

Bloeddrukbehandeling als secundaire preventie na een beroerte



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Afd. Vasculaire Geneeskunde



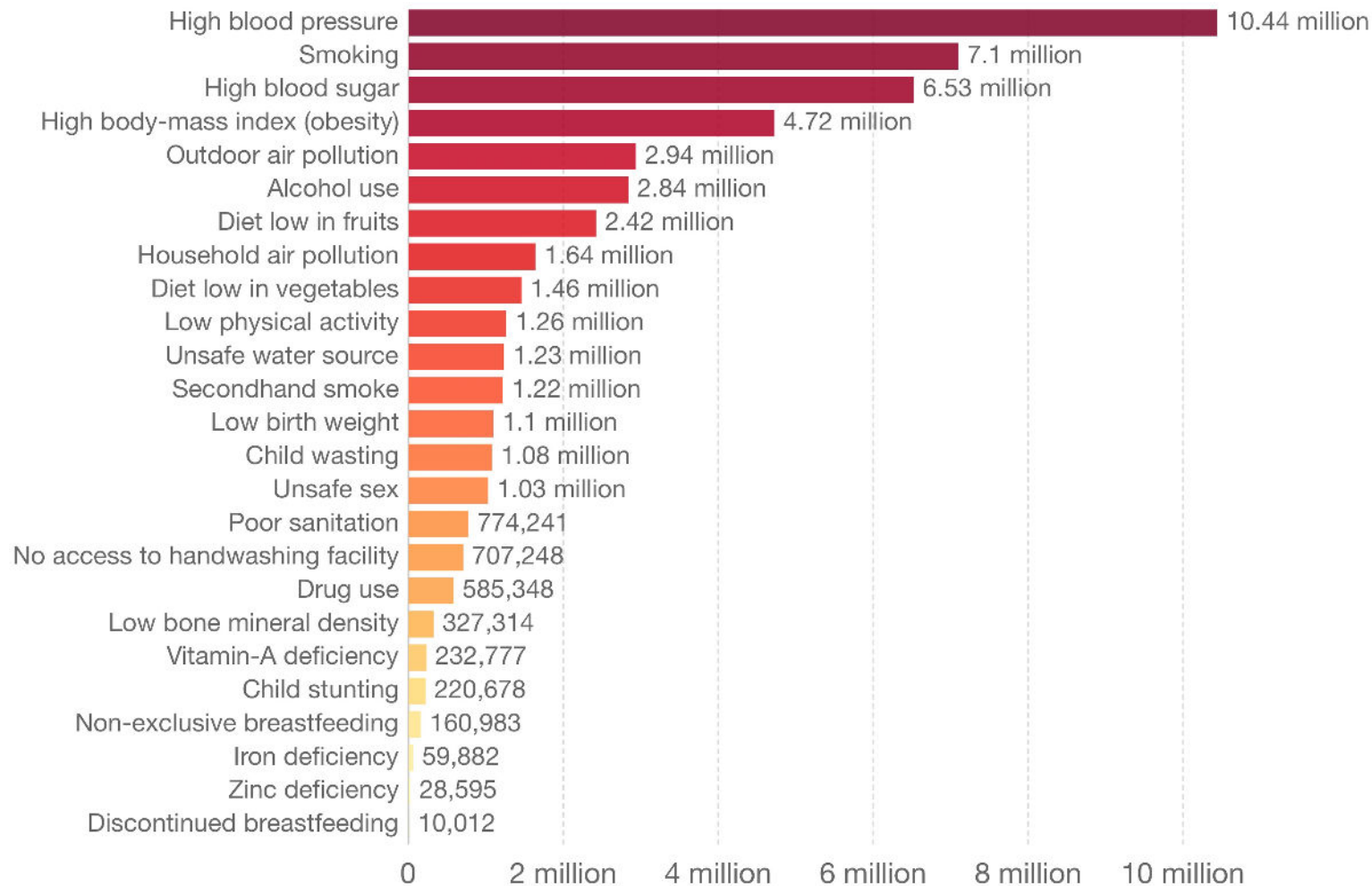
UMC Utrecht

Vraag 1

Het wereldwijde aantal doden per dag door COVID-19 vs. hypertensie:

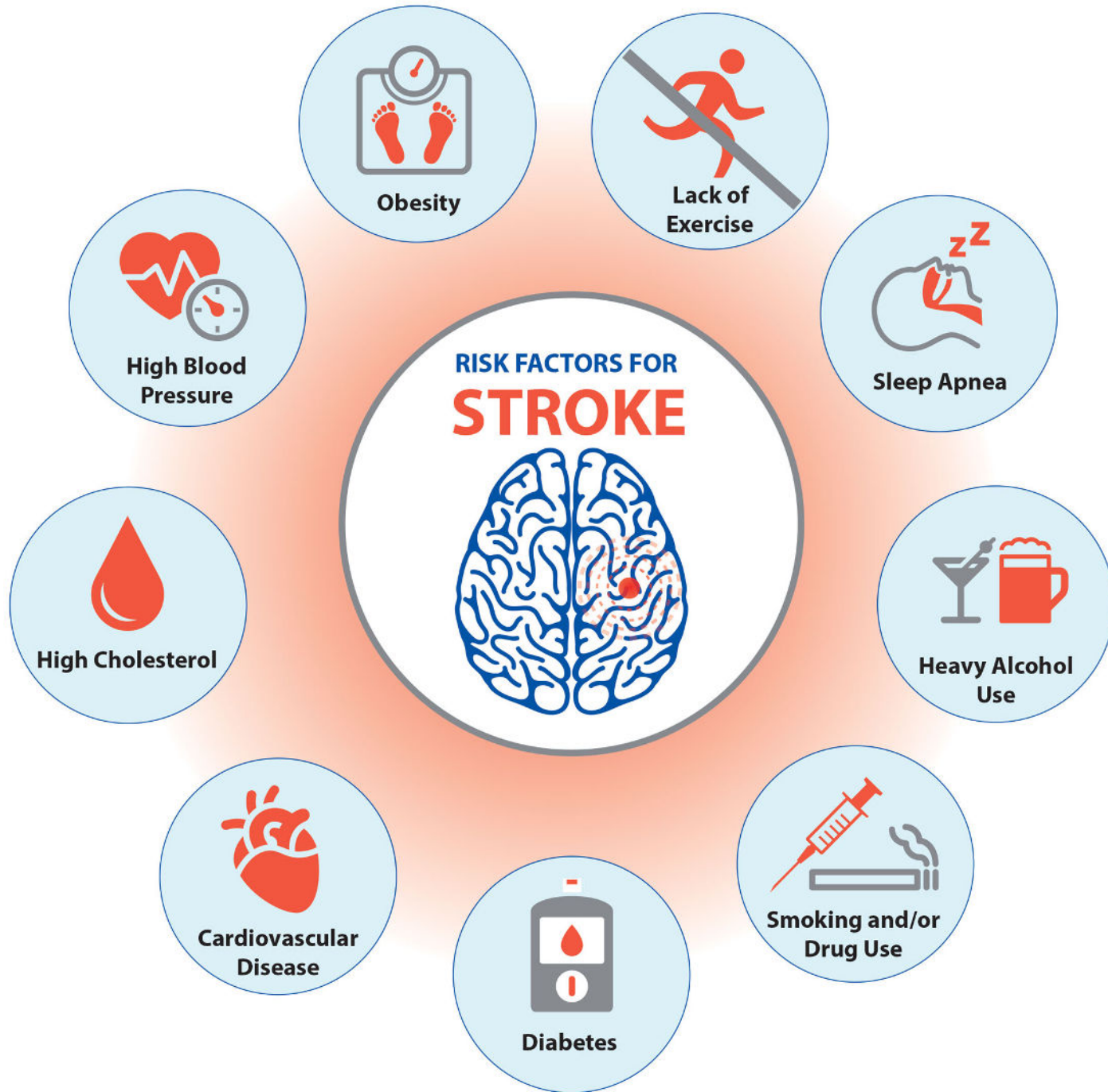
- A. COVID 13.400, hypertensie 15.000
- B. COVID 20.700, hypertensie 20.000
- C. COVID 9.500, hypertensie 25.000
- D. COVID 6.100, hypertensie 30.000

