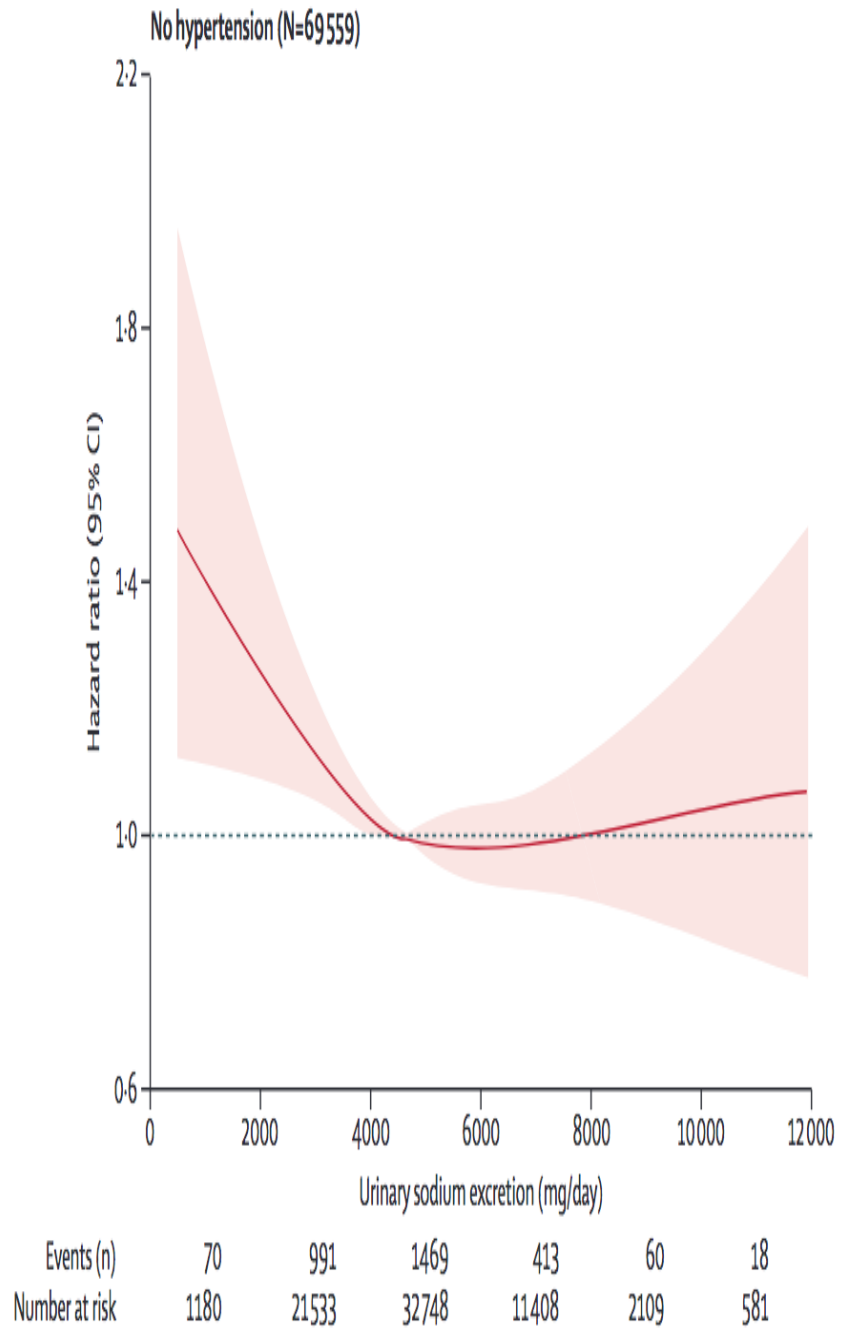
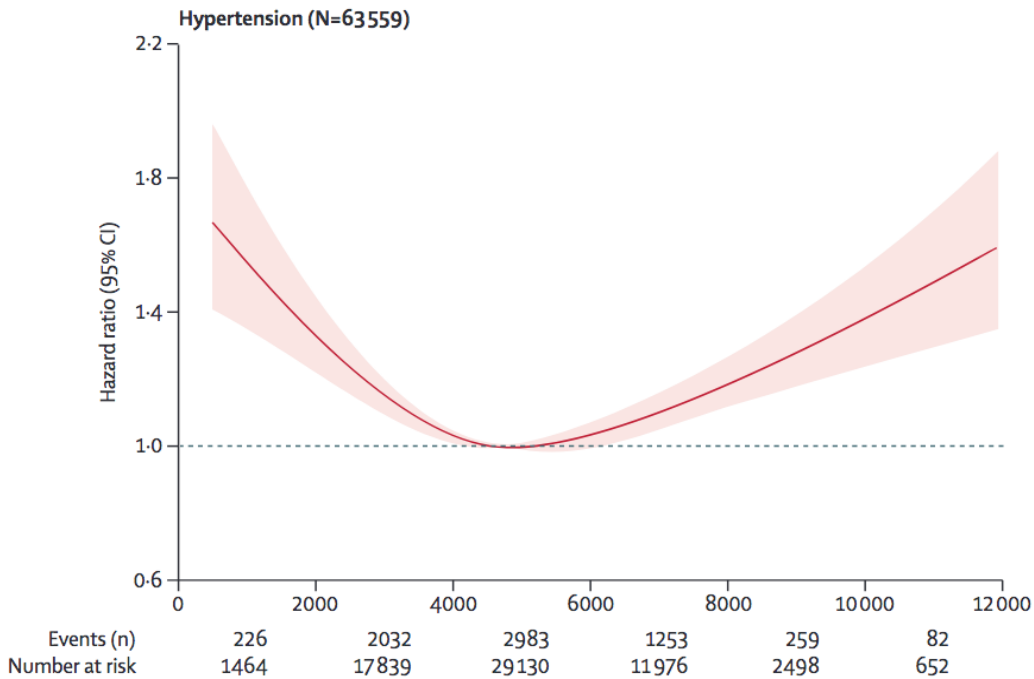
