



ESRC Business and Local Government
Data Research Centre



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The ideal blood pressure: assessment of fixed and variant targets over time in clinical trial and routine clinical practice

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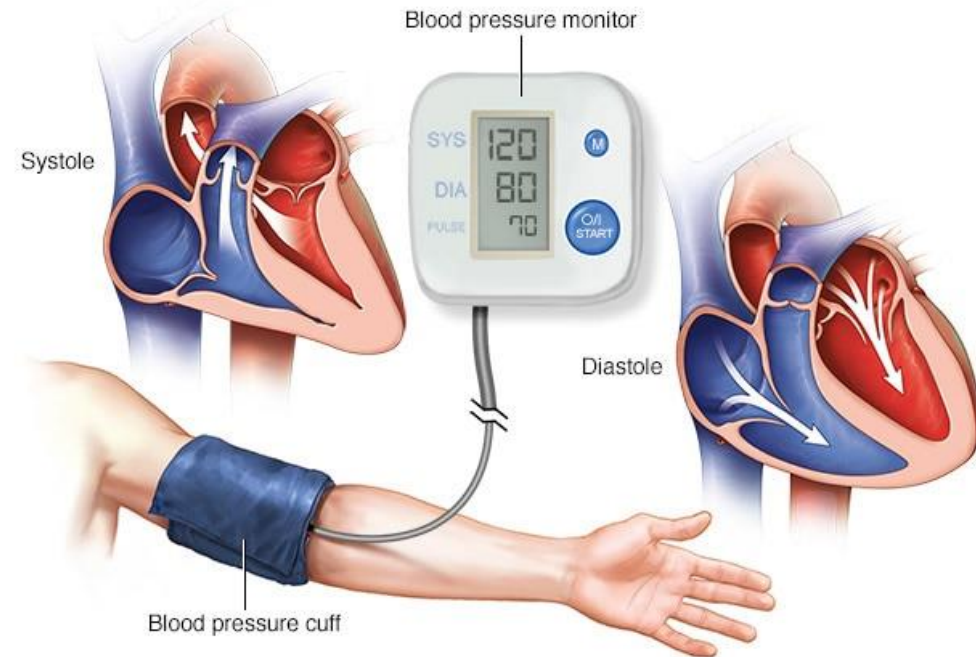
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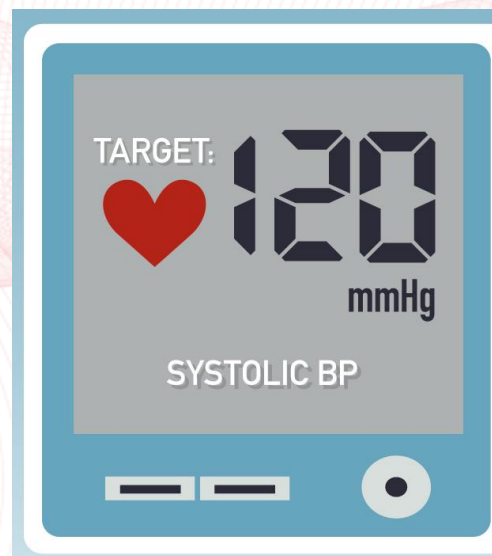


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Rationale

- High blood pressure is a leading risk factor of the global burden of disease (GBD 2016).
- SPRINT results showed great survival benefits of intensive treatment of systolic blood pressure (SPRINT 2015).
- Different updated American and United Kingdom clinical guidelines.



LOWER BLOOD PRESSURE TARGET

DRAMATIC RESULTS

25%

lower rates of heart attack, heart failure, and other cardiovascular events

27%

lower risk of death

Source: UAB 2015



Research question

- What are the survival prospects and renal side effects of intensive treatment of systolic blood pressure to <120 mmHg versus standard treatment to <140 mmHg in the US clinical trial SPRINT in comparison to similar hypertensive patients managed in routine primary care in the UK?
- Paper under review:
Gitsels LA, Kulinskaya E, Bakbergenuly I, Steel N. Optimal systolic blood pressure targets in routine clinical care. Journal of Hypertension.



Study design of SPRINT

- SPRINT: US randomised control trial.
 - Enrolment of Nov2010-Mar2013 and follow-up to Aug2015.
 - Sample of people aged 50 to 90 with systolic blood pressure of 130-180 mmHg and increased risk of cardiovascular disease, and no history of cancer, dementia, diabetes, heart failure, or stroke.
 - Randomly assigned intensive treatment of lowering systolic blood pressure to <120 mmHg or standard treatment to <140 mmHg.
 - Our additional exclusion criteria: history of chronic kidney disease at baseline, not prescribed antihypertensive drugs at trial entry, or not reached the target blood pressure in six months.



