# GRENSER FOR Å INITIERE MEDIKAMENTELL BLODTRYKKS-SENKENDE BEHANDLING OG MÅLBLODTRYKK ANBEFALT I NYE (2018) EUROPEISKE HYPERTENSJONS-RETNINGSLINJER

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European Society of Cardiology (ESC) og European Society of Hypertension (ESH) har siden 2003 samarbeidet om å utgi retningslinjer for behandling av høyt blodtrykk. Disse ble revidert i 2007 og i 2013, og de har vært trykket omtrent samtidig i *European Heart Journal, Journal of Hypertension* og *Blood Pressure*. Retningslinjene har nå på nytt blitt revidert og gjort tilgjengelig ved samtidig *online*-publikasjon I European Heart Journal og Journal of Hypertension 25. August 2018. Tidsskriftene har opphavsrett til de trykkede artiklene slik de fremstår med spesifikk formattering, men foreningene ESC og ESH med tilknyttede nasjonale foreninger har opphavsrett til det faglige innhold. Etter ønske fra redaktør i *Hjerteforum* er derfor 2 viktige avsnitt fra 2018-retningslinjene, nemlig avsnittene om intervensjonsgrenser for medikamentell behandling, og avsnittet om målblodtrykk for behandlingen blitt tilpasset noe for trykking i *Hjerteforum*. Retningslinjene er skrevet på engelsk og vi har valgt å trykke disse avsnittene i *Hjerteforum* også på engelsk for å unngå unøyaktigheter og misforståelser. Det er mer hensiktsmessig ved senere anledning å oversette de langt kortere, men mer anvendelige «praksisretningslinjene» som vil bli publisert i de to hypertensjonstidsskriftene i november-desember 2018. For referanser henvises til online-publikasjonene av 25. august 2018.

## When to initiate antihypertensive treatment

### Recommendations in previous guidelines

All guidelines agree that patients with grade 2 or 3 (moderate or severe) hypertension should receive antihypertensive drug treatment alongside lifestyle interventions. Guidelines are also consistent in recommending that patients with grade 1 (mild) hypertension (140-159/90-99 mmHg) and high cardiovascular (CV) risk or hypertension mediated organ damage (HMOD) should be treated with blood pressure (BP)-lowering drugs. There has been less consistency about whether BP-lowering drugs should be offered to patients with grade 1 hypertension and low-to-moderate CV risk or grade 1 hypertension in older patients (> 60 years), or the need for BP-lowering drug treatment in patients with high-normal BP levels (130-139/80-89 mmHg). This uncertainty relates to the fact that low-risk patients with high-normal BP or grade 1 hypertension have rarely been included in randomized clinical trials (RCTs), and that in older patients, RCTs have invariably recruited patients with at least grade 2 hypertension (160-179/100-110 mmHg). New analyses and RCT data have become available in these important areas and are discussed below.

## Drug treatment for patients with grade 1 hypertension at low-to-moderate cardiovascular risk

Recent meta-analyses show significant treatment-induced reductions in CV events and mortality in patients with grade 1 hypertension. However, the first of these analyses included a substantial number of patients who had grade 1 hypertension despite existing treatment, and were therefore likely to have had initial BPs above the grade 1 range. Furthermore, many of the patients had diabetes and were therefore at high CV risk. The second meta-analysis, limited to RCTs in patients with grade 1 hypertension and low-moderate risk (five RCTs, 8974 patients), demonstrated a significant reduction in all major CV events by BP-lowering drug treatment (combined stroke and coronary artery disease [CAD] reduced by 34% and all-cause mortality by 19% for a SBP reduction of ~7 mmHg). A third analysis demonstrated benefit of BP lowering in reducing death and CVD in patients with a baseline BP 140/90 mmHg or higher but not when baseline BP was lower. These findings have been supported by the results of a subgroup analysis of the Heart Outcomes Prevention Evaluation (HOPE)-3 trial, showing a significant 27% reduction in major CV outcomes in patients at intermediate CV risk and baseline systolic blood pressure (SBP) values in the grade 1 hypertensive range (i.e. > 143.5 mmHg [mean 154 mmHg]), when SBP was lowered by drug treatment by a mean of 6 mmHg.