Hypertension is a silent killer

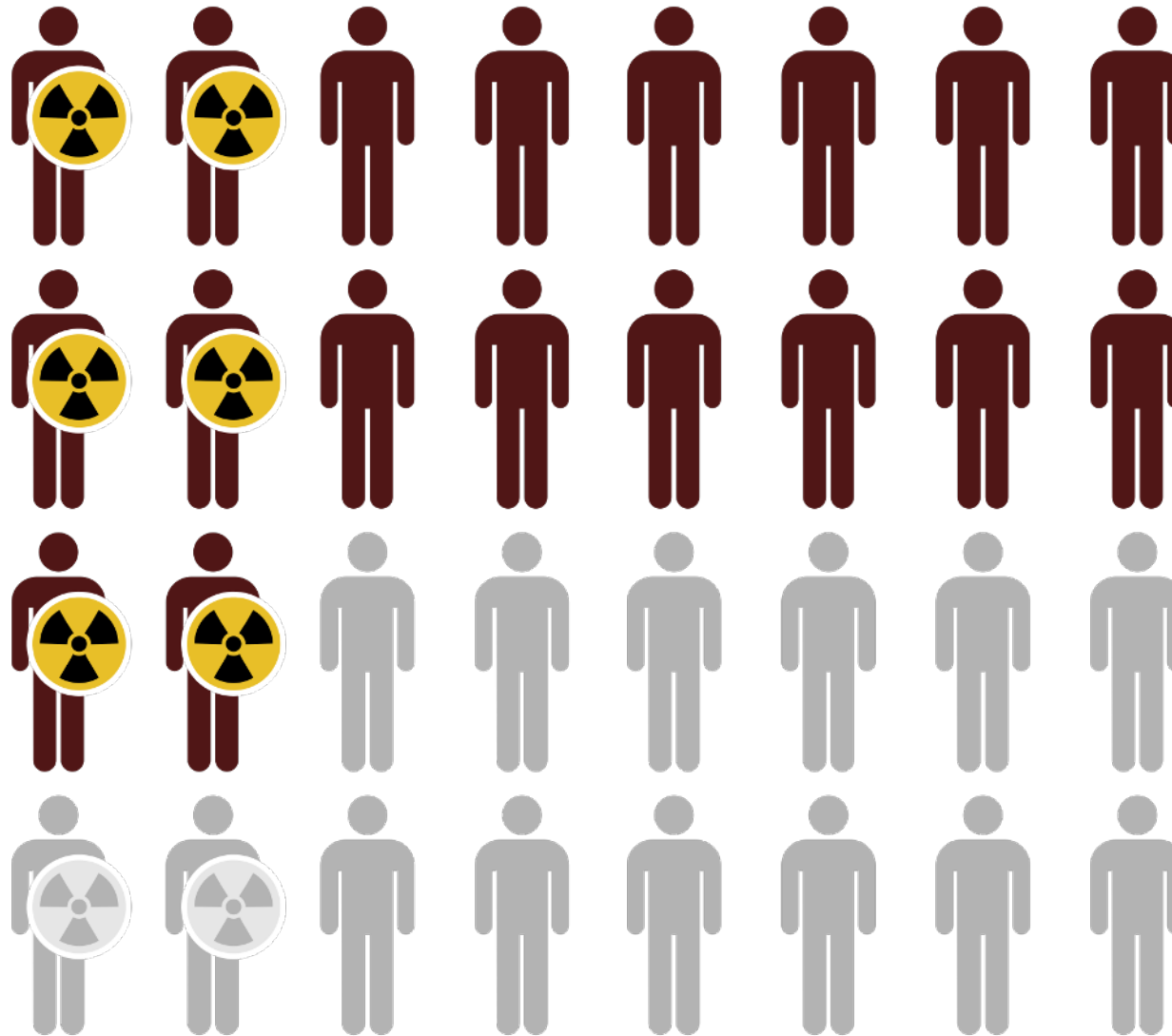


Source: IHME, Global Burden of Disease (GBD)

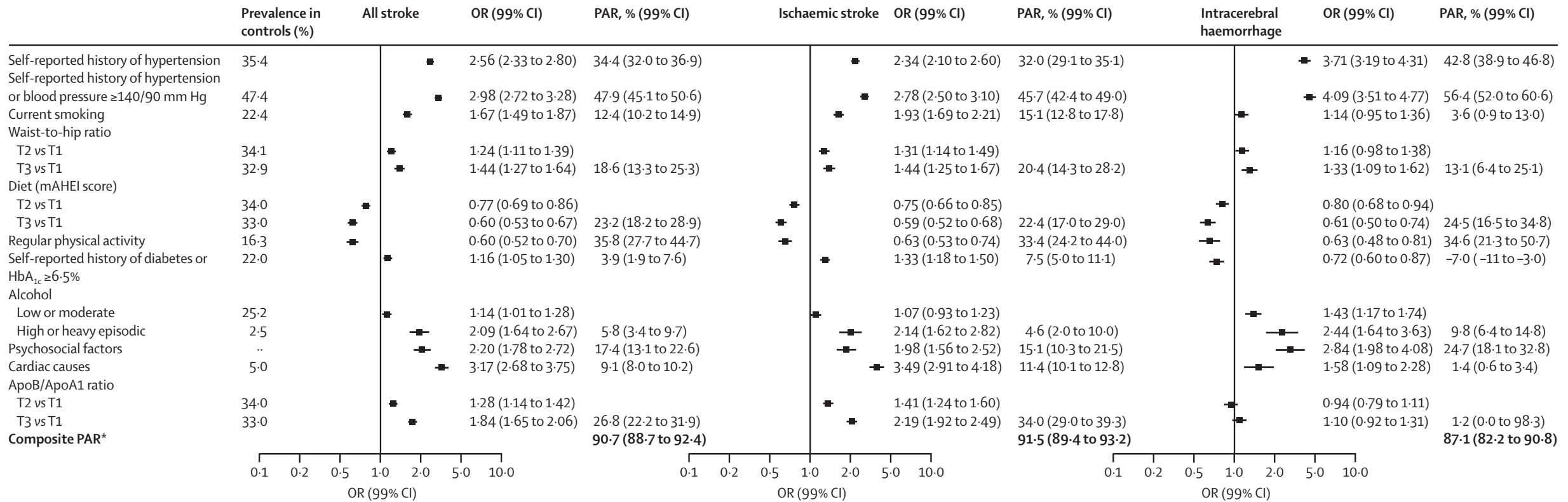
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Population Attributable Risk (PAR)

