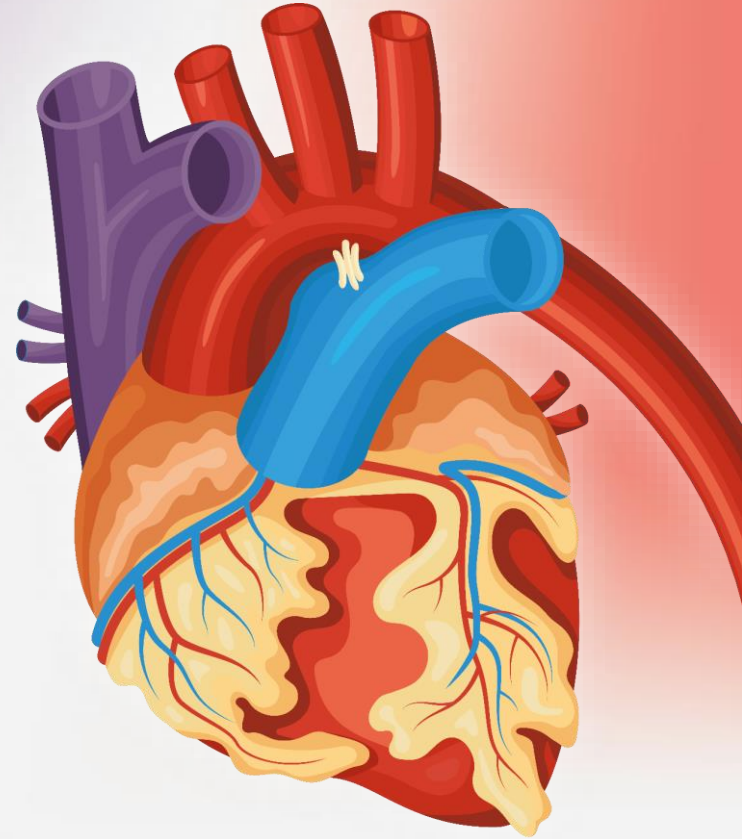


**Title:**  
Lowering systolic blood pressure to less than 120 mm Hg versus less than 140 mm Hg in patients with high cardiovascular risk with and without diabetes or previous stroke: an open-label, blinded-outcome, randomised trial