Study design of THIN

- THIN: UK primary care database.
 - 2 cohorts: same dates as SPRINT / extended dates with enrolment of Jan2005-Dec2013 and follow-up to Jan2017.
 - Patients selected whose systolic blood pressure reduced from 141-180 mmHg (baseline) to either 121-140 mmHg (standard treatment) or 70-120 mmHg (intensive treatment) within six months.
 - Same selection criteria as SPRINT plus:
 - diagnosis of hypertension at baseline or at least one ongoing antihypertensive drug prescription in the month prior to the baseline, and
 - change in antihypertensive treatment in the month prior to the dropped blood pressure.



Methodology

- Outcomes: time to all-cause mortality and time to chronic kidney disease (eGFR to <60 ml/min/1.73m²)
- Exposures: intensive treatment (SBP target <120 mmHg) vs standard treatment (SBP target <140 mmHg); number of antihypertensive drugs; and change in number of drugs.
- Confounders: sex, age, ethnicity (SPRINT only), deprivation (THIN only), systolic blood pressure (SBP), cardiovascular disease, aspirin, statin, smoking status, body mass index, and clinical site.
- Regression: standard Cox's.
 - Tested for competing risks adaption, which provided similar results.
 - Tested for interactions between treatment type and other factors.
 - Tested for time-dependent effects.

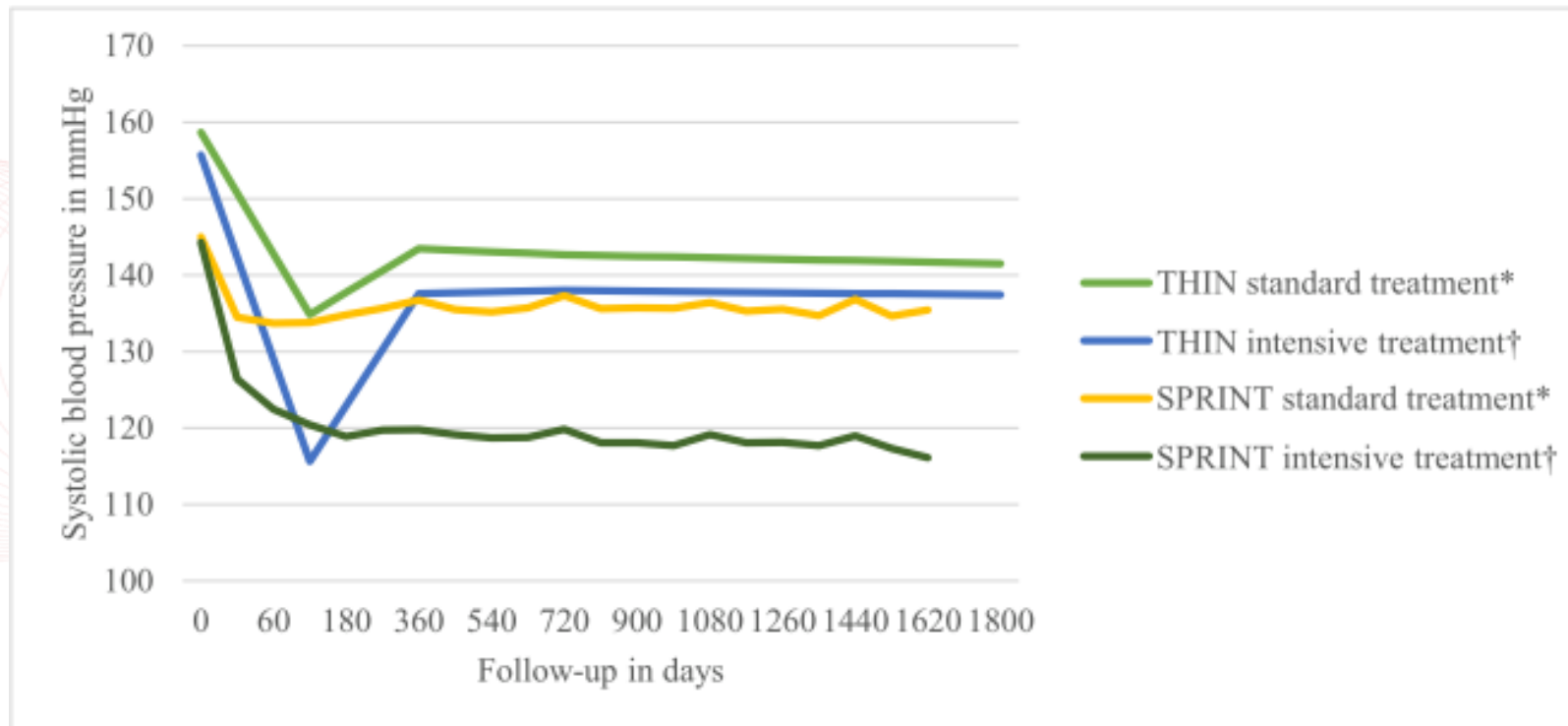


Results: cohorts' characteristics

	SPRINT	THIN_spr	THIN_ext
Study period	2010-15	2010-15	2005-17
Sample size	4,165	8,361	54,683
Exposure intensive treatment (SBP<120 mmHg)	45%	43%	36%
Outcome death	3%	3%	12%
Outcome chronic kidney disease	3%	4%	15%