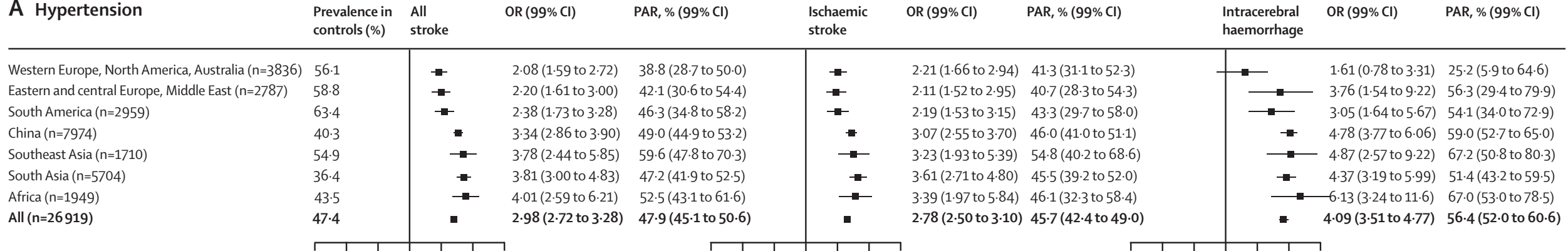


Risk factors for stroke

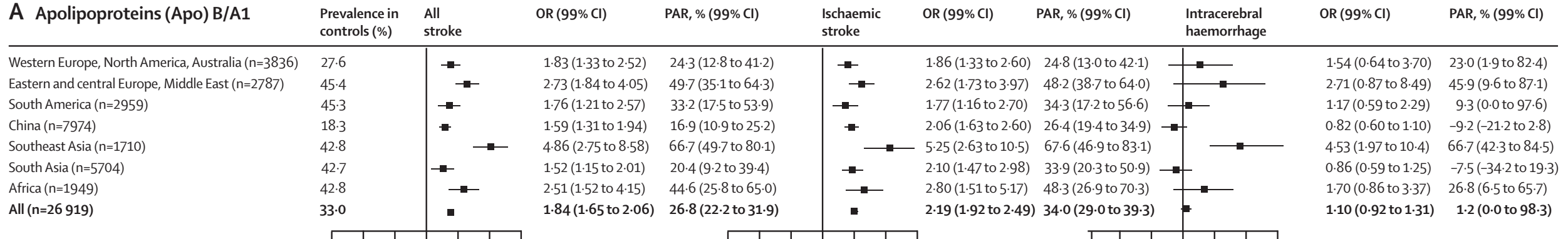


PAR of hypertension vs. high cholesterol

A Hypertension

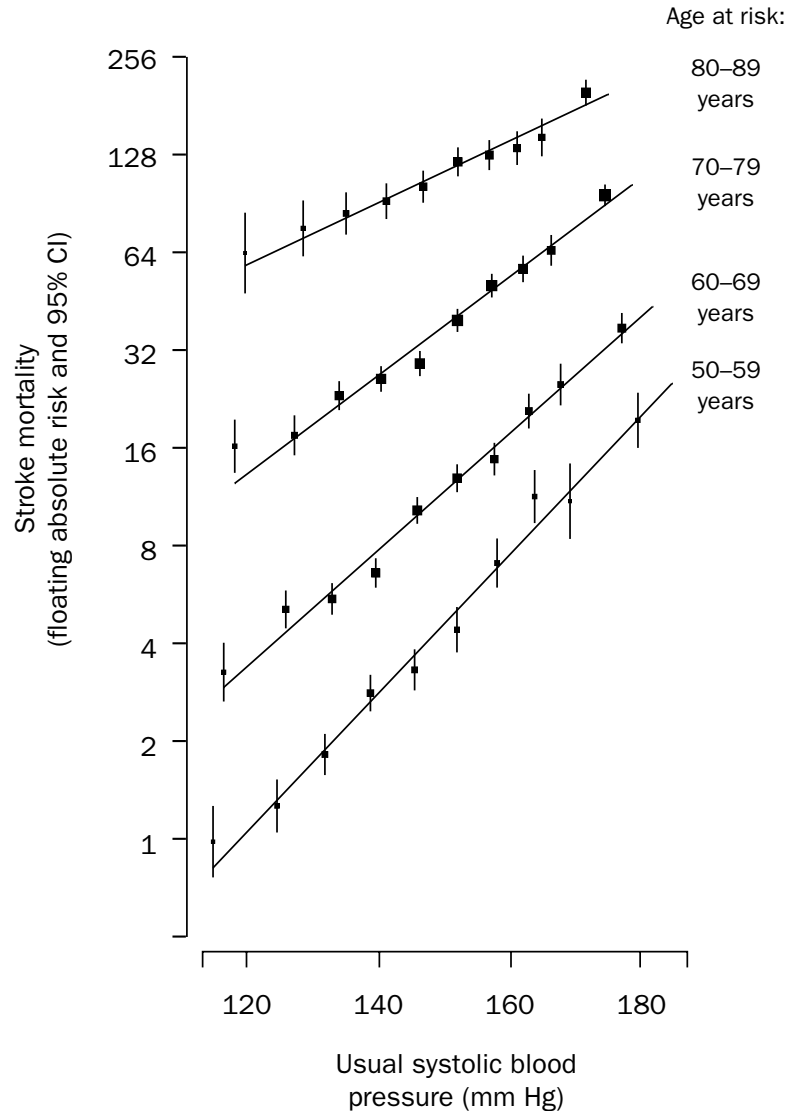


A Apolipoproteins (Apo) B/A1

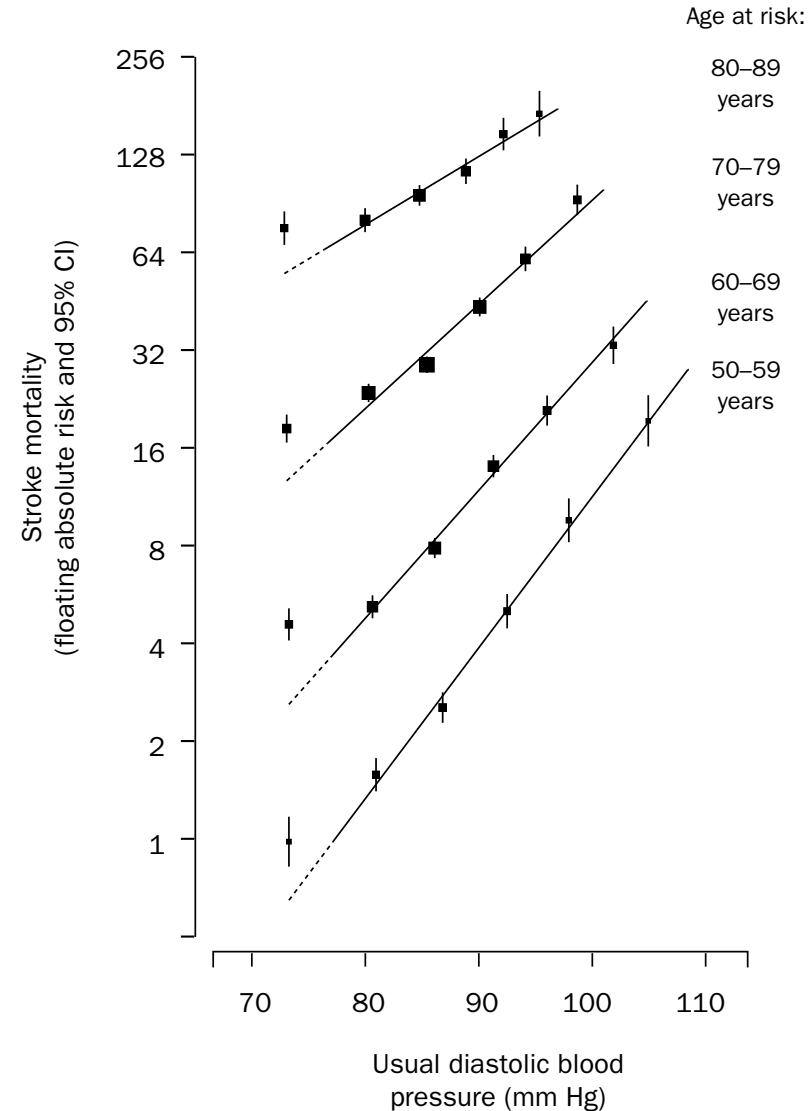


Stroke mortality and blood pressure

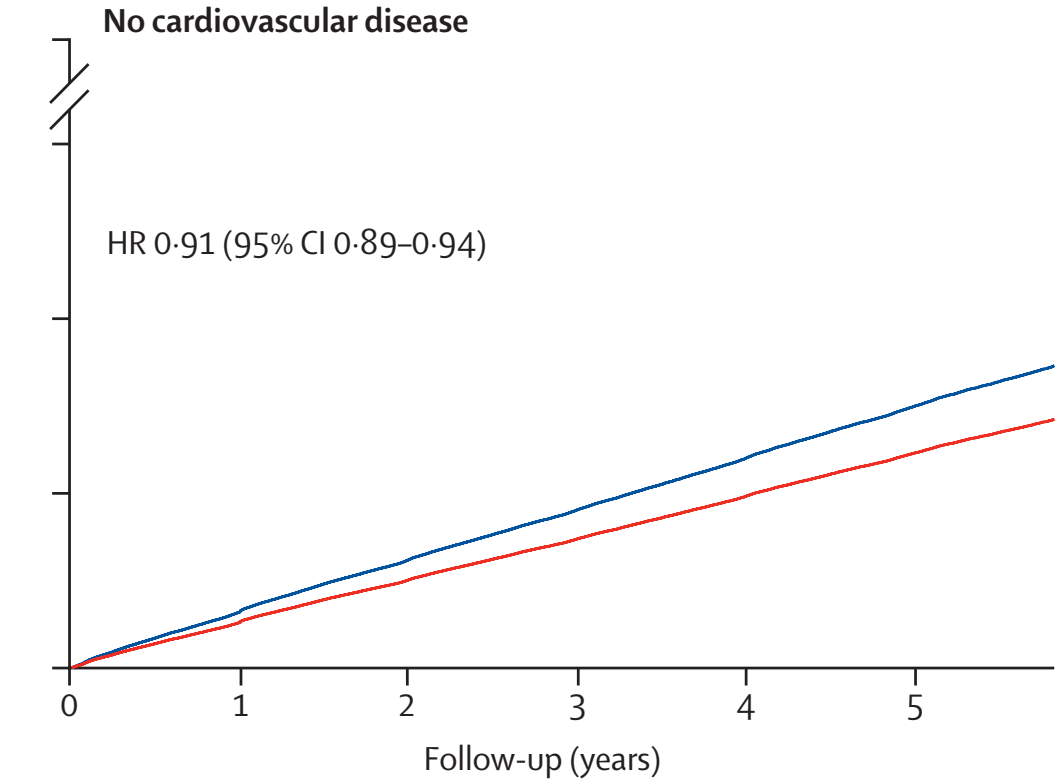
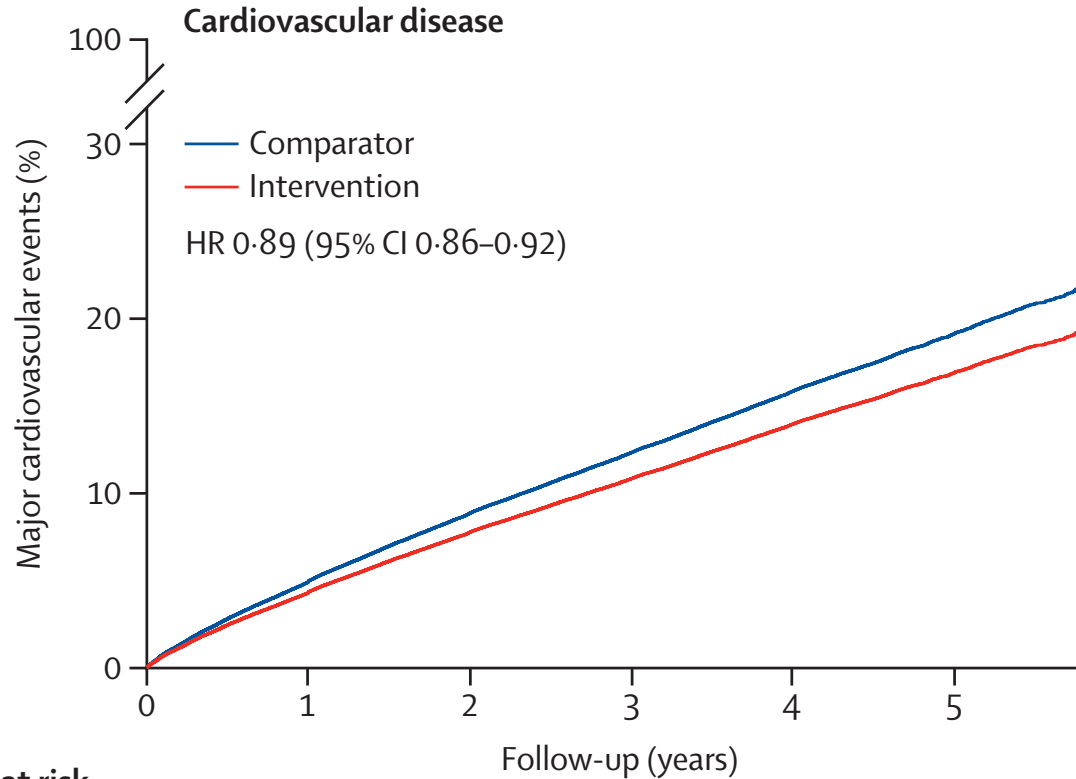
A: Systolic blood pressure



B: Diastolic blood pressure



Effects of 5 mmHg reduction SBP (1/2)



Number at risk

Comparator	82 657	77 319	70 312	54 275	39 443	11 408
Intervention	73 896	69 344	62 737	47 188	33 216	10 003

Comparator	98 840	91 516	83 271	71 149	51 516	26 376
Intervention	87 033	81 226	73 875	63 798	45 888	23 694

Effects of 5 mmHg reduction SBP (2/2)

	Intervention		Comparator		HR (95% CI)
	Events	Total	Events	Total	
Major cardiovascular events					
Previous CVD	9356	73 896	11718	82 657	0.89 (0.86–0.92)
No previous CVD	8931	87 033	12 319	98 840	0.91 (0.89–0.94)
Overall	18287	160 929	24 037	181 497	0.90 (0.88–0.92)
Adjusted $p_{\text{interaction}}$	1.00				
Unadjusted $p_{\text{interaction}}$	0.99				
Stroke					
Previous CVD	3404	74 275	4167	83 125	0.89 (0.85–0.94)
No previous CVD	2601	87 164	3600	98 980	0.85 (0.80–0.90)
Overall	6005	161 439	7767	182 105	0.87 (0.84–0.91)
Adjusted $p_{\text{interaction}}$	0.14				
Unadjusted $p_{\text{interaction}}$	0.07				
Ischaemic heart disease					
Previous CVD	4042	74 201	5185	83 031	0.90 (0.86–0.95)
No previous CVD	4265	87 152	5960	98 976	0.95 (0.91–0.99)
Overall	8307	161 353	11 145	182 007	0.92 (0.89–0.95)
Adjusted $p_{\text{interaction}}$	0.40				
Unadjusted $p_{\text{interaction}}$	0.20				

Heart failure

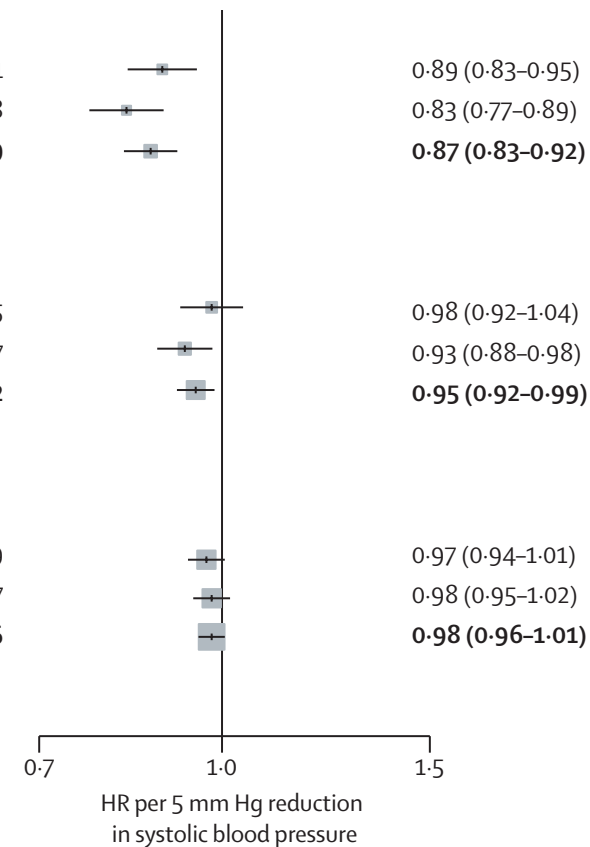
Previous CVD	1796	72 661	2346	81 521	0.89 (0.83–0.95)
No previous CVD	1453	73 801	2238	85 988	0.83 (0.77–0.89)
Overall	3249	146 462	4584	167 509	0.87 (0.83–0.92)
Adjusted $p_{\text{interaction}}$	0.02				
Unadjusted $p_{\text{interaction}}$	0.01				