**present by: Alireza Zamani**

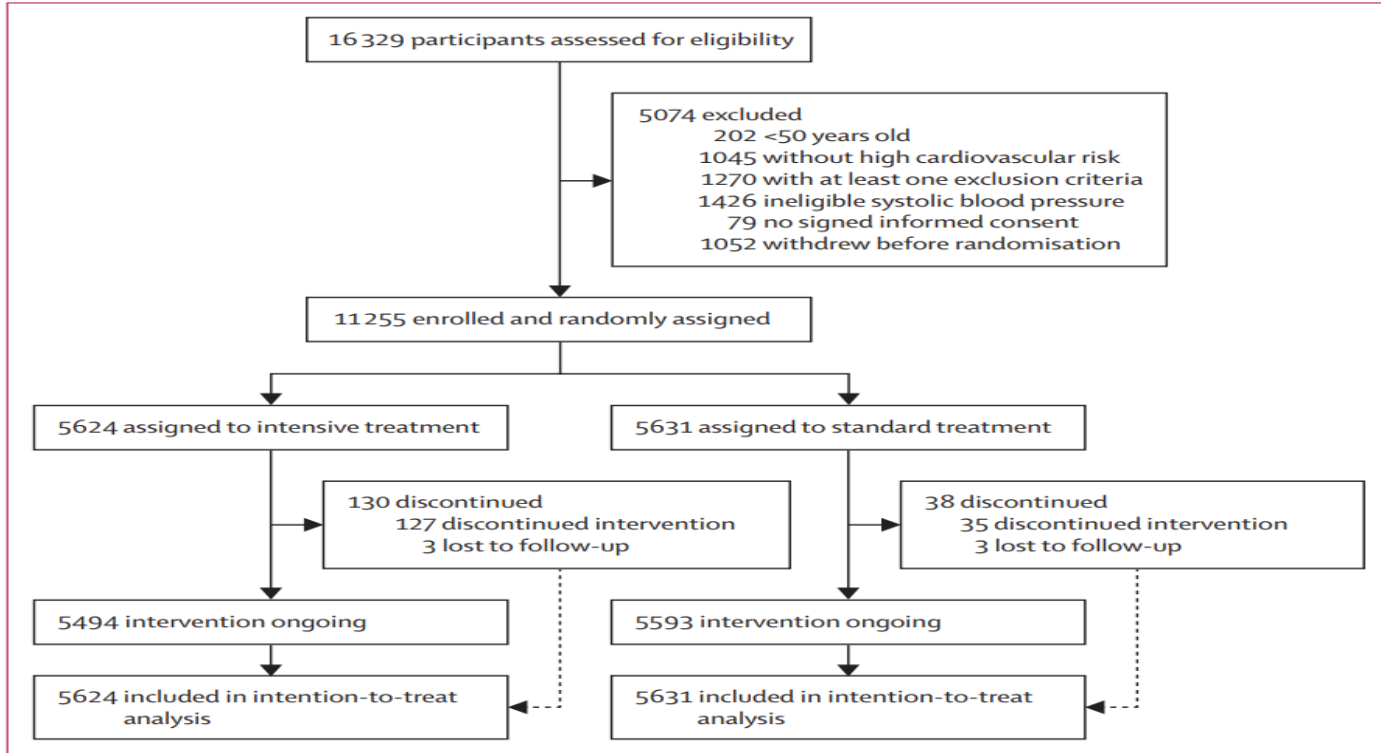


## Introduction



- Elevated blood pressure is the largest modifiable contributor for cardiovascular disease and premature death worldwide.
- most current clinical guidelines do not recommend lowering systolic blood pressure to less than 120 mm Hg.
- The ACCORD trial compared the two systolic blood pressure targets in patients with diabetes and the RESPECT trial in those with history of stroke, and both obtained nonsignificant results.
- SPRINT is the only trial that proved targeting systolic blood pressure of less than 120 mm Hg was more effective in reducing the risk of major vascular events than standard treatment in patients with high cardiovascular risk and without diabetes or stroke.

# Methods



# Methods



- Inclusion criteria:
- Age at least 50 + BP (130-180) + high cardiovascular risk
  - established cardiovascular disease ,or
  - at least two major cardiovascular risk factors
    - aged 60 years
    - older for men or 65 years or older for women,
    - Diabetes
    - Dyslipidemia
    - current smoker

## Methods



- Exclusion criteria
  - secondary cause of hypertension
  - one-minute standing systolic blood pressure of less than 110 mm Hg
  - scheduled revascularisation within the next 6 months
  - EF less than 35%
  - GFR less than 45

# Methods



|                            | <b>Intensive<br/>treatment<br/>(n=5624)</b> | <b>Standard<br/>treatment<br/>(n=5631)</b> |
|----------------------------|---|--|
| <b>Age, years</b>          |   |  |
| Mean                       | 64.6 (7.1)                                  | 64.6 (7.2)                                 |
| <b>Distribution</b>        |   |  |
| <60                        | 1395 (24.8%)                                | 1412 (25.1%)                               |
| 60–69                      | 2864 (50.9%)                                | 2835 (50.4%)                               |
| ≥70                        | 1365 (24.3%)                                | 1384 (24.6%)                               |
| <b>Sex</b>                 |   |  |
| Female                     | 2327 (41.4%)                                | 2323 (41.3%)                               |
| Male                       | 3297 (58.6%)                                | 3308 (58.8%)                               |
| <b>Region*</b>             |   |  |
| Northern                   | 4465 (79.4%)                                | 4466 (79.3%)                               |
| Southern                   | 1159 (20.6%)                                | 1165 (20.7%)                               |
| <b>Smoking status</b>      |   |  |
| Current smoker             | 1739 (30.9%)                                | 1777 (31.6%)                               |
| Former smoker              | 1084 (19.3%)                                | 1086 (19.3%)                               |
| Never smoker               | 2801 (49.8%)                                | 2768 (49.2%)                               |
| <b>Alcohol consumption</b> |   |  |
| Not drinking               | 3831 (68.1%)                                | 3847 (68.3%)                               |
| Moderate drinking          | 1148 (20.4%)                                | 1107 (19.7%)                               |
| Excessive drinking†        | 645 (11.5%)                                 | 677 (12.0%)                                |