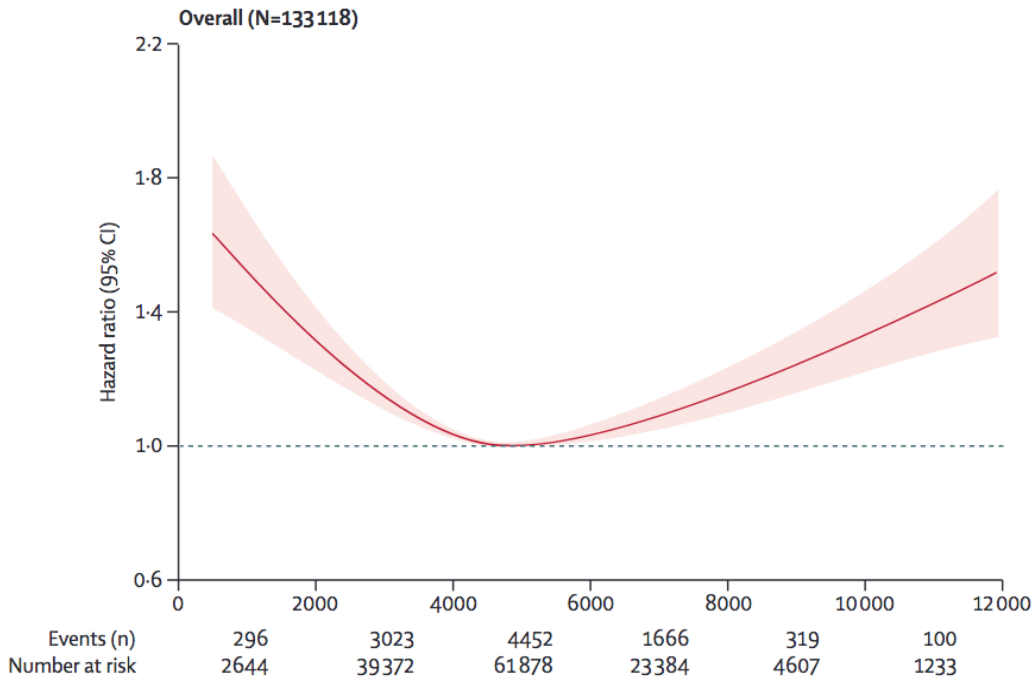
The DASH Eating Plan—Available at:

<http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/>

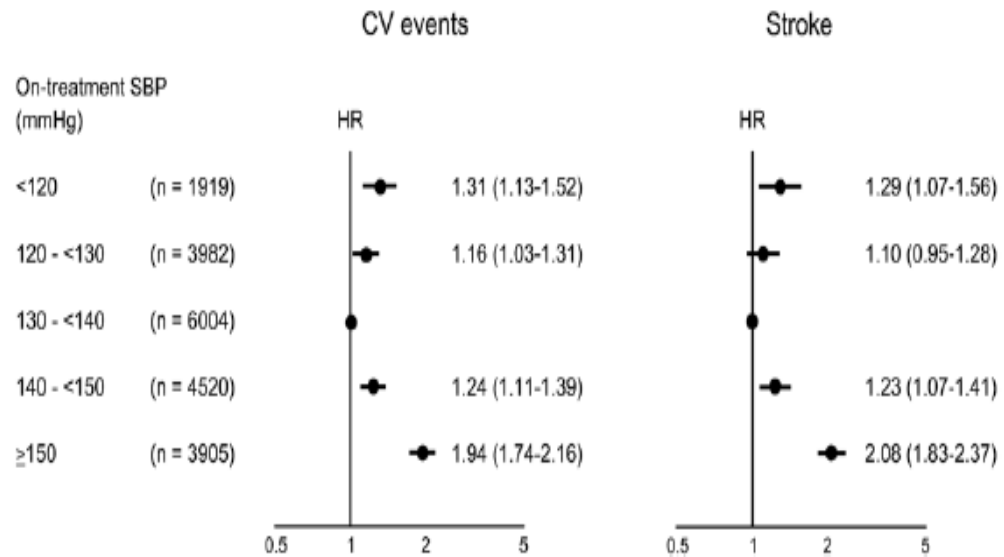
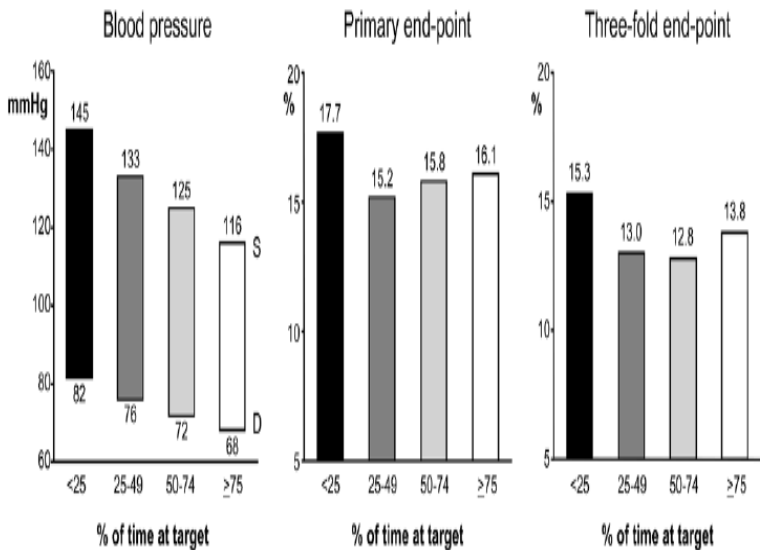


* $P < .05$; † $P < .01$; ‡ $P < .001$ indicate significant differences between groups or between dietary sodium categories.

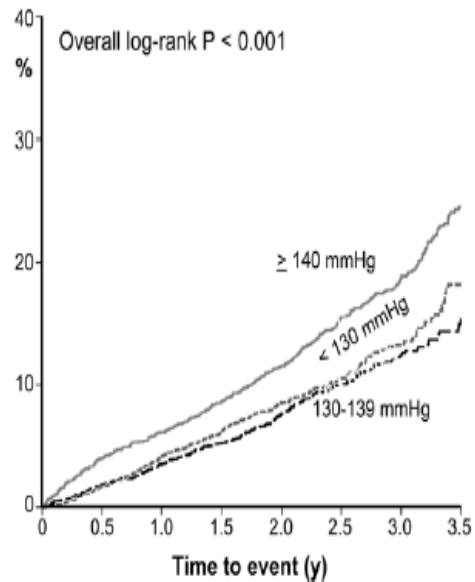
Sodium Level



The Proverbial J Curve



Cumulative CV event rate



Adjusted Risk (all-cause mortality)
(pts with SBP > 130 mmHg)