Based on these new data, the ESC/ESH Task Force now recommends that lifestyle advice should be accompanied by BP-lowering drug treatment in patients with grade 1 hypertension (140-159/90-99 mmHg) at low-to-moderate CV risk.

## Initiation of BP lowering drug treatment in older people with grade 1 hypertension

Discussion about the treatment of «the elderly» or «older» people has been complicated by the various definitions of older age used in RCTs. For example, older was defined as > 60 years in the earliest trials, then as 65, 70, and finally 75 years or 80 years in later trials. Chronological age is often a poor surrogate for biological age, with consideration of frailty and independence influencing the likely tolerability of BP-lowering medications. For the purposes of this guideline, the «old» are defined as ≥ 65 years and the «very old» as ≥ 80 years. The previous guideline noted that all available evidence on CV event reduction by BP lowering in older patients was obtained in patients whose baseline SBP was ≥ 160 mmHg, and there is strong evidence that these patients should be offered BP-lowering drug treatment.

Undoubtedly, there are RCTs showing outcome benefits with BP-lowering treatment in older patients whose baseline BP was in a lower systolic BP range, but these patients were often on background antihypertensive treatment, thus they cannot be defined as true grade 1 hypertension. This is also the case for the data recently published from the Systolic Blood Pressure Intervention Trial (SPRINT) trial, which included a cohort of patients older than 75 years, in whom more-intense BP lowering reduced the risk of major CV events and mortality. However, in most RCTs showing a protective effect of BP-lowering treatment in patients with an untreated baseline BP in the grade 1 hypertension range, older patients were well represented. This was further supported by the recent HOPE-3 trial, which showed beneficial effects of BP lowering on CV outcomes in patients, many with grade 1 hypertension (SBP > 143 mmHg and mean BP 154 mmHg), whose mean age was ~66 years, and in whom only 22% had prior treatment of hypertension.

The evidence supports the recommendation that older patients (> 65 years, including patients over 80 years) should be offered BP-lowering treatment if their systolic BP is ≥ 160 mmHg. There is also justification to now recommend BP-lowering treatment for old patients (> 65–80 years) at a lower BP (i.e. grade 1 hypertension; systolic BP between 140 mmHg and 159 mmHg). BP-lowering drugs should not be withdrawn on the basis of age alone. It is well established that BP-lowering treatment withdrawal leads to a marked increase in CV risk. This was exemplified in older patients by a recent subgroup analysis of Hypertension in the Very Elderly Trial

(HYVET), reporting that in patients aged ≥ 80 years, CV risk reduction was greatest in those who continued treatment rather than in those whose treatment was discontinued. As stated above, all of the above recommendations relate to relatively fit and independent older patients, because physically and mentally frail and institutionalized patients have been excluded in most RCTs of patients with hypertension.

## Initiation of BP lowering drug treatment in patients with high-normal BP

The previous (2013) guidelines recommended not to initiate antihypertensive treatment in people with high-normal BP and low-moderate CV risk. This recommendation is further supported by new evidence:

i. In all RCTs (including SPRINT) and meta-analyses that have reported reduced major outcomes by lowering «baseline» BP in the high-normal range, the «baseline» BP was commonly measured on a background of antihypertensive treatment. Therefore, these studies do not provide evidence to support treatment initiation in patients without hypertension.

ii. The HOPE-3 trial, in which only 22% of the patients at intermediate CV risk had background antihypertensive treatment, showed that BP-lowering treatment did not reduce the risk of major CV events in patients with baseline SBP values in the high-normal range.