# Methods



|   |                 |                 |
|---|-----------------|-----------------|
| <b>BMI, kg/m<sup>2</sup></b>  |                 |                 |
| Mean  | 26.3 (3.3)      | 26.3 (3.3)      |
| <b>Distribution</b>   |                 |                 |
| <24   | 1337 (23.8%)    | 1368 (24.3%)    |
| ≥24 to <28  | 2741 (48.7%)    | 2688 (47.7%)    |
| ≥28   | 1540 (27.4%)    | 1568 (27.9%)    |
| Missing data  | 6 (0.1%)        | 7 (0.1%)        |
| <b>Time from hypertension diagnosis to randomisation visit, years</b> |                 |                 |
| Median,   | 10.3 (5.0–18.6) | 10.4 (5.0–19.0) |
| <b>Distribution</b>   |                 |                 |
| <5  | 1400 (24.9%)    | 1347 (23.9%)    |
| ≥5 to <10   | 1133 (20.2%)    | 1118 (19.9%)    |
| ≥10 to <20  | 1898 (33.8%)    | 1932 (34.3%)    |
| ≥20   | 1193 (21.2%)    | 1234 (21.9%)    |
| <b>Diabetes‡</b>  | 2180 (38.8%)    | 2179 (38.7%)    |
| <b>Time from diabetes diagnosis to randomisation visit, years</b>     |                 |                 |
| Median  | 6.9 (2.7–12.2)  | 7.0 (3.0–13.0)  |
| <b>Distribution</b>   |                 |                 |
| <4  | 725 (33.3%)     | 684 (31.4%)     |
| ≥4 to <10   | 654 (30.0%)     | 658 (30.2%)     |
| ≥10   | 801 (36.7%)     | 837 (38.4%)     |
| <b>Previous disease‡</b>  |                 |                 |
| Coronary heart disease§   | 1632 (29.0%)    | 1620 (28.8%)    |
| Stroke  | 1520 (27.0%)    | 1502 (26.7%)    |
| Peripheral artery disease¶  | 44 (0.8%)       | 28 (0.5%)       |
| Abdominal aortic aneurysm   | 3 (0.1%)        | 4 (0.1%)        |
| Atrial fibrillation   | 113 (2.0%)      | 112 (2.0%)      |

# Methods



|  | <b>Intensive<br/>treatment<br/>(n=5624)</b> | <b>Standard<br/>treatment<br/>(n=5631)</b> |
|--|---|--|
| (Continued from previous column)       |   |  |
| Distribution                           |   |  |
| <141                                   | 1871 (33.3%)                                | 1872 (33.2%)                               |
| 141–50                                 | 1833 (32.6%)                                | 1791 (31.8%)                               |
| >150                                   | 1920 (34.1%)                                | 1968 (35.0%)                               |
| Diastolic blood pressure, mm Hg        |   |  |
| Mean                                   | 82.8 (10.1)                                 | 82.9 (10.5)                                |
| Distribution                           |   |  |
| <78                                    | 1715 (30.5%)                                | 1693 (30.1%)                               |
| 78–86                                  | 1899 (33.8%)                                | 1851 (32.9%)                               |
| >86                                    | 2010 (35.7%)                                | 2087 (37.1%)                               |
| eGFR, mL/min per 1.73 m <sup>2**</sup> |   |  |
| Mean                                   | 83.2 (13.6)                                 | 83.5 (13.7)                                |
| <60                                    | 337 (6.0%)                                  | 340 (6.0%)                                 |
| Missing data                           | 23 (0.4%)                                   | 11 (0.2%)                                  |
| Total cholesterol, mmol/L††            |   |  |
| Mean                                   | 4.0 (1.2)                                   | 4.0 (1.2)                                  |
| Missing data                           | 23 (0.4%)                                   | 11 (0.2%)                                  |
| LDL cholesterol, mmol/L††              |   |  |
| Mean                                   | 2.3 (0.8)                                   | 2.3 (0.8)                                  |
| Missing data                           | 23 (0.4%)                                   | 11 (0.2%)                                  |