Cardiovascular death

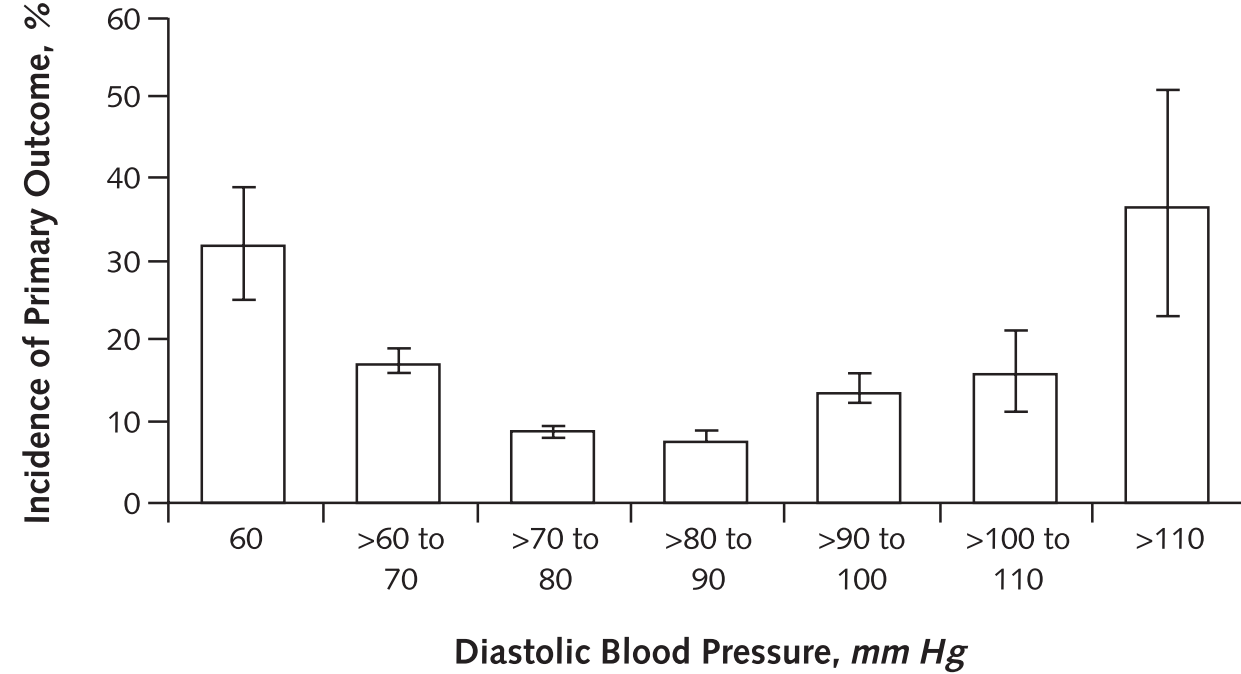
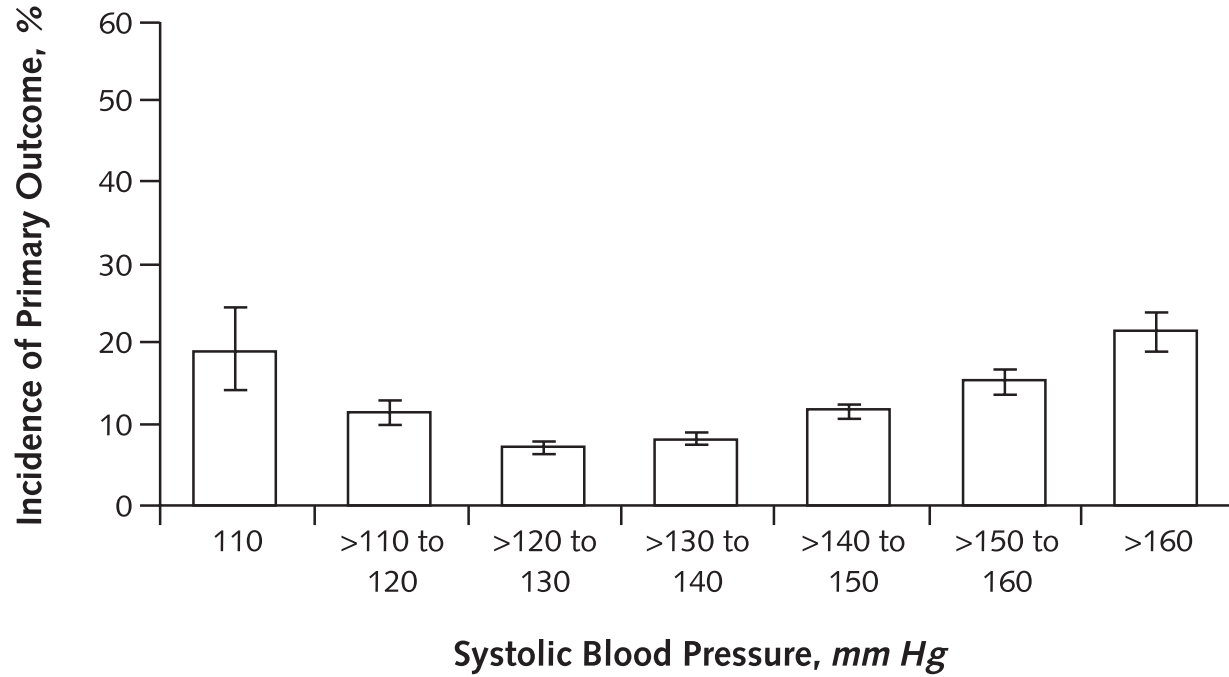
Previous CVD	2357	64 414	2726	73 165	0.98 (0.92–1.04)
No previous CVD	2468	85 028	3384	97 307	0.93 (0.88–0.98)
Overall	4825	149 442	6110	170 472	0.95 (0.92–0.99)
Adjusted $p_{\text{interaction}}$	0.12				
Unadjusted $p_{\text{interaction}}$	0.06				

All-cause death

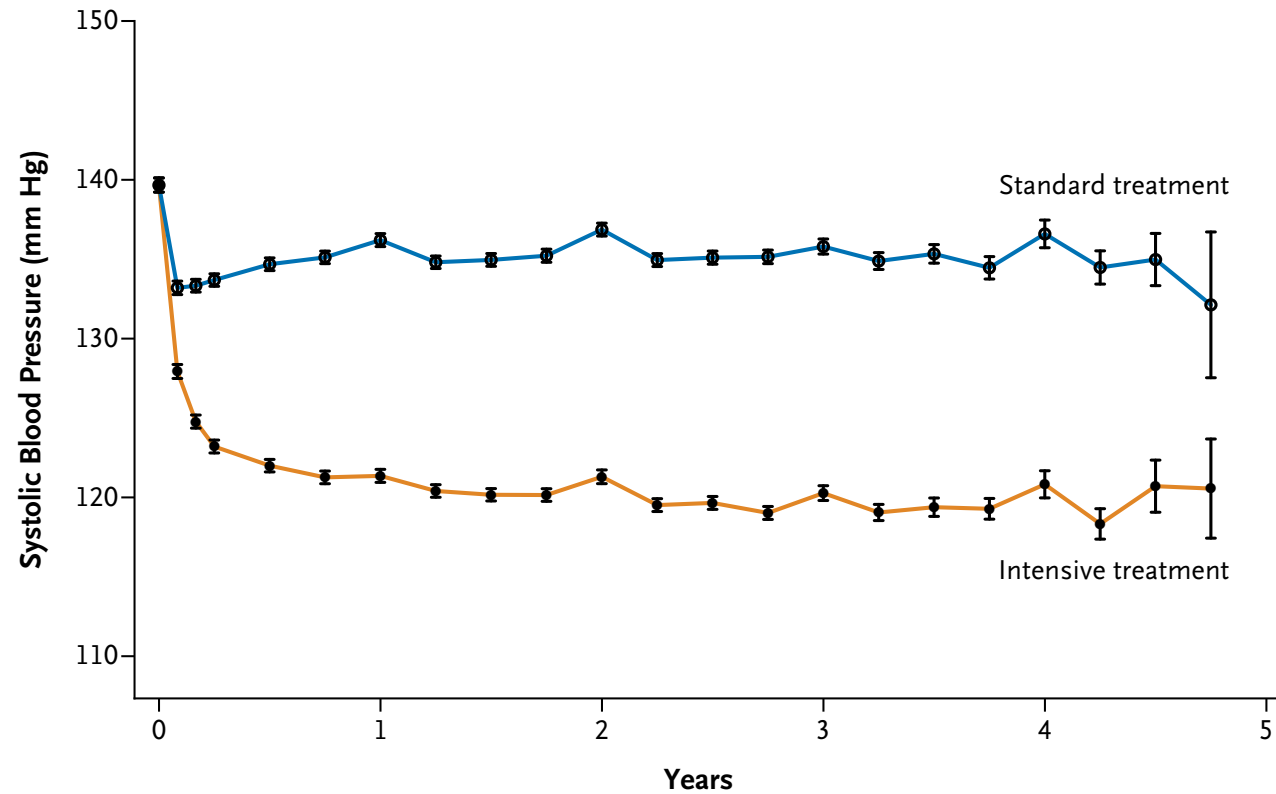
Previous CVD	6646	74 326	7905	83 159	0.97 (0.94–1.01)
No previous CVD	6375	87 151	7969	98 967	0.98 (0.95–1.02)
Overall	13 021	161 477	15 874	182 126	0.98 (0.96–1.01)
Adjusted $p_{\text{interaction}}$	1.00				
Unadjusted $p_{\text{interaction}}$	0.74				