iii. A meta-analysis of 13 RCTs or RCT subgroups (involving 21,128 individuals) in patients at low-to-moderate CV risk and untreated baseline BP in the high-normal and normal range, showed no effect of BP-lowering treatment on any CV outcomes.

iv. Another recent analysis, including patients with high-normal BP, concluded that primary preventive BP lowering was associated with reduced risk for death and incident CVD if baseline SBP was 140 mmHg or higher, but at lower BP levels (i.e. high-normal BP [< 140/90 mmHg]), treatment was not associated with any benefit in primary prevention.

v. The situation may be different in very high-risk patients with a high-normal BP and established CVD. In a meta-analysis of 10 RCTs or RCT subgroups that also included individuals at high or very high CV risk, mostly with previous CVD and untreated high-normal and normal BP (*n* = 26,863), BP-lowering drug treatment, achieving a SBP reduction of 4 mmHg, reduced the risk of stroke but not any other CV events. Another analysis of trials including people with previous CAD and mean baseline SBP of 138 mmHg, treatment was associated with reduced risk for major CV events (relative risk 0.90; 95% confidence interval 0.84–0.97), but was not associated with survival (relative risk 0.98; 95% confidence interval 0.89–1.07). Thus, the benefit for treating people with high-normal BP appears marginal, and if present, appears to be restricted to those at very high CV risk and established CVD, especially CAD.

We recommend that patients with high-normal BP and low-moderate CV risk should be offered lifestyle advice because this reduces their risk of progressing to established hypertension and may further reduce their CV risk. These patients should not be offered BP-lowering drug treatment. Nevertheless, based on the data from the HOPE-3 trial, drug treatment may be considered in these patients if their BP is close to the hypertension diagnostic threshold of 140/90 mmHg, after a prolonged attempt to control BP with lifestyle changes.

BP-lowering drugs may be considered for patients with high-normal BP and established CVD, especially CAD. In these patients, monotherapy may be sufficient.

## Should BP lowering drug treatment be initiated on the basis of BP values or the level of total CV risk?

Two recent meta-analyses of RCTs have shown that when BP-lowering data are stratified according to CV risk, the relative risk reductions do not differ across the various risk strata; not surprisingly, the absolute risk reduction is greater with increasing baseline CV risk. These data have been taken as support for the hypothesis that

BP-lowering treatment should be based on CV risk and target those at greatest CV risk, irrespective of their BP. It has recently been made clear, however, that whereas patients at high or very high CV risk exhibit the greatest absolute reduction in CV outcomes with BP-lowering treatment, they also have the highest residual risk, which means failure of treatment to exert full protection. It is the opinion of the ESC/ESH Task Force that these data support earlier treatment of patients with systolic BP or diastolic BP values > 140/90 mmHg when their CV risk is still low-to-moderate, to prevent the accumulation of hypertension-mediated organ damage (HMOD and a high incidence of late treatment failure (residual risk), which would otherwise occur if treatment was delayed by a purely CV risk-based approach. The most effective strategy to reduce risk is to prevent the development of high CV risk situations with earlier intervention. The assessment of CV risk is at the core of the treatment strategy recommended by this guideline because of the frequent coexistence of multiple CV risk factors in hypertensive patients, and to inform the use of concomitant medications (e.g. statins, antiplatelet therapies, etc.) to reduce CV risk. We conclude that, in general, the decision to use BP-lowering treatment should not be based solely on the level of CV risk because even in patients at the highest risk (with established CVD), when baseline BP is below 140/90 mmHg, the benefits of BP-lowering treatment are at best marginal and most evident in patients with CAD at the upper end of the high-normal BP range.

## Initiation of BP lowering drug treatment

In patients with grade 2 or 3 hypertension, it is recommended that BP-lowering drug treatment should be initiated alongside lifestyle interventions. In patients with grade 1 hypertension and high-risk or HMOD, drug treatment should also be initiated simultaneously with lifestyle interventions. In lower risk patients with grade 1 hypertension, BP-lowering drug treatment should be initiated after 3–6 months, if BP is not controlled by lifestyle interventions alone (*Figure 1*).