## Methods

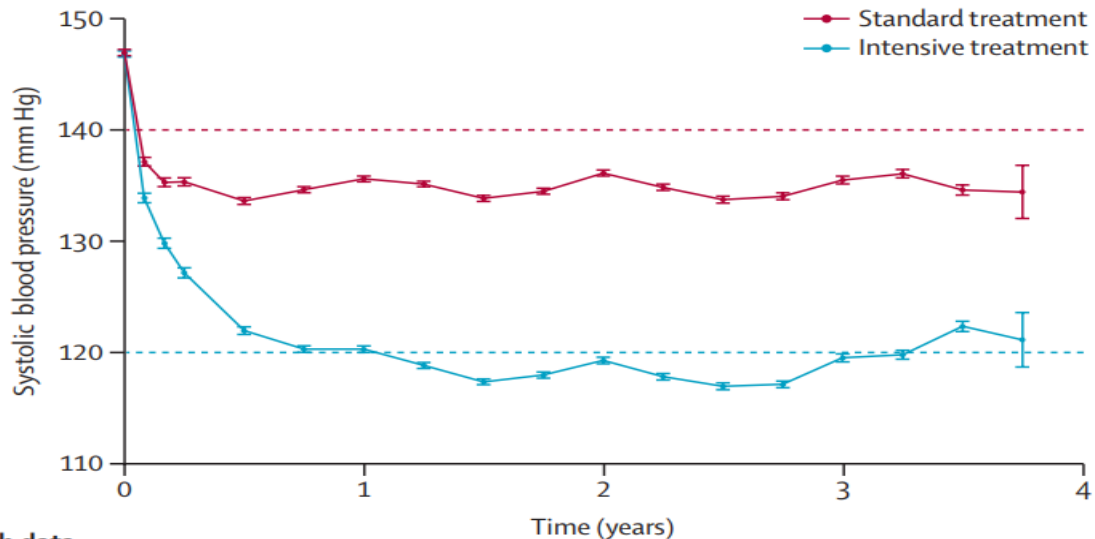


|  |              |              |
|--|--------------|--------------|
| LDL cholesterol, mmol/L††              |              |              |
| Mean                                   | 2.3 (0.8)    | 2.3 (0.8)    |
| Missing data                           | 23 (0.4%)    | 11 (0.2%)    |
| HDL cholesterol, mmol/L††              |              |              |
| Mean                                   | 0.9 (0.3)    | 0.9 (0.3)    |
| Missing data                           | 23 (0.4%)    | 11 (0.2%)    |
| Total triglycerides, mmol/L††          |              |              |
| Mean                                   | 1.7 (1.1)    | 1.7 (1.1)    |
| Missing data                           | 23 (0.4%)    | 11 (0.2%)    |
| Number of antihypertensive medications |              |              |
| 0                                      | 149 (2.7%)   | 149 (2.7%)   |
| 1                                      | 2437 (43.3%) | 2451 (43.5%) |
| 2                                      | 2154 (38.3%) | 2111 (37.5%) |
| 3                                      | 761 (13.5%)  | 787 (14.0%)  |
| ≥4                                     | 123 (2.2%)   | 133 (2.4%)   |
| Statin use‡‡                           | 2623 (46.6%) | 2591 (46.0%) |
| Aspirin use                            | 2419 (43.0%) | 2398 (42.6%) |



