















Case		
<ul> <li>64 year old Black male,</li> </ul>	Assessment	Results
with type 2 diabetes (2 yrs).	BMI	28.8
<ul> <li>hypertension (25 yrs).</li> <li>He has no major complaints</li> <li>Current medications</li> </ul>	BP (mm Hg)	148/86
	Albumin (mg/g Cr)	680
	A1C (%)	7.5
	LDL-C (mg/dL)	110
	HDL-C (mg/dL)	38
Hydrochlorothlazide     Low dose Aspirin	TG (mg/dL)	250
	SCr (mg/dL)	1.3
	eGFR	73
Our Patient has HTN, DM, protein	ouria & BP is 148/	86 mmHg
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Trial	#	Median Duration	Total End Points, n	Primary Outcome
<150 mm Hg		BP < 150	improves ou	tcomes
HYVET (>80yrs) <sup>3</sup> HCTZ <u>+</u> ACEI vs place Actual SBP 144 vs 158	* 3845 ebo	2.1 y	CVD: 331; Strokes: 120 Deaths: 431	HR: 0.61 P 0.046
SHEP (> 60 yrs) HCTZ <u>+</u> BB vs placebo Actual SBP 143 vs 155	4736	4.5 y	CVD: 703; Strokes: 245 Deaths: 455	RR: 0.64 P 0.0003
Syst-Eur (> 60) CCB <u>+</u> ACEI <u>+</u> THZ vs placebo Actual SBP 150 vs. 16	4,695	2 y	CVD: 136; Strokes: 121 Deaths: 260	CVA $\downarrow$ 42% ( $p$ = 0.003) All CVD $\downarrow$ 26% ( $p$ = 0.03) CV mortality (P = 0.07), All-cruse death (P = 0.22)

Trial	#	Median Duration	Total End Points, n	Primary Outcome	
BP < 140 equivocal improvement					
<140 mm Hg					
JATOS (65-85 yrs) CCB <u>±</u> ACEI <u>±</u> (HCTZ < 15%) & other to BP goal Actual SBP 135.9 vs. 145.6	4418	2 у	CVD or renal event: 172 Deaths: 17	Rate/1000 PYs: 22.6 vs. 22.7 P=0.99	
VALISH (70-85 yrs) Valsartan <u>+</u> CCB <u>+</u> (HCTZ < 15%) & other to BP goal Actual SBP 136.6 vs 142.0	3260	2.9 y	CVD or renal event: 99 Deaths: 54	HR: 0.89 P 0.383	
FEVER (50-79 yrs) HCTZ-CCB vs HCTZ & placebo Actual SBP 137.3 vs 142.5	9711	3.3 y	CVD: 575 Strokes: 428 Deaths: 263	HR: 0.73 P 0.0019	
FEVER Felodipine Event Reduction	on; HR hazard	I ratio; JATOS Ja	apanese Triz' FEV	ER Trial not	













Guideline	Evidence Review Methodology	BP Target in General Adult Population	BP Target in CKD and DM
ISHIB (2010)	Consensus	<135/85	<130/80
ACCF/AHA (2011)	Consensus	Age $< 80: \le 140/90$ Age $\ge \underline{80}: \le 140-145/90$	<130/80
NICE (2011)	Systematic Review	Age $< 80: <140/90$ Age $\ge 80: <150/90$	<140/90
NKF-KDOQI (2012)	Consensus (Graded)	<140/90	<140/90
ESH/ESC (2013)	Consensus (Graded)	Age $< 80: <140/90$ Age $\ge 80: <150/90$	<140/90
ADA (2013)	Consensus		<140/80
ASH/ISH (2014)	Consensus	Age $< 80: <140/90$ Age $\ge 80: <150/90$	<140/90
CHEP (2014)	Consensus	Age $< 80: <140/90$ Age $\ge 80: <150/90$	<140/90 (CKD) < 130/80 (DM)
JAMA "JNC 8" (2014)	Systematic Review	Age $<60: <140/90$ Age $\geq 60: <150/90$	<140/90
BP targets val ypertension/European Society of Cardi ssociation; 8) NICE = National Institute nitiative.	ry from SBP 13 ology; 6) ISHIB = International Societ for Health and Clinical; 10) NKF-KDC	Co-150 and DBP 8 y on Hypertension in Blacks; 7) JAMA = The QI = The National Kidney Foundation Kid	<b>0-90 mmHg</b> e Journal of American Medical ney Disease Outcomes Quality



