Time to intensify blood pressure treatment in people with type 2 diabetes?

The randomised BPROAD study, published in the *New England Journal of Medicine*, demonstrated that reducing systolic blood pressure to <120 mmHg versus <140 mmHg in people with type 2 diabetes at risk of cardiovascular disease resulted in a reduction in the composite of first occurrence of a major adverse cardiovascular event or treatment or hospitalisation for heart failure. Over a median of 4.2 years, there was a 21% reduction in events with systolic BP <120 mmHg compared to <140 mmHg, with benefits accruing by 1 year. Fatal and non-fatal stroke risk was also significantly reduced with intensive blood pressure control, but there was no difference in all-cause mortality. The study was carried out in China but results were similar to those in the SPRINT trial conducted in the US in people without type 2 diabetes. This alignment of hypertension trial results suggests that the time is right to consider lower blood pressure targets in people with type 2 diabetes, and primary care clinicians are in the ideal place to ensure people gain these benefits.

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Hypertension increases the risk of cardiovascular (CVD), renal and retinal disease in people with type 2 diabetes, but the optimal blood pressure target for those with type 2 diabetes is still not clear.

The SPRINT trial previously demonstrated that a systolic blood pressure (BP) target of <120 mmHg resulted in a 27% reduction in risk of major adverse cardiovascular events (MACE) than a target of <140 mmHg, but the study excluded people with type 2 diabetes (SPRINT Research Group, 2015).

The ACCORD BP trial compared intensive systolic BP lowering to <120 mmHg versus <140 mmHg but also compared intensive versus standard blood glucose targets in nearly 5000 people with type 2 diabetes of around 10 years' duration (ACCORD Study Group, 2010). The study found no difference in the risk of MACE (defined as non-fatal myocardial infarction, non-fatal stroke or cardiovascular death) between the two BP groups, although there was a reduction in stroke in those in the intensive BP arm. However, *post hoc* analysis demonstrated a significant reduction in MACE in those who were in the standard glycaemic control group and received intensive systolic BP control, suggesting that the impact of the intensive glycaemic control was impacting on CVD risk, or that trial numbers were too low given the event rates (Beddhu et al, 2018). There was a higher risk of adverse events, including hypotension, hypokalaemia, syncope arrhythmias and renal impairment, in the intensive BP arm.

Around 20% of people in the STEP (Strategy of Blood Pressure Intervention in Elderly Hypertensive Patients) trial had type 2 diabetes, and in this study a BP target of <130 mmHg achieved a 26% lower rate of CVD events or death compared to a target of <150 mmHg (Zhang et al, 2021).

Many guidelines, including the ADA Standards of Care, recommend a systolic BP of <130 mmHg in people with type 2 diabetes. However, NICE and the British and Irish Hypertension Society recommend a target of <140/90 mmHg for clinic BP in those aged <80 years and <150/90 mmHg for those 80 years and older. NICE only recommends a BP target of <130/80 mmHg in people with chronic kidney disease and an albumin:creatinine ratio of ≥70 mg/mol (see our *Need to know guide* for more information).

The BPROAD study

In the BPROAD study, carried out in China, Bi and colleagues randomised 12 821 people with type 2 diabetes and increased CVD risk to intensive blood pressure control (target systolic

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Box 1. Lifestyle behaviours associated with reduced blood pressure and/or reduced cardiovascular risk (McEvoy et al, 2024).

- Smoking cessation
- Aerobic and resistance exercise as per guidelines
- Reducing salt intake to <5 g/day (<2 g sodium)
- Increasing potassium and fibre intake by consuming more fruit and vegetables
- Eating a Mediterranean or DASH diet
- Reducing alcohol intake to recommended levels, and ideally cutting it out altogether
- Avoiding sugar-sweetened and energy drinks
- Maintaining as close to an optimal weight as possible (BMI 20–25 kg/m^2)
- 7–9 hours of sleep per night

BP <120 mmHg) versus standard control (systolic BP <140 mmHg), and followed them for up to 5 years. The primary outcome was a composite of first occurrence of 3-point MACE (non-fatal myocardial infarction, non-fatal stroke or cardiovascular death) and treatment or hospitalisation for heart failure.