The evidence is summarized in *Table 1*.

The treatment thresholds are summarized in *Table 2*.

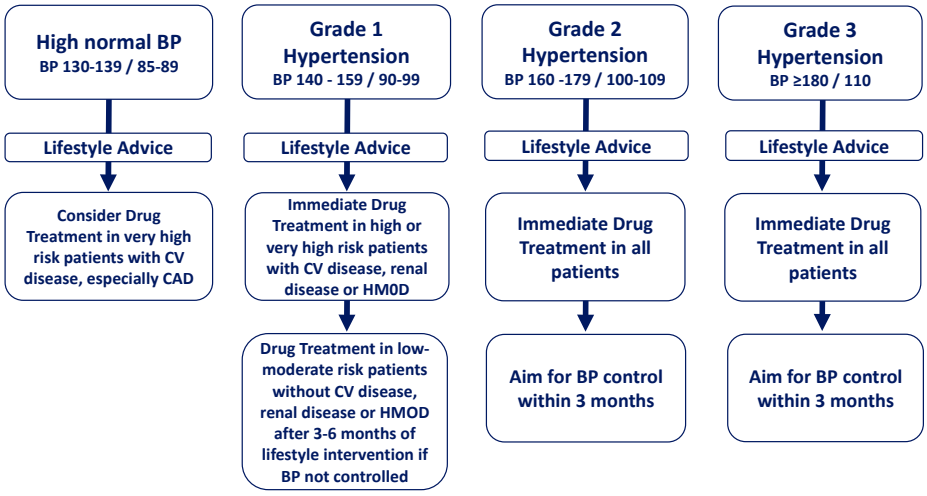


*Figure 1. Initiation of BP lowering treatment (lifestyle changes and medication) at different initial office BP levels. BP = blood pressure (mmHg); CAD = coronary artery disease; CV = cardiovascular; HMOD = hypertension-mediated organ damage.*

*Table 1. Initiation of hypertension treatment according to office BP*

| Recommendations | Class[a] | Level[b] |
|---|---|---|
| Prompt initiation of BP lowering drug treatment is recommended in patients with grade 2 or 3 hypertension at any level of CV risk, simultaneous with the initiation of lifestyle changes. | I | A |
| In patients with grade 1 hypertension: | | |
| • Lifestyle interventions are recommended to determine if this will normalize BP. | II | B |
| • In patients with grade 1 hypertension (140-159/90-99 mmHg) at low-moderate risk and without evidence of HMOD, BP-lowering drug treatment is recommended if the patient remains hypertensive after a period of lifestyle interventions. | I | A |
| • In patients with grade 1 hypertension and at high-risk or with evidence of HMOD, prompt initiation of drug treatment is recommended simultaneously with lifestyle interventions. | I | A |
| In fit older patients with hypertension (even if age > 80 years), BP-lowering drug treatment and lifestyle intervention are recommended when systolic BP is ≥ 160 mmHg. | I | A |
| BP-lowering drug treatment and lifestyle intervention are recommended in the fit older patients (> 65 years but not over 80 years) when systolic BP is in the grade 1 range (140–159 mmHg), provided that treatment is well tolerated. | I | A |
| Antihypertensive treatment may also be considered in frail older patients if tolerated. | IIb | B |
| Withdrawal of BP-lowering drug treatment on the basis of age, even when patients attain an age of ≥ 80 years, is not recommended, provided that treatment is well tolerated. | III | A |
| In patients with high-normal BP (130–139/85–89 mmHg): | | |
| • Lifestyle changes are recommended. | I | A |
| • Drug treatment may be considered when their CV is very high due to established CVD, especially CAD. | IIb | A |