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hypertension (25 yrs). • He has no major complaints • Current medications	BP (mm Hg)	148/86
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	TG (mg/dL)	250
•Low dose Aspinin	SCr (mg/dL)	1.3
	eGFR	73
Our Patient has HTN, DM, protein	uria & BP is 148/	86 mmHg
Is SBP < 148 mmHg ok or shou	ld we go for < 14	0 mmHg
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The NEW ENGLAND JOURNAL	of MEDICINE
ORIGINAL ARTIC	LE
A Randomized Trial of In Standard Blood-Press	ntensive versus ure Control
The SPRINT Research G	roup*
<ul> <li>Among patients at high risk for CV ev diabetes, targeting a systolic BP &lt; 12 mmHg, resulted in lower rates of fata events and death from any cause.</li> </ul>	vents but without 20 mmHg, vs. < 140 I and nonfatal major CV
<ul> <li>However, significantly higher rates of were observed in the intensive-treatment</li> </ul>	f some adverse events nent group.
David Geffen School of Medicine	The SPRINT Research Group. N Engl J Med. 2015 Nov 9. [Epub ahead of print] 25











Characteristic	Intensive Treatment (N=4678)	Standard Treatment (N=4683)	
Criterion for increased cardiovascular risk — no. (%)†			
Age ≥75 yr	1317 (28.2)	1319 (28.2)	
Chronic kidney disease‡	1330 (28.4)	1316 (28.1)	
Cardiovascular disease	940 (20.1)	937 (20.0)	
Clinical	779 (16.7)	783 (16.7)	
Subclinical	247 (5.3)	246 (5.3)	
Framingham 10-yr cardiovascular disease risk score ≥15%	2870 (61.4)	2867 (61.2)	
Female sex — no. (%)	1684 (36.0)	1648 (35.2)	
Age — yr			
Overall	67.9±9.4	67.9±9.5	
Among those ≥75 yr of age	79.8±3.9	79.9±4.1	
Race or ethnic group — no. (%)∬			
Non-Hispanic black	1379 (29.5)	1423 (30.4)	
Hispanic	503 (10.8)	481 (10.3)	
Non-Hispanic white	2698 (57.7)	2701 (57.7)	
Other	98 (2.1)	78 (1.7)	
Black race§¶	1454 (31.1)	1493 (31.9)	

3aseline blood pressure — mm Hg		
Systolic	139.7±15.8	139.7±15.4
Diastolic	78.2±11.9	78.0±12.0
Distribution of systolic blood pressure — no. (%)		
≤132 mm Hg	1583 (33.8)	1553 (33.2)
>132 mm Hg to <145 mm Hg	1489 (31.8)	1549 (33.1)
≥145 mm Hg	1606 (34.3)	1581 (33.8)
Serum creatinine — mg/dl	1.07±0.34	1.08±0.34
Estimated GFR — ml/min/1.73 m <sup>2</sup>		
Among all participants	71.8±20.7	71.7±20.5
Among those with estimated GFR ≥60 ml/min/1.73 m <sup>2</sup>	81.3±15.5	81.1±15.5
Among those with estimated GFR <60 ml/min/1.73 m <sup>2</sup>	47.8±9.5	47.9±9.5
Ratio of urinary albumin (mg) to creatinine (g)	44.1±178.7	41.1±152.9
Fasting total cholesterol — mg/dl	190.2±41.4	190.0±40.9
Fasting HDL cholesterol — mg/dl	52.9±14.3	52.8±14.6
Fasting total triglycerides — mg/dl	124.8±85.8	127.1±95.0
Fasting plasma glucose — mg/dl	98.8±13.7	98.8±13.4
Statin use — no./total no. (%)	1978/4645 (42.6)	2076/4640 (44.7)
Aspirin use — no./total no. (%)	2406/4661 (51.6)	2350/4666 (50.4)
Smoking status — no. (%)		
Never smoked	2050 (43.8)	2072 (44.2)
Former smoker	1977 (42.3)	1996 (42.6)
Current smoker	639 (13.7)	601 (12.8)
Missing data	12 (0.3)	14 (0.3)







/ariable	Intensive Treatment (N=4678)	Standard Treatment (N=4683)	Hazard Ratio	P Value
	no. of pa	tients (%)		
Serious adverse event*	1793 (38.3)	1736 (37.1)	1.04	0.25
Conditions of interest				
Serious adverse event only				
Hypotension	110 (2.4)	66 (1.4)	1.67	0.001
Syncope	107 (2.3)	80 (1.7)	1.33	0.05
Bradycardia	87 (1.9)	73 (1.6)	1.19	0.28
Electrolyte abnormality	144 (3.1)	107 (2.3)	1.35	0.02
★ Injurious fall†	105 (2.2)	110 (2.3)	0.95	0.71
Acute kidney injury or acute renal failure‡	193 (4.1)	117 (2.5)	1.66	< 0.001
Emergency department visit or serious adverse event				
Hypotension	158 (3.4)	93 (2.0)	1.70	< 0.001
lypotension, Syncop renal failure also	be Electrol led to incr	yte Abnoi eased hos	rmalities spitaliza	& acu tions
Acute kidney injury or acute renal failure:	204 (4.4)	120 (2.6)	1.71	< 0.001