INVEST study



SPRINT study – BP change



No. with Data

Standard treatment	4683	4345	4222	4092	3997	3904	3115	1974	1000	274
Intensive treatment	4678	4375	4231	4091	4029	3920	3204	2035	1048	286

Mean No. of Medications

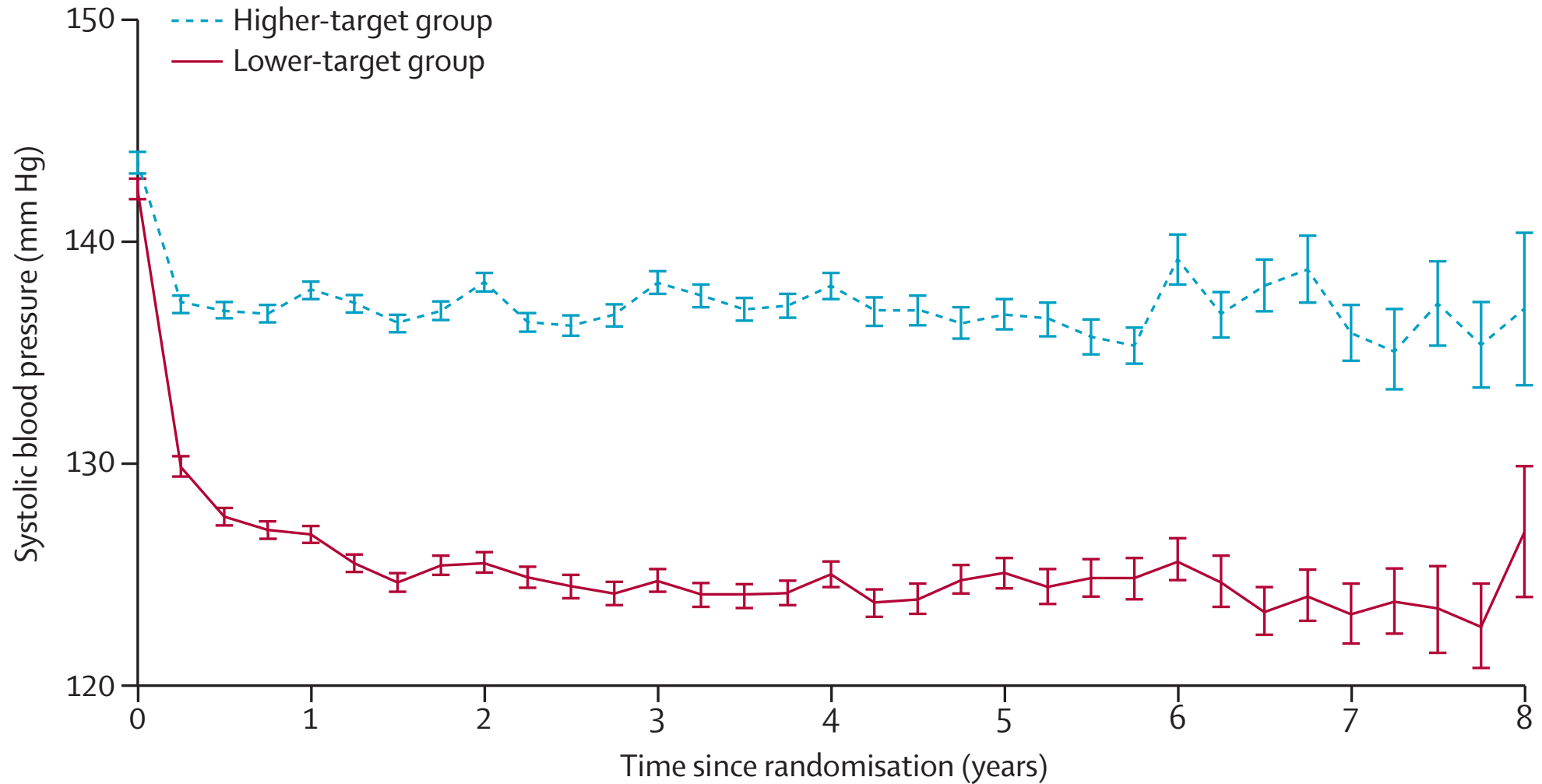
Standard treatment	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Intensive treatment	2.3	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0

SPRINT study – outcomes [updated]

Table 1. Outcomes during the Intervention Period (through August 20, 2015).*

Outcome	Intensive Treatment		Standard Treatment		Hazard Ratio (95% CI)	P Value†
	no. of participants	% per year	no. of participants	% per year		
All participants	(N = 4678)		(N = 4683)			
Primary outcome‡	264	1.77	354	2.40	0.73 (0.63–0.86)	<0.001
Primary outcome without nonfatal heart failure	222	1.48	293	1.97	0.75 (0.63–0.89)	0.001
Secondary outcomes‡						
Myocardial infarction	102	0.68	140	0.93	0.72 (0.56–0.93)	0.01
Acute coronary syndrome	42	0.28	41	0.27	1.02 (0.66–1.57)	0.93
Stroke	69	0.45	78	0.52	0.89 (0.64–1.23)	0.48
Heart failure	68	0.45	105	0.70	0.63 (0.46–0.86)	0.003
Nonfatal heart failure	66	0.43	101	0.67	0.64 (0.47–0.87)	0.004
Death from cardiovascular causes	41	0.27	71	0.47	0.58 (0.39–0.84)	0.004
Death from any cause	163	1.06	215	1.41	0.75 (0.61–0.92)	0.006
Primary outcome or death from any cause	370	2.47	474	3.20	0.77 (0.67–0.88)	<0.001
Participants with CKD at baseline	(N = 1330)		(N = 1316)			
Composite renal outcome§	17	0.39	16	0.37	1.03 (0.52–2.06)	0.93
≥50% Reduction in eGFR¶	12	0.28	12	0.28	0.98 (0.43–2.22)	0.97
Long-term dialysis	7	0.16	10	0.23	0.66 (0.24–1.72)	0.39
Kidney transplantation	0		0		—	—
Incident albuminuria	64	3.93	85	5.61	0.71 (0.50–1.00)	0.05
Participants without CKD at baseline	(N = 3332)		(N = 3345)			
≥30% Reduction in eGFR¶	148	1.39	41	0.38	3.67 (2.62–5.26)	<0.001
Long-term dialysis	0		0		—	—
Kidney transplantation	0		0		—	—
Incident albuminuria	142	2.54	184	3.25	0.77 (0.62–0.96)	0.02


SPS3 Study – BP change



SPS3 Study – outcomes

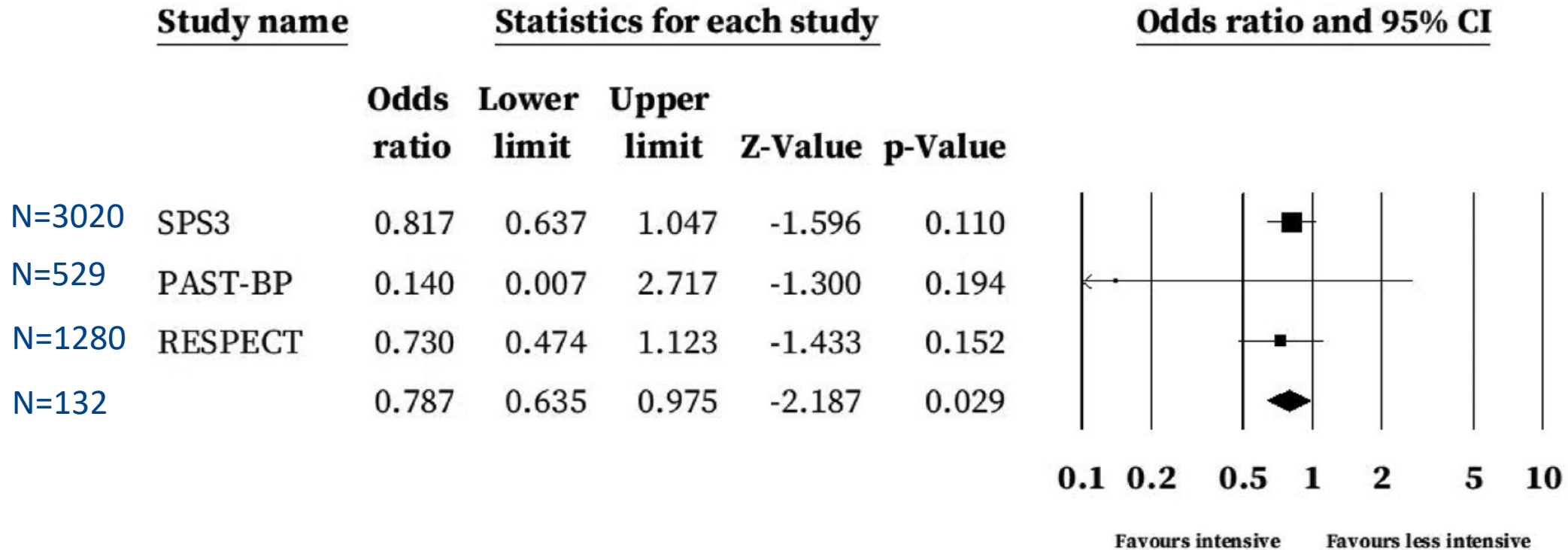
	Higher-target group (n=1519)		Lower-target group (n=1501)		Hazard ratio (95% CI)	p value
	Number of patients	Rate (% per patient-year)	Number of patients	Rate (% per patient-year)		
Stroke						
All stroke	152	2.77%	125	2.25%	0.81 (0.64–1.03)	0.08
Ischaemic stroke or unknown	131	2.4%	112	2.0%	0.84 (0.66–1.09)	0.19
Intracranial haemorrhage						
All	21*	0.38%	13†	0.23%	0.61 (0.31–1.22)	0.16
Intracerebral	16	0.29%	6	0.11%	0.37 (0.15–0.95)	0.03
Subdural or epidural	5	0.091%	6	0.11%	1.18 (0.36–3.88)	0.78
Other	2	0.036%	4	0.072%	1.97 (0.36–10.74)	0.43
Disabling or fatal stroke‡	49	0.89%	40	0.72%	0.81 (0.53–1.23)	0.32
Myocardial infarction	40	0.70%	36	0.62%	0.88 (0.56–1.39)	0.59
Major vascular event*	188	3.46%	160	2.91%	0.84 (0.68–1.04)	0.10
Deaths						
All	101	1.74%	106	1.80%	1.03 (0.79–1.35)	0.82
Vascular death	41	0.70%	36	0.61%	0.86 (0.55–1.35)	0.52
Non-vascular	35	0.60%	40	0.68%	1.12 (0.71–1.76)	0.62
Uncertain	25	0.43%	30	0.51%	1.18 (0.69–2.00)	0.55

European Stroke Organisation (ESO) guideline on pharmacological interventions for long-term secondary prevention after ischaemic stroke or transient ischaemic attack

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Intensive vs. less intensive strategy



2021 ESC Guidelines on cardiovascular disease prevention in clinical practice

Developed by the Task Force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies

With the special contribution of the European Association of Preventive Cardiology (EAPC)

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Office BP target ranges

Table 18 Recommended office blood pressure target ranges. The first step in all groups is a reduction to systolic blood pressure <140 mmHg. The subsequent optimal goals are listed below.