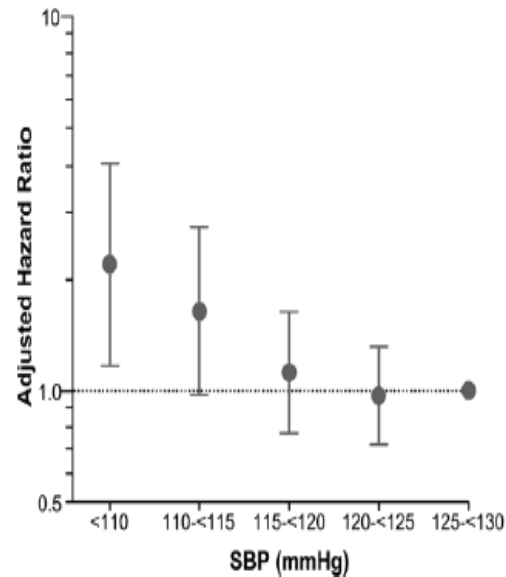
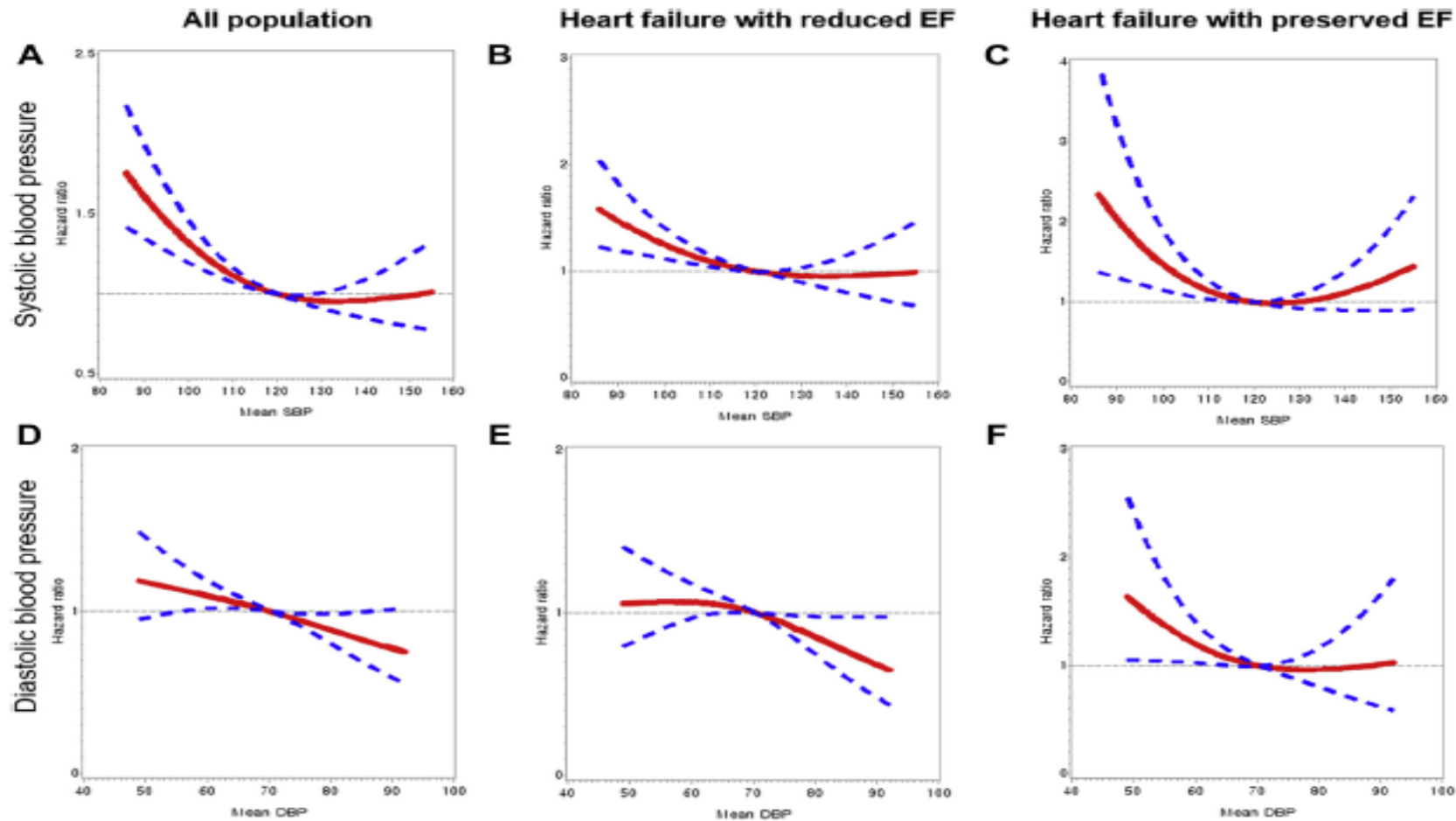


FIGURE 3 Restricted Cubic Splines Model for Heart Failure Readmission Due to Heart Failure Aggravation According to On-Treatment BP



J Am Coll Cardiol HF 2017;5:810–9

The Hypertension Paradox

“This study, and others, have shown that there is a close relationship between SBP changes and CVD morbidity and mortality in patients with HF. This is called the BP paradox in HF and is contrary to the majority of CVD, where a high BP is an adverse prognostic sign...”