Renal Outcomes						
Participants with CKD at baseline	(N=133	0)	(N=131	6)		
Composite renal outcome‡	14 (1.1)	0.33	15 (1.1)	0.36	0.89 (0.42–1.87)	0.76
≥50% reduction in estimated GFR§	10 (0.8)	0.23	11 (0.8)	0.26	0.87 (0.36-2.07)	0.75
ong-term dialysis	6 (0.5)	0.14	10 (0.8)	0.24	0.57 (0.19–1.54)	0.27
(idney transplantation	0		0			
ncident albuminuria¶	49/526 (9.3)	3.02	59/500 (11.8)	3.90	0.72 (0.48–1.07)	0.11
Participants without CKD at baseline	(N=3332)		(N = 3345)			
≥30% reduction in estimated GFR to <60 ml/min/1.73 m²§	127 (3.8)	1.21	37 (1.1)	0.35	3.49 (2.44–5.10)	<0.001
ncident albuminuria¶	110/1769 (6.2)	2.00	135/1831 (7.4)	2.41	0.81 (0.63-1.04)	0.10
Few renal events among participants WITH CKD at baseline Among those WITHOUT CKD at baseline increased risk of						
		.g		0 1 14		















Outcome	Intensive T	reatment	Standard T	reatment	Hazard Ratio (95% CI)	P Value
	no. of patients (%)	% per year	no. of patients (%)	% per year		
All participants	(N=4	578)	(N=4	683)		
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
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
Participants with CKD at baseline	(N=1	330)	(N=1	316)		
Composite renal outcome‡	14 (1.1)	0.33	15 (1.1)	0.36	0.89 (0.42-1.87)	0.76
≥50% reduction in estimated GFR§	10 (0.8)	0.23	11 (0.8)	0.26	0.87 (0.36-2.07)	0.75
Long-term dialysis	6 (0.5)	0.14	10 (0.8)	0.24	0.57 (0.19-1.54)	0.27
Kidney transplantation	0		0			
Incident albuminuria¶	49/526 (9.3)	3.02	59/500 (11.8)	3.90	0.72 (0.48-1.07)	0.11
Participants without CKD at baseline	(N=3)	332)	(N=3)	345)		
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14,692 Patients were assessed for eligibility 333 Wore ineligibility 34 Wore - 509 352 Hald low y model were takin model of the standing 2284 Wore takin model of the of of ange 718 Wore no 351 Did not gib 351 Did not gib 351 Did not gib 351 Did not gib 351 Did not gib 4672 Wore a scienced to instancion	ble or declined yr of age systolic blood t t J min after ig too many is or many yr sor that systolic sure that was out a increased cular risk ellaneous reasons ve consent myblete screening
40/5 were assigned to intensive treatment	en to standard ent
224 Discontinued intervention 111 Were lost to followup 154 Withdrew consent 121 Withdrew co	lintervention follow-up nsent
4673 Were included in the analysis 4683 Were included	din the analysis The SPRINT Research Group. N Engl J Med 2015.
David Geffen School of Medicine	



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Hypotension	158 (3.4)	93 (2.0)	1.70	< 0.001	
Syncope	163 (3.5)	113 (2.4)	1.44	0.003	
Bradycardia	104 (2.2)	83 (1.8)	1.25	0.13	
Electrolyte abnormality	177 (3.8)	129 (2.8)	1.38	0.006	
Injurious fall†	334 (7.1)	332 (7.1)	1.00	0.97	
Acute kidney injury or acute renal failure:	204 (4.4)	120 (2.6)	1.71	< 0.001	
Monitored clinical events					
Adverse laboratory measure§					
Serum sodium <130 mmol/liter	180 (3.8)	100 (2.1)	1.76	< 0.001	
Serum sodium >150 mmol/liter	6 (0.1)	0		0.02	
Serum potassium <3.0 mmol/liter	114 (2.4)	74 (1.6)	1.50	0.006	
Serum potassium >5.5 mmol/liter	176 (3.8)	171 (3.7)	1.00	0.97	
Orthostatic hypotension¶					
Alone	777 (16.6)	857 (18.3)	0.88	0.01	
With dizziness	62 (1.3)	71 (1.5)	0.85	0.35	SPRINT Research Group. N Engl J Med 20































TRBLE []] ECONOMIC BURDEN OF NONCOMMUNICABLE DISEASES, 2011-2025 (US\$ TRILLION IN 2008).									
COUNTRY INCOME GROUP	DIABETES	CARDIOVASCULAR DISEASES	RESPIRATORY DISEASES	CANCER	TOTAL				
Upper middle	0.31	2.52	1.09	1.20	5.12				
Lower middle	0.09	1.07	0.44	0.26	1.85				
Low	0.02	0.17	0.06	0.05	0.31				
Total of low and middle	0.42	3.76	1.59	1.51	7.28				
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