*BP = blood pressure; CAD = coronary artery disease; CV = cardiovascular; CVD = cardiovascular disease; HMOD = hypertension mediated organ damage.*
*[a] Class of recommendation.*
*[b] Level of evidence.*
*[c] In patients with grade 1 hypertension and at low-to-moderate risk, drug treatment may be preceded by a prolonged period of lifestyle intervention to determine if this approach will normalize BP. The duration of the lifestyle intervention alone will depend on the level of BP within the grade 1 range, i.e. the likelihood of achieving BP control with lifestyle intervention alone, and the opportunities for significant lifestyle change in individual patients.*

# Blood pressure treatment targets

## New evidence on systolic BP and diastolic BP treatment targets

The 2013 ESC/ESH hypertension guidelines recommended an office BP treatment target of < 140/90 mmHg, regardless of the number of comorbidities and level of CV risk. The guidelines specifically stated that evidence from RCTs, meta-analysis, and post-hoc analysis of large-scale RCTs all showed no obvious incremental benefit of lowering BP to below 130/80 mmHg. Since then, new information has emerged from post-hoc analyses of large outcome trials in patients at high CV risk, registries in patients with coronary disease, and, more importantly, new RCTs and meta-analyses of all available RCT evidence. In the post-hoc RCT analyses and registry data, compared with a target systolic BP of between 130 mmHg and 139 mmHg, lowering SBP to below < 130 mmHg was, in general, associated with no further benefit on major CV events, except perhaps for further reductions in the risk of stroke. A consistent finding was that reducing SBP to < 120 mmHg increased the incidence of CV events and death.

A recent RCT relevant to the issue of target BP is SPRINT, which compared

*Table 2. Summary of office BP thresholds for treatment*

| Age group | Office SBP treatment threshold (mmHg) | | | | | Diastolic treatment threshold (mmHg) |
|---|---|---|---|---|---|---|
| | Hypertension | + Diabetes | + CKD | + CAD | + Stroke/TIA | |
| 18–65 years | ≥ 140 | ≥ 140 | ≥ 140 | ≥ 140[a] | ≥ 140[a] | ≥ 90 |
| 65–79 years | ≥ 140 | ≥ 140 | ≥ 140 | ≥ 140[a] | ≥ 140[a] | ≥ 90 |
| ≥ 80 years | ≥ 160 | ≥ 160 | ≥ 160 | ≥ 160 | ≥ 160 | ≥ 90 |
| Diastolic treatment threshold (mmHg) | ≥ 90 | ≥ 90 | ≥ 90 | ≥ 90 | ≥ 90 | |

*BP = blood pressure; CAD = coronary artery disease; CKD = chronic kidney disease; SBP = systolic blood pressure; TIA = transient ischaemic attack.*
*[a] Treatment may be considered also in very high-risk patients with high-normal SBP (i.e. SBP 130–140 mmHg).*

two different systolic BP targets (< 140 or < 120 mmHg) in > 9000 patients at high CV risk, but excluded patients with diabetes or previous stroke. More intensive BP lowering treatment (achieved SBP 121 vs 136 mmHg) was associated with a 25% reduction in major CV events and a 27% reduction in all-cause death (but no significant reduction in stroke or myocardial infarction). This outcome unquestionably provides strong support for the beneficial effects of more- versus less intensive BP lowering treatment strategies in higher risk patients. However, this RCT does not clarify the optimal BP target because the method used for office BP measurement in SPRINT (unattended automated measurement) had not been used in any previous RCTs that provide the evidence-base for the treatment of hypertension. This is because unattended automated office BP measurement results in lower BP values, relative to conventional office BP measurement, due to the absence of the white-coat effect. Thus, it has been suggested that the BP values reported in SPRINT may correspond to conventional office SBPs in the 130–140 and 140–150 mmHg ranges, in the more versus less intensive BP-lowering groups, respectively.