Ventura, HO *European Journal of Heart Failure* (2017) 19, 843–845

Final Thoughts



“I limit myself to 1 glass of wine daily!”

Exercise is Good For You?



Endurance exercise kills! Beware.

Cheboygan Times-Standard

On Saturday, a teenage girl training for an IronMan Triathlon dies w

BBC NEWS

Runner dies after London Marathon

A 22-year-old runner who was taken ill after completing the London Marathon has died, race organisers have said.



Triathlete died of a heart attack

He collapsed at Cohasset event

By Mac Daniel, Globe Staff | July 10, 2007

Soldier collapses, dies during Country Music Marathon

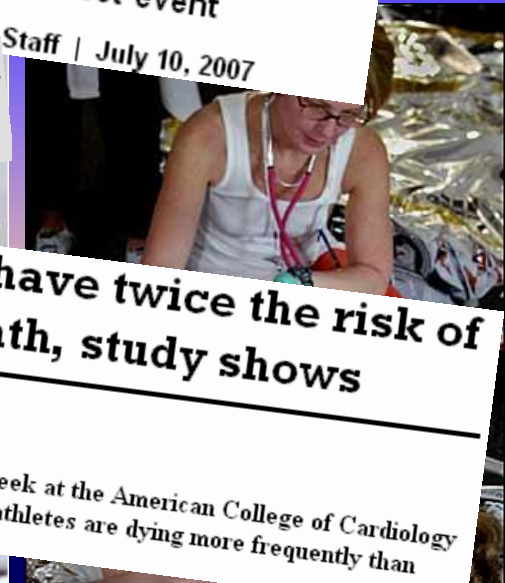
The Associated Press. April 26, 2009



Triathlon athletes have twice the risk of sudden cardiac death, study shows

Los Angeles Times

According to a new study published this week at the American College of Cardiology Conference in Orlando, Florida, triathlon athletes are dying more frequently than marathon runners.




Taxes and my blood pressure, two things we can always count on goin' up!



Maxine

Wagner



Step with care and great tact, and
remember that Life's a Great
Balancing Act.

Dr. Seuss

[view quote](#)



**Those are my principles,
and if you don't like
them...**

Groucho Marx



... well, I have others

Groucho Marx

- Published in 2015
- Randomly assigned 9361 people with BP >130 but <180 and an increased cardiovascular risk to target less than 120 or less than 140
- Age greater than 50
- Increased CV risk defined as one or more of the following:
 - Clinical or subclinical CV disease other than stroke
 - CKD with eGFR of 20 to less than 60 ml/min
 - 15% or greater Framingham score
 - Age 75 or greater
- Diabetics and previous stroke excluded

- MI
- Stroke
- Other Acute Coronary Syndrome
- Heart Failure
- Death from Cardiovascular cause

1. Intense treatment group had 25% lower relative risk of primary outcome, 38% lower relative risk for heart failure, 43% lower relative risk for death from CV cause, 27% lower relative risk for death from any cause
2. NNT was 61 for primary outcome and number needed to prevent one death from any cause was 90
3. Benefits with respect to primary outcome and death were across all ages and subgroups

Median follow-up 3.26 years

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Death from cardiovascular causes	37 (0.8)	0.25	65 (1.4)	0.43	0.57 (0.38–0.85)	0.005
Death from any cause	155 (3.3)	1.03	210 (4.5)	1.40	0.73 (0.60–0.90)	0.003
Primary outcome or death	332 (7.1)	2.25	423 (9.0)	2.90	0.78 (0.67–0.90)	<0.001

Lifestyle Modification

Modification	Approximate SBP reduction (range)
Weight reduction	5–20 mmHg/10 kg weight loss
Adopt DASH eating plan	8–14 mmHg
Dietary sodium reduction	2–8 mmHg
Physical activity	4–9 mmHg
Moderation of alcohol consumption	2–4 mmHg