- The primary outcome
  - major vascular events
    - a composite of myocardial infarction, coronary or noncoronary revascularisation, hospitalisation or emergency room visit for heart failure, stroke, or death from cardiovascular causes
- secondary outcomes
  - included components of the primary composite outcome, death from any cause, a composite of the primary outcome or death from any cause, and composite kidney outcome

# Results and Discussion



**Number with data**

|                     |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| Standard treatment  | 5631 | 5077 | 5283 | 5223 | 5081 | 4791 | 4180 | 3226 |
| Intensive treatment | 5624 | 5029 | 5276 | 5205 | 5075 | 4832 | 4211 | 3250 |

**Mean number of medications**

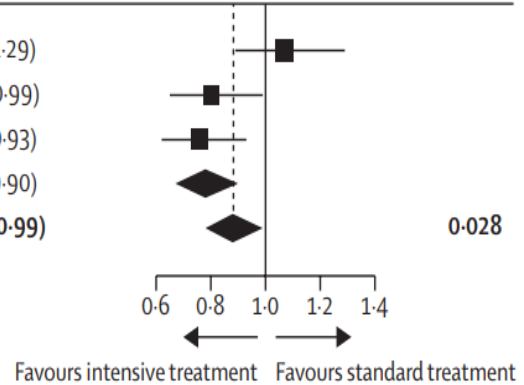
|                     |     |     |     |     |     |     |     |     |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Standard treatment  | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |
| Intensive treatment | 1.7 | 2.5 | 2.6 | 2.7 | 2.7 | 2.8 | 2.8 | 2.8 |

# Results and Discussion



**B**

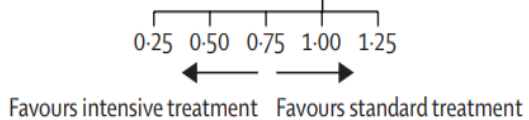
| First event         | (n participants with event [% per year]) |                    | Hazard ratio (95% CI)   | p value |
|---------------------|--|--------------------|-------------------------|---------|
|                     | Intensive treatment                      | Standard treatment |                         |         |
| ≤1 year             | 226 (4.1%)                               | 211 (3.8%)         | 1.07 (0.89–1.29)        | 0.028   |
| >1 year to ≤2 years | 156 (3.0%)                               | 195 (3.7%)         | 0.80 (0.65–0.99)        |         |
| >2 years            | 165 (2.6%)                               | 217 (3.4%)         | 0.76 (0.62–0.93)        |         |
| >1 year             | 321 (2.7%)                               | 412 (3.5%)         | 0.78 (0.67–0.90)        |         |
| <b>Overall</b>      | <b>547 (3.2%)</b>                        | <b>623 (3.6%)</b>  | <b>0.88 (0.78–0.99)</b> |         |