Age group	Office SBP treatment target ranges (mmHg)				
	Hypertension	+ DM	+ CKD	+ CAD	+ Stroke/TIA
18 – 69 years	120–130	120–130	<140–130	120–130	120–130
	<i>Lower SBP acceptable if tolerated</i>				
≥70 years	<140 mmHg, down to 130 mmHg if tolerated				
	<i>Lower SBP acceptable if tolerated</i>				
DBP treatment target (mmHg)	<80 for all treated patients				

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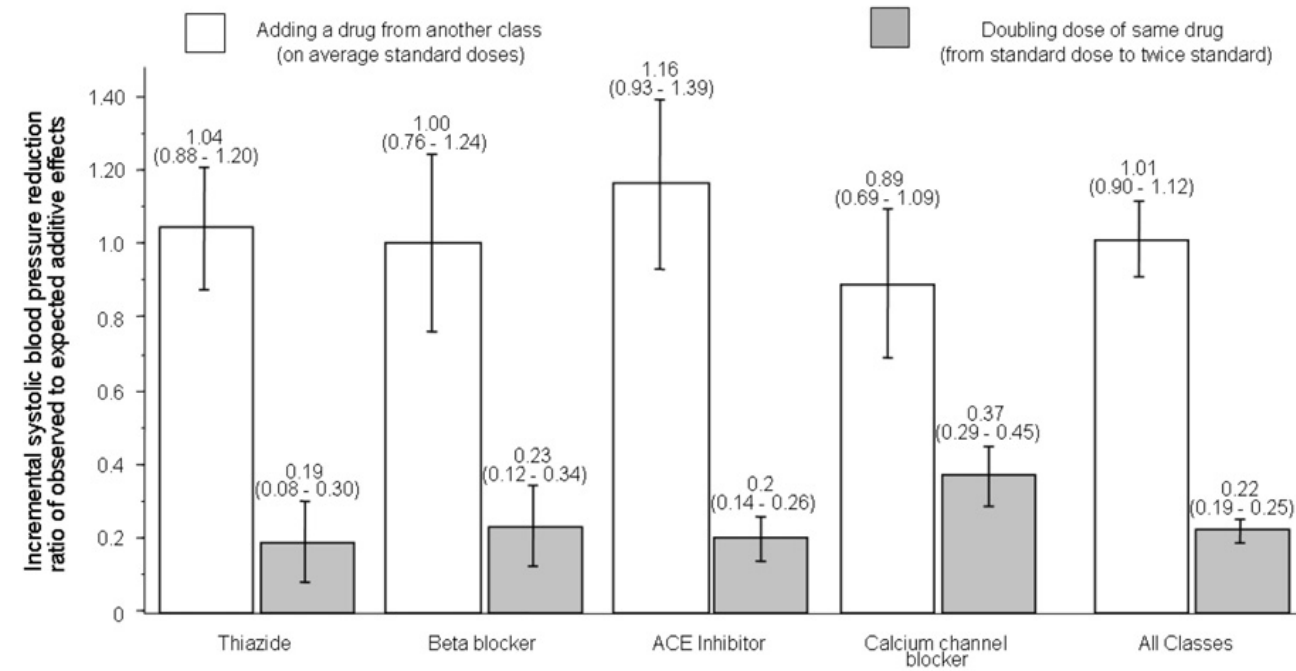
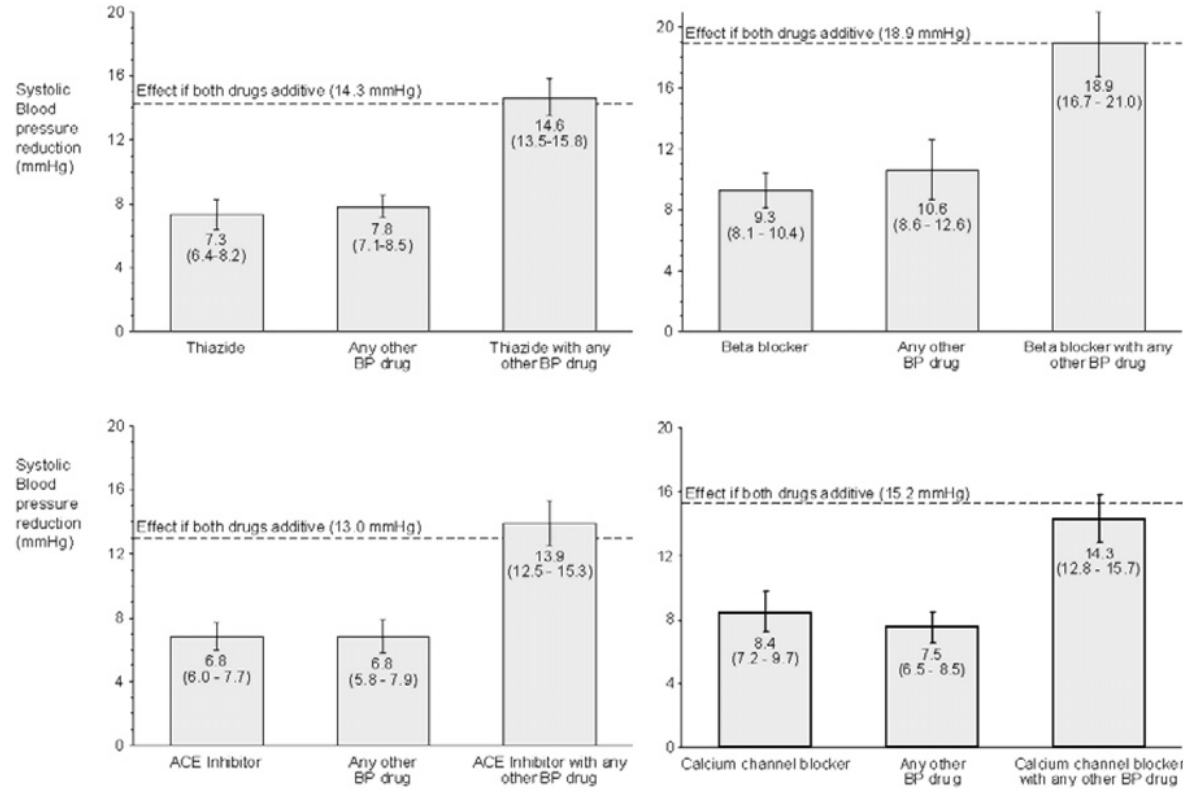
Evidence-based recommendation

In people with previous ischaemic stroke or TIA, we suggest aiming for a blood pressure target of <130/80 mmHg to reduce the risk of recurrent stroke.

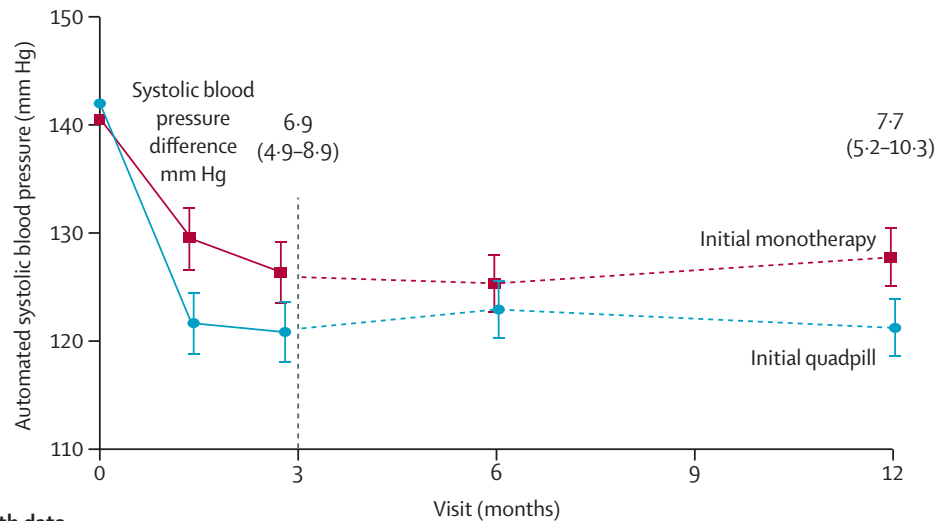
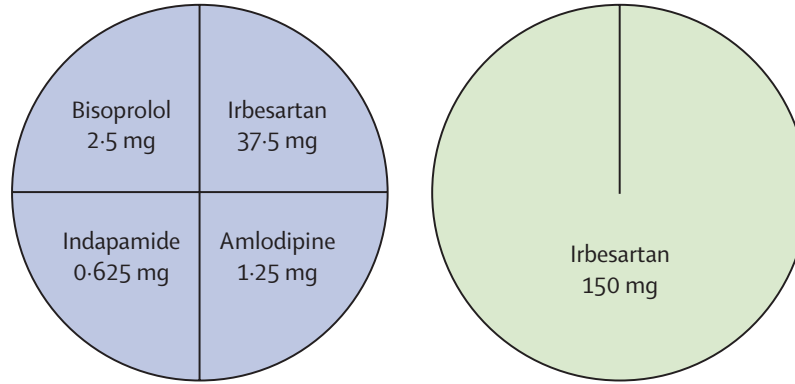
Quality of evidence: **Moderate** ⊕⊕⊕

Strength of recommendation: **Weak for intervention** ↑?