Results: systolic blood pressure



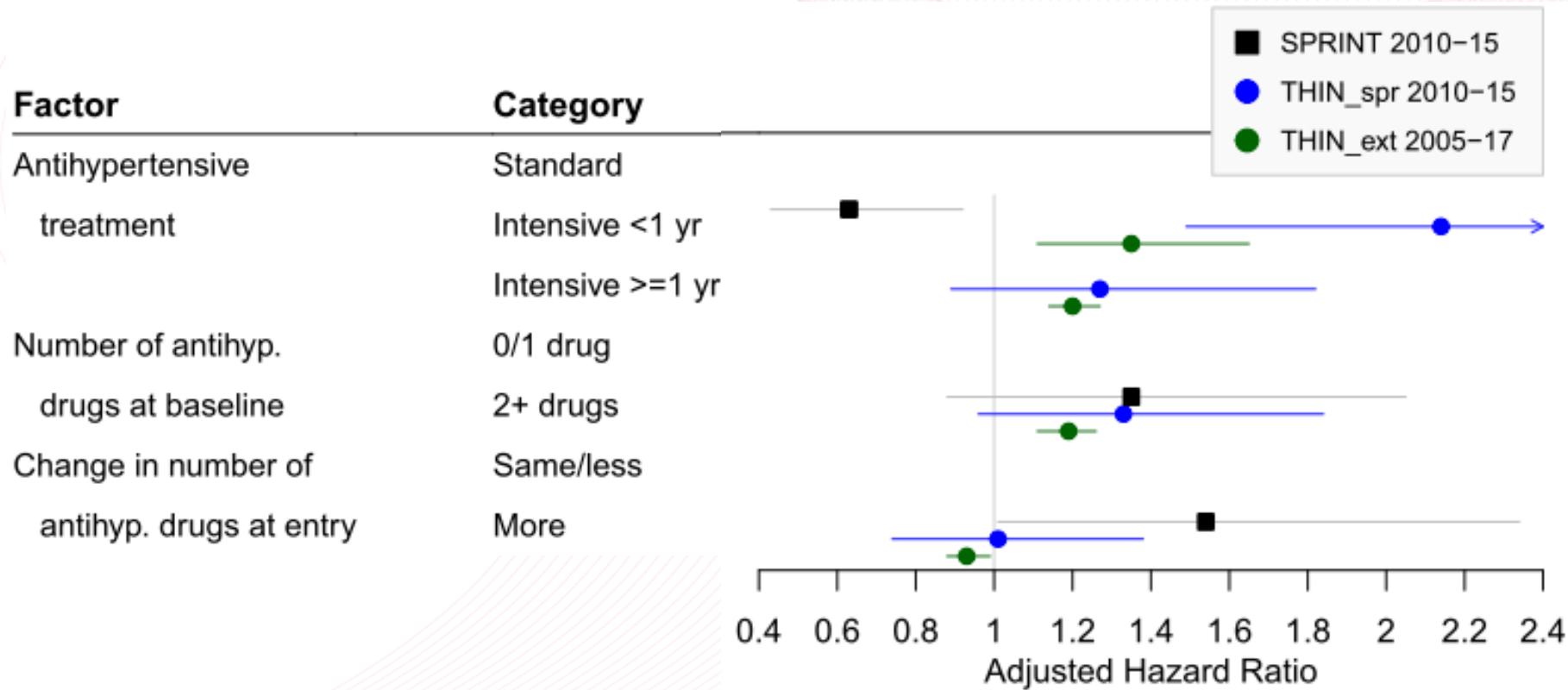
*Standard treatment of systolic blood pressure <140 mmHg.

†Intensive treatment of systolic blood pressure <120 mmHg.



Results: regression models

- Adjusted effects of antihypertensive treatment associated with the hazard of all-cause mortality.



Standard SBP <140 mmHg vs intensive SBP < 120mmHg



Discussion

- Study found intensive treatment associated with survival benefits in SPRINT, but survival harms in THIN, which were time-dependent.
- Study found intensive treatment associated with increased hazard of chronic kidney disease, where the hazards were higher in SPRINT and dependent on number of drugs in THIN.
(Results not shown.)
- Possible explanations for different results:
 - how blood pressure was measured, and
 - stable/unstable follow-up blood pressure.



Recommendations

- Study suggests that the optimal systolic blood pressure is <140 mmHg in hypertensive patients treated in routine clinical practice.
- However, lowering systolic blood pressure to <120 mmHg might be beneficial in some selective and closely monitored group of patients.



References

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Any questions?

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