Baseline systolic blood pressure was around 140 mmHg in both groups and decreased rapidly, with participants achieving a mean level of 121.6 mmHg (median 118.3 mmHg) in the intensive arm and 133.2 mmHg (median 135 mmHg) in the standard group at 1 year. Around 60% of the intensive group reached target after 1 year.

Over a median of 4.2 years, a primary outcome event occurred in 393 people in the intensive treatment group compared with 492 people in the standard BP group (1.65 vs 2.09 events per 100 person-years), giving a significant hazard ratio of 0.79. The Kaplan–Meier curves for the primary outcome separated after around 1 year.

The rate of stroke (fatal or non-fatal) was reduced in the intensive versus standard group (1.19 vs 1.50 events per 100 person-years). Unlike in SPRINT, however, there was no significant difference in all-cause mortality between the treatment arms. Chronic kidney disease development and progression was similar in the two groups, as were other secondary outcomes, including myocardial infarction, treatment or hospitalisation for heart failure and cardiovascular death.

An accompanying editorial highlights the much lower rates of adverse events such as hypotension and falls compared to SPRINT, with no adverse kidney events (Anand and Beddhu, 2025). The authors suggest this may relate to the younger age and higher eGFR in BPROAD's participants, but it may also have been due to fewer blood tests being performed, as the trial took place partly during COVID-19 lockdown.

The trial authors highlight multiple limitations, including the fact that both the participants and the trial doctors were aware of the treatment group, although the outcome assessors were unaware. Home BP measurements and telephone data collection were used during the COVID-19 pandemic, and there were differences in diastolic BP levels between the groups, such that the difference in outcomes may not have been attributable only to systolic BP. The authors also comment that it may not be possible to generalise these findings to other ethnic groups and different populations. For example, glucose-lowering medication prescribing patterns in this study were different to UK prescribing, with a third of the study participants on alpha-glucosidase inhibitors (e.g. acarbose), 15% on a sulfonylurea, low usage of GLP-1 receptor agonists (around 4%) and only around 65% of participants on statins.

Serious adverse event rates were similar in both groups, occurring in just over 36% in each. Although absolute numbers were low, symptomatic hypotension was more common in the intensive group, and potassium levels >5.5 mmol/L occurred in 2.8% of the intensive group compared with 2.0% of the standard group.

Implications for practice

There has been major debate about BP targets in people with type 2 diabetes over recent years, and several studies are now aligned in suggesting that the NICE BP target recommendations, both for people with type 2 diabetes and without, may be too high, denying people the cardiovascular, renal and retinal benefits of more intensive BP control, if this can be achieved safely.

Lifestyle guidance for hypertension is consistent across guidelines, and adherence to the behaviours in *Box 1* have been shown to reduce both BP and CVD risk (McEvoy et al, 2024).

Bi and colleagues highlight that it may not be possible to extrapolate these findings to all populations. One of the key differences in China is the significantly higher salt intake (around 11.1 g/day) compared to UK intake, although our increased ultra-processed food consumption carries with it an increased salt intake (now at 8.1 g/day, versus a recommended intake of 5–6 g/day). However, the outcomes in BPROAD are very similar to those in SPRINT, and have been carefully scrutinised and published in a reputable, peer-reviewed journal; therefore, these findings should inform our practice.

In primary care, we are ideally placed at every diabetes check to discuss lifestyle changes and

more intensive BP management if appropriate, to identify adverse events (including postural hypotension on standing BP measurements or raised potassium on blood tests) and to enquire about problem medications resulting in non-adherence. This paper and the accompanying editorial suggest it is time to update our systolic BP targets in people with type 2 diabetes. ■

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Intensive blood-pressure control in patients with type 2 diabetes

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Practice points

1. For people with type 2 diabetes, a target systolic blood pressure of <120 mmHg, if this can be achieved safely, results in lower cardiovascular risk than the NICE recommendation of <140 mmHg.
2. Reinforce lifestyle advice to lower blood pressure (see *Box 1*) at every diabetes review.
3. Review blood pressure medications at each diabetes review to identify adverse events, issues with adherence and the potential need for more intensive blood pressure management.

Read more

How to diagnose and treat hypertension in adults with type 2 diabetes

How to diagnose and treat hypertension in accordance with updated NICE guidelines.

Diabetes & Primary Care **26**: 47–9

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