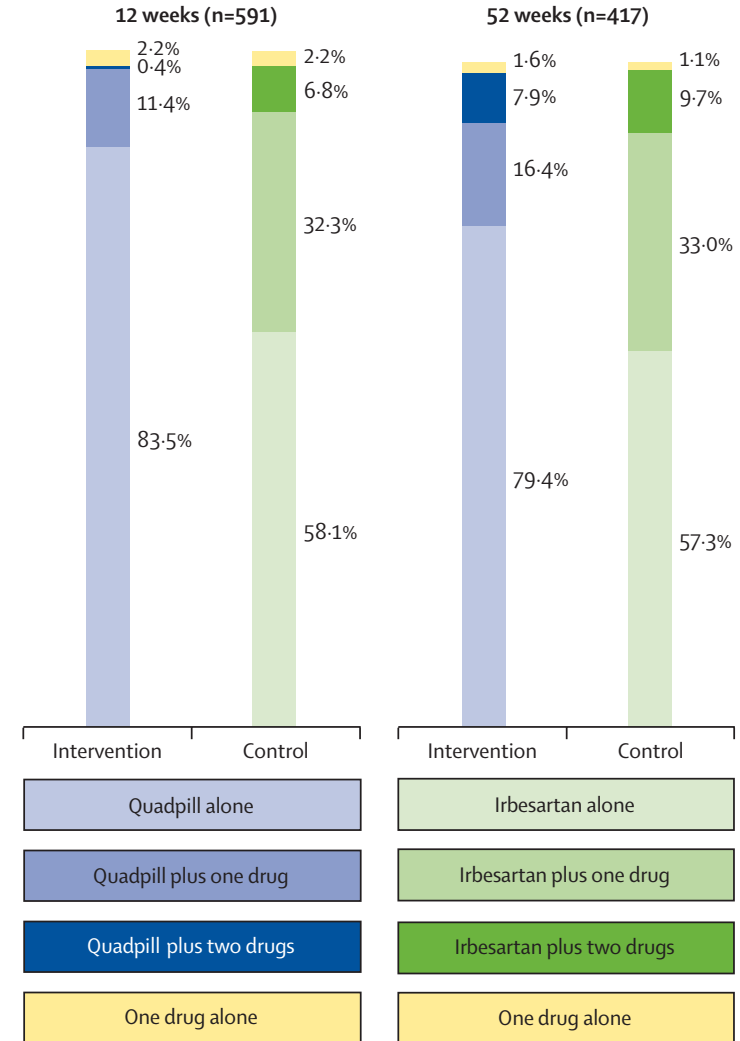
Combination therapy vs. monotherapy



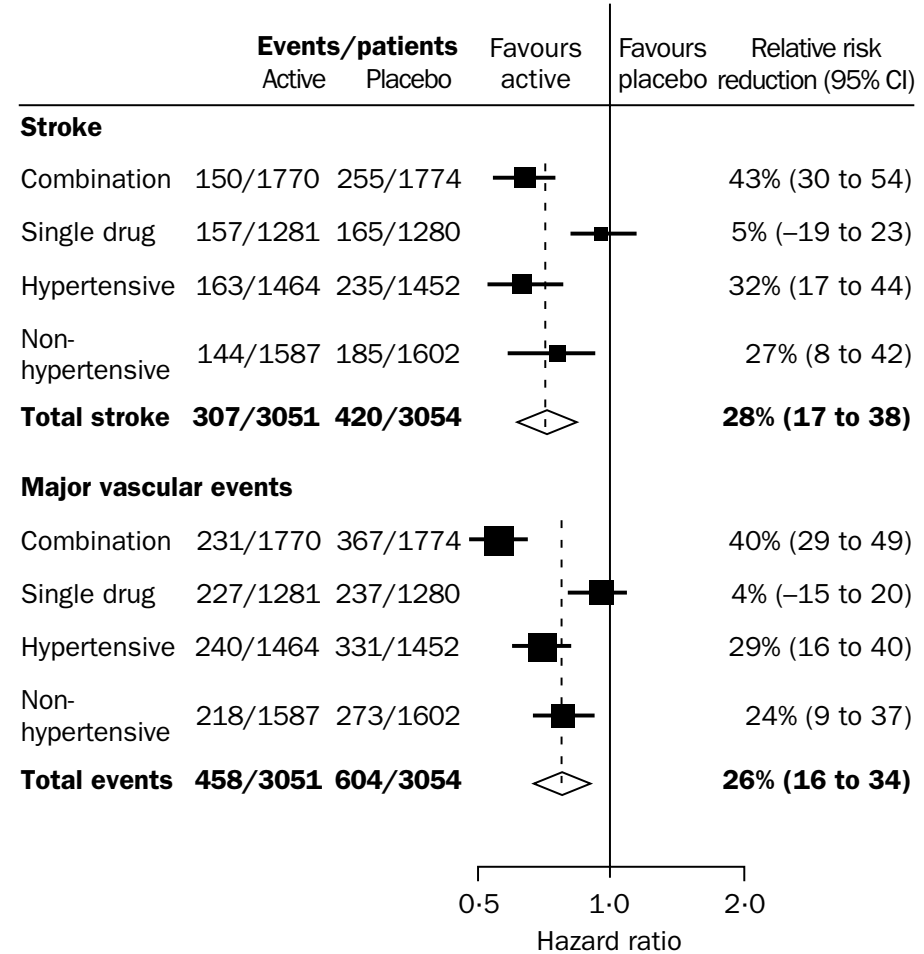
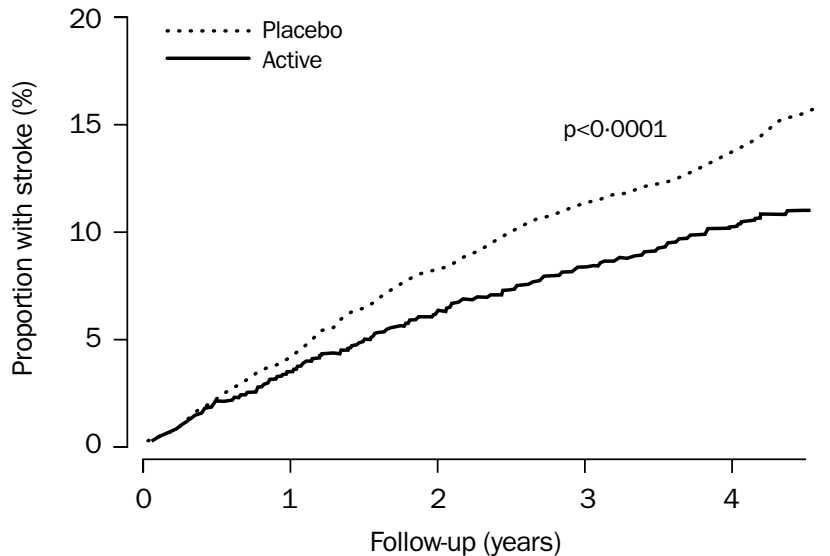
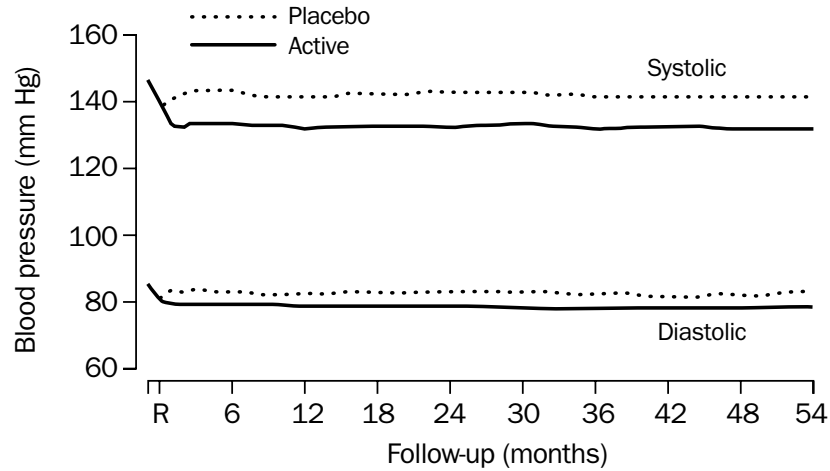
Quadpill as antihypertensive strategy



Number with data	0	3	6	12
Initial quadpill	300	276	267	192
Initial monotherapy	291	272	270	188