# Results and Discussion



|  | Intensive treatment<br>(n=5624) | Standard treatment<br>(n=5631) | Hazard ratio (95% CI)   |  | p value      |
|--|---------------------------------|--------------------------------|-------------------------|--|--------------|
| Myocardial infarction                                  | 82 (1.5%)                       | 91 (1.6%)                      | 0.90 (0.67-1.22)        |  | 0.50         |
| Stroke   | 262 (4.7%)                      | 303 (5.4%)                     | 0.86 (0.73-1.02)        |  | 0.083        |
| Heart failure  | 57 (1.0%)                       | 78 (1.4%)                      | 0.73 (0.52-1.03)        |  | 0.072        |
| Death from cardiovascular causes                       | 59 (1.1%)                       | 97 (1.7%)                      | 0.61 (0.44-0.84)        |  | 0.0027       |
| <b>Major vascular events without revascularisation</b> | <b>417 (7.4%)</b>               | <b>495 (8.8%)</b>              | <b>0.84 (0.74-0.96)</b> |  | <b>0.010</b> |
| Coronary revascularisation                             | 183 (3.3%)                      | 182 (3.2%)                     | 1.01 (0.82-1.24)        |  | 0.94         |
| Non-coronary revascularisation                         | 23 (0.4%)                       | 22 (0.4%)                      | 1.05 (0.58-1.88)        |  | 0.88         |
| <b>Major vascular events (primary outcome)</b>         | <b>547 (9.7%)</b>               | <b>623 (11.1%)</b>             | <b>0.88 (0.78-0.99)</b> |  | <b>0.028</b> |
| Death from any cause                                   | 160 (2.8%)                      | 203 (3.6%)                     | 0.79 (0.64-0.97)        |  | 0.025        |
| <b>Primary outcome or death from any cause</b>         | <b>637 (11.3%)</b>              | <b>714 (12.7%)</b>             | <b>0.89 (0.80-0.99)</b> |  | <b>0.039</b> |



## Results and Discussion



|   | Intensive treatment<br>(n=5624) | Standard treatment<br>(n=5631) | Hazard ratio<br>(95% CI) | p value |
|---|---------------------------------|--------------------------------|--------------------------|---------|
| Serious adverse event*                        | 2366 (42.1%)                    | 2378 (42.2%)                   | 1.01 (0.95–1.07)         | 0.78    |
| Conditions of interest                        |                                 |                                |                          |         |
| Serious adverse event only                    |                                 |                                |                          |         |
| Hypotension†                                  | 7 (0.1%)                        | 3 (0.1%)                       | 2.33 (0.60–9.02)         | 0.22    |
| Syncope‡                                      | 24 (0.4%)                       | 8 (0.1%)                       | 3.00 (1.35–6.68)         | 0.0071  |
| Electrolyte abnormality                       | 9 (0.2%)                        | 13 (0.2%)                      | 0.69 (0.30–1.62)         | 0.40    |
| Injurious fall§                               | 29 (0.5%)                       | 20 (0.4%)                      | 1.45 (0.82–2.57)         | 0.20    |
| Acute kidney injury¶                          | 3 (0.1%)                        | 2                              | 1.50 (0.25–8.99)         | 0.66    |
| Emergency room visit or serious adverse event |                                 |                                |                          |         |
| Hypotension†                                  | 17 (0.3%)                       | 5 (0.1%)                       | 3.40 (1.26–9.22)         | 0.016   |
| Syncope‡                                      | 26 (0.5%)                       | 12 (0.2%)                      | 2.17 (1.09–4.30)         | 0.027   |
| Electrolyte abnormality                       | 10 (0.2%)                       | 13 (0.2%)                      | 0.77 (0.34–1.76)         | 0.53    |
| Injurious fall§                               | 40 (0.7%)                       | 33 (0.6%)                      | 1.21 (0.77–1.92)         | 0.41    |
| Acute kidney injury¶                          | 3 (0.1%)                        | 2                              | 1.50 (0.25–8.99)         | 0.66    |
| Monitored electrolyte disturbances            |                                 |                                |                          |         |
| Serum sodium <130 mmol/L                      | 92 (1.6%)                       | 60 (1.1%)                      | 1.54 (1.11–2.14)         | 0.0090  |
| Serum sodium >150 mmol/L                      | 15 (0.3%)                       | 21 (0.4%)                      | 0.72 (0.37–1.39)         | 0.32    |
| Serum potassium <3.0 mmol/L                   | 97 (1.7%)                       | 91 (1.6%)                      | 1.07 (0.80–1.43)         | 0.64    |
| Serum potassium >5.5 mmol/L                   | 105 (1.9%)                      | 98 (1.7%)                      | 1.07 (0.82–1.42)         | 0.61    |

**Thanks for your attention**