PROGRESS study



Combination therapy as secondary prevention

Evidence-based recommendation

–

Quality of evidence: –

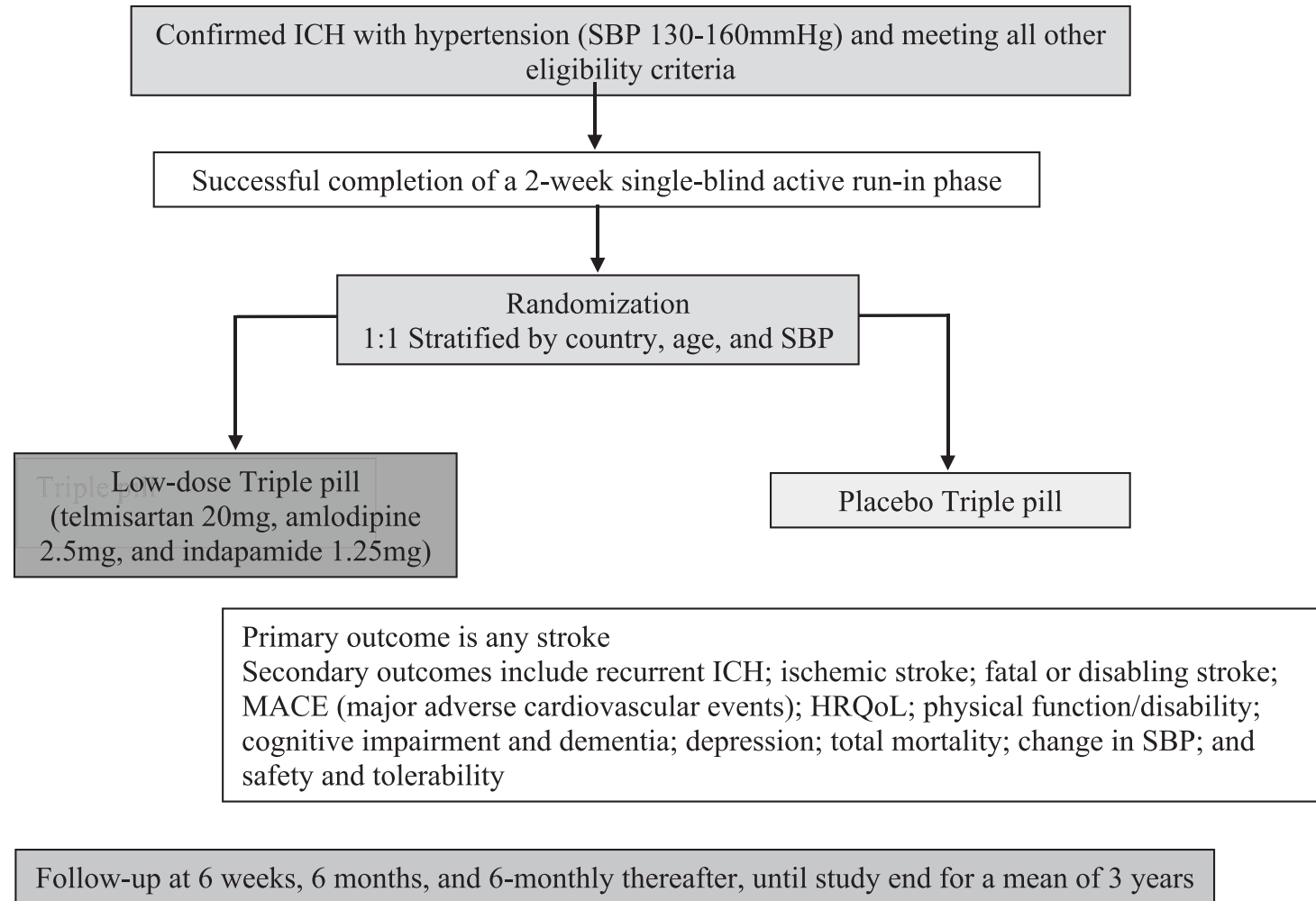
Strength of recommendation: –

Expert consensus statement

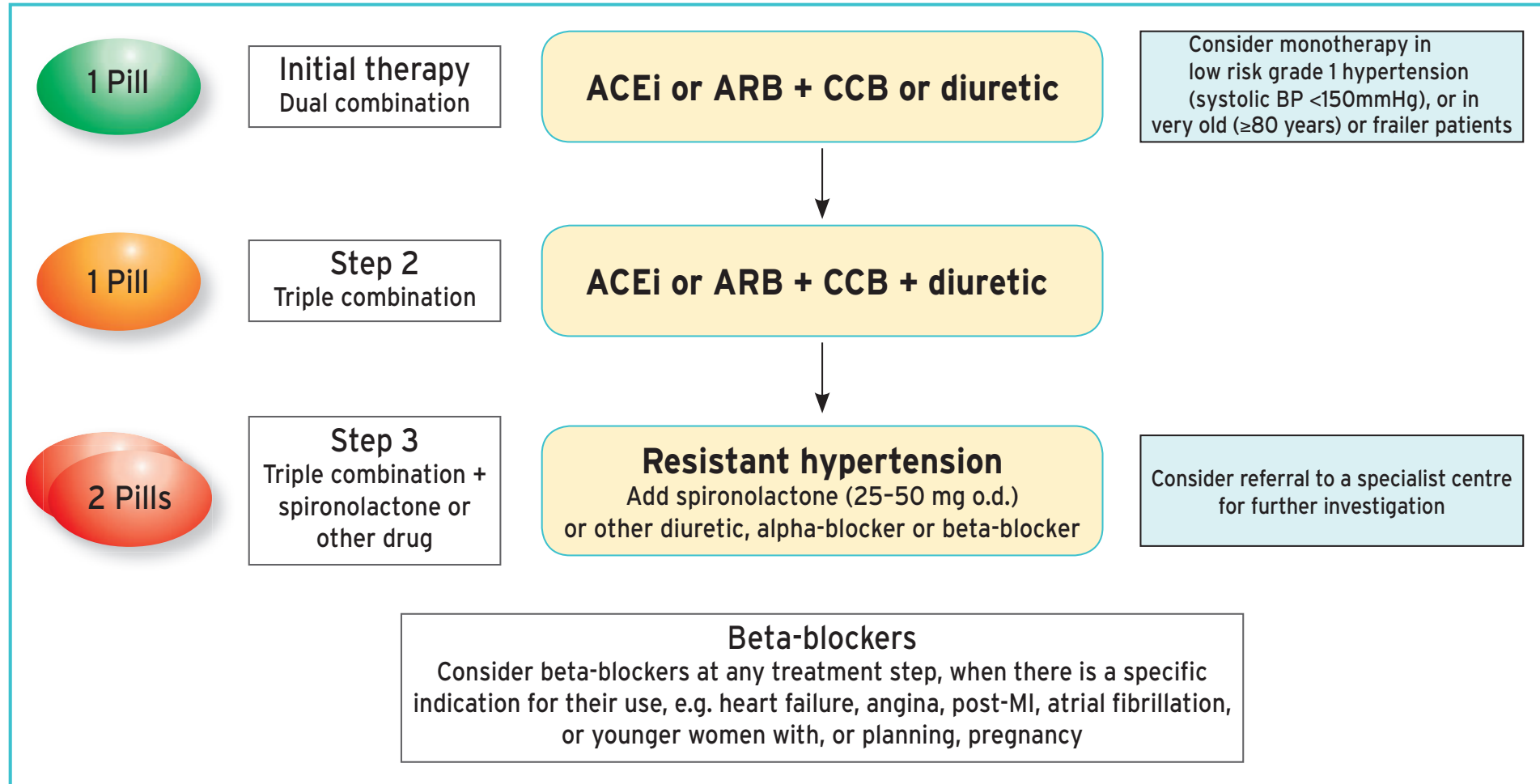
In people with ischaemic stroke or TIA, we support initiation of a combination of two blood pressure lowering drugs to reduce the risk of recurrent stroke, with consideration of monotherapy where there are potential risks of hypotension, such as in frail, elderly people and people with borderline hypertension

In adult people with ischaemic stroke or TIA there is continued uncertainty over the initiation of two blood pressure lowering medications compared to monotherapy.

TRIDENT trial

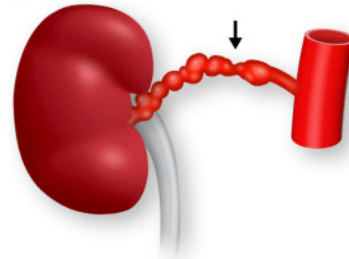


Core drug treatment strategy in hypertension

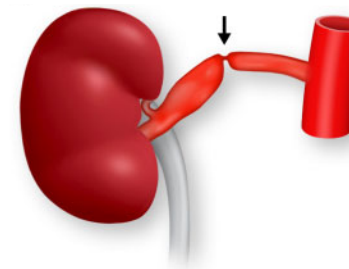


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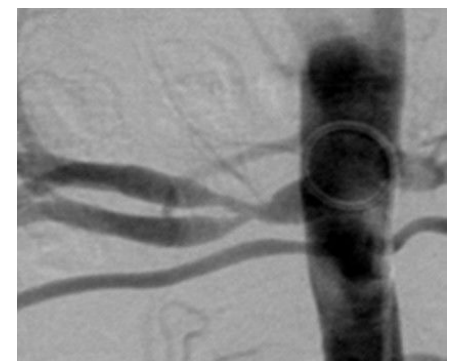
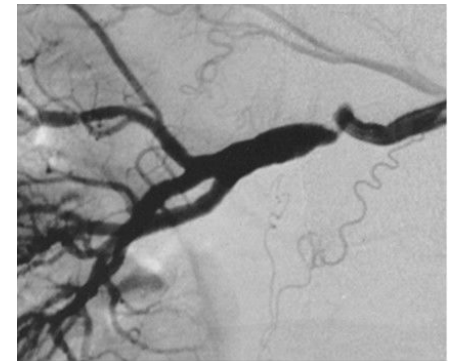
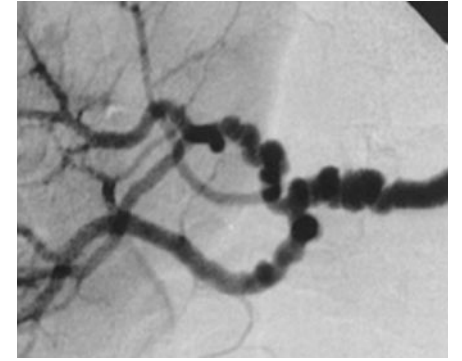
Cervical artery dissection and FMD



Multifocal ('string-of-beads')



Focal



Prevalence of FMD in patients with SCeAD

Study	Registry; (country)	SCeAD Patients, n	FMD, n (%)	Imaging
Bonacina et al. (2021)	IPSYS; Italy	1283	103 (8)	Only cervical
Talarowska et al. (2019)	ARCADIA-POL (Poland)	43	17 (39.5)	Head-pelvic
Bejot et al. (2014)	CADISP study (Europe, Argentina)	983	41 (5.6)	Only cervical
Von Babo et al. (2013)	(Switzerland, France)	970	18 (7.9)	Only cervical
Hassan et al. (2013)	The U.S.	46	6 (13.0)	Only cervical
De Bray et al. (2007)	France	103	17 (16.5)	Only cervical
Dziewas et al. (2003)	Germany	126	16 (12.7)	Only cervical
Baumgartner et al. (2001)	Switzerland	77	4 (5.2)	Only cervical
Overall composite		3631	222 (6.1)	

Dutch FMD Registry

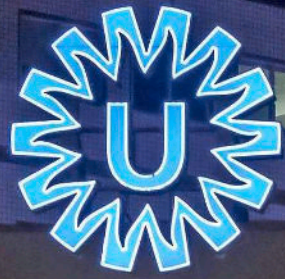
- Dutch network:
 - UMC Utrecht (coordinating center)
 - Amsterdam UMC
 - Elisabeth-TweeSteden Ziekenhuis
 - Erasmus MC
 - Jeroen Bosch Ziekenhuis
 - Haaglanden MC
 - Maastricht UMC+
 - Radboudumc
 - Zuyderland MC



- Inclusion criteria:
 - Fibromuscular dysplasia
 - Spontaneous coronary artery dissection (SCAD)
 - Spontaneous cervical artery dissection (SCeAD)

Conclusions

- Hypertension is most important risk factor for stroke
- Recent guidelines recommend BP target <130/80 mmHg after stroke/TIA
- (Single pill) combination therapy of antihypertensive medication results in better BP AND risk reduction



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