Some new information on systolic BP and diastolic BP targets for drug treatment has been provided by two recent, large meta-analyses of RCTs of BP lowering. In the first of these meta-analyses, achieved SBP was stratified according to three systolic BP target ranges (149–140 mmHg, 139–130 mmHg, < 130 mmHg). Lowering systolic BP to < 140 mmHg reduced the relative risk of all major CV outcomes (including mortality); similar benefits were seen when SBP was lowered to < 130 mmHg (average 126 mmHg). Importantly, the latter was also true when the achieved systolic BP in the comparator group was 130–139 mmHg. Stratification of RCTs for achieved diastolic BP, to either 89–80 mmHg or < 80 mmHg, also showed a reduction in all types of CV outcomes compared with higher diastolic BP values.

The second meta-analysis, which also included the SPRINT trial, noted that every 10 mmHg reduction in systolic BP reduced the rate of major CV events and death for baseline systolic BP values > 160 mmHg to baseline values between 130 and 139 mmHg, implying benefit at achieved systolic BP values of < 130 mmHg. Furthermore, a benefit of a 10 mmHg reduction in systolic BP was also reported for patients with a baseline systolic BP of < 130 mmHg, thereby achieving values < 120 mmHg. However, there were far fewer patients in these subgroups, and this last set of data will have been heavily influenced by the unusually low BP values in the SPRINT trial, due to the method of BP measurement (see above). Importantly, this analysis showed consistent benefit from intensive BP lowering in patients at all levels of risk, including those with and without existing CV disease, stroke, diabetes, and chronic kidney disease.

Finally, in the first meta-analysis, the incremental benefit of BP lowering on events progressively decreased as the target BP was lowered. Furthermore, an additional meta-analysis by the same group found that permanent treatment discontinuation because of treatment-related adverse effects was significantly higher in those targeted to lower BP values. Therefore, advocating more-intensive BP lowering targets for all has to be viewed in the context of an increased risk of treatment discontinuations due to adverse events, which might offset, in part or completely, the limited incremental reduction in CV risk.

Whilst considering BP targets, it is important to acknowledge that < 50% of patients treated for hypertension currently achieve a target office systolic BP of < 140 mmHg. This is a major missed opportunity for CV disease prevention in millions of people across the world.

The ESC/ESH Task Force recommends that when BP lowering drugs are used, the first objective should be to lower BP to < 140/90 mmHg in all patients. Provided that the treatment is well tolerated, treated BP values should be targeted to 130/80 mmHg or lower, in most patients, although in some groups the evidence is less compelling. In older patients (> 65 years), systolic BP should be targeted to between 130 and 140 mmHg and diastolic PB to < 80 mmHg. Treated systolic BP should not be targeted to < 120 mmHg.

Importantly, we specify a target range because the lower safety boundary assumes greater importance when BP is targeted to lower levels. Furthermore, in general, when systolic BP is lowered to < 120 mmHg in patients included in RCTs (i.e. older and higher risk patients, often with comorbidities and CVD), the risk of harm appears to increase and outweigh the benefits.

## BP targets in specific subgroups of hypertensive patients

### Diabetes mellitus

RCTs in type 1 diabetes mellitus demonstrate that BP lowering treatment has a reno-protective effect, but because these patients tend to be younger, previous RCTs have had inadequate power to study CV outcomes and to establish optimal BP targets.

In contrast, there have been many BP lowering treatment RCTs, either exclusively dedicated to patients with type 2 diabetes, or hypertension trials that have included a large cohort of patients with type 2 diabetes. Most of these RCTs have shown that BP lowering to < 140/85 mmHg is beneficial in patients with type 2 diabetes and hypertension. However, the results have been less clear about whether a lower BP target is associated with further benefits. The evidence can be summarized as follows:

1. A large RCT in patients with type 2 diabetes has shown that an achieved SBP of < 135 mmHg, compared with ~140 mmHg, was associated with a significant reduction in cardiovascular and all-cause mortality.
2. Evidence from another large RCT in patients with type 2 diabetes showed that compared to patients with an on-treatment SBP of ~135 mmHg, reducing SBP to 121 mmHg did not reduce CV morbidity and mortality or all-cause death but substantially reduced the risk of stroke.
3. Although one recent meta-analysis concluded that most of the benefit associated with BP lowering was obtained at higher BP targets (i.e. < 150 mmHg but not < 140 mmHg), other large meta-analyses have confirmed that in type 2 diabetes, lowering systolic BP to < 140 mmHg is associated with reductions in all major CV events.
4. Two of the meta-analyses concluded that the overall benefit of lowering BP in patients with type 2 diabetes (unlike patients without type 2 diabetes) largely disappears when systolic BP is lowered to < 130/80 mmHg, except for the continuing incremental benefit on stroke.
5. Similar evidence for stroke benefit from lower achieved systolic BP has also been reported from post-hoc analysis of diabetic patients in the ONTARGET trial. In addition, re-analysis of the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial in type 2 diabetes, after removing the interaction from the inten-

sive glucose-lowering arm – thereby limiting the analysis to BP-lowering effects, showed an overall reduction in CV events with intensive systolic BP lowering to < 130 mmHg.

6. Further recent analysis of the ACCORD trial has shown that reducing systolic BP to < 120 mmHg was associated with increased risk of major CV events.
7. With regard to diastolic BP, earlier evidence suggested a benefit on major CV events when diastolic BP was lowered to < 85 mmHg. More recently, in the Action in Diabetes and Vascular Disease: Preterax and Diamicron – MR Controlled Evaluation (ADVANCE) trial, the benefits on CV outcomes were observed at diastolic BP of 75 mmHg. This is consistent with evidence from the meta-analyses cited above, that it is safe and effective to lower diastolic BP to < 80 mmHg in patients with type 2 diabetes.

In summary, in patients with diabetes receiving BP-lowering drugs, it is recommended that office BP should be targeted to SBP of 130 mmHg, and lower if tolerated. In older patients (aged ≥ 65 years) the systolic BP target range should be 130–140 mmHg if tolerated. Systolic BP should not be lowered to < 120 mmHg and diastolic BP should be lowered to < 80 mmHg. Attention should also be given to the consistency of BP control because visit-to-visit BP variability is associated with increased CV and renal disease risk. Furthermore, CV protection has been found to be greater when BP control is accompanied by fewer visit-to-visit BP variations.

## Older patients

The definition of «older» is complex. As populations age, there is increasingly wide variation between a patient's chronological age and their functional status, ranging from fit, active, and independent, through to frail and dependent. The anticipated benefits versus potential harm of BP treatment in older patients will be influenced by the patient's ability to tolerate treatment and their health and functional status. For the purposes of this guideline, «older» patients are defined as those aged ≥ 65 years.

In the 2013 ESC/ESH Hypertension guidelines, the target systolic BP for older hypertensive patients was set at 140 to < 150 mmHg because this was the range of systolic values achieved by major outcome trials demonstrating a beneficial effect of antihypertensive treatment in these patients. A similar systolic BP target was suggested by the HYVET trial, in which treating to a systolic BP target of < 150 mmHg (achieving a mean systolic BP of 144 mmHg) in the very old (> 80 years), demonstrated significant reductions in mortality, fatal stroke, and heart failure, with the caveat that the «very old» patients in this study were active and independent. More recent evidence supports a lower systolic BP target for older patients (≥ 65 years):

1. The SPRINT study included a high proportion of patients over the age of 75 years ($n$ = 2636) and demonstrated that more-intensive BP lowering treatment (mean achieved BP 124/62 mmHg) significantly reduced the risk of major CV events, heart failure, and all-cause death (all by > 30%) compared with standard treatment (mean achieved BP 135/67 mmHg). It has been noted above that the BP-measurement technique used in SPRINT generated lower values than those provided by the conventional office BP measurement. Consequently, the systolic BP of 124 mmHg achieved in the intensively treated older patients in the SPRINT trial most probably reflects a conventional office systolic BP range of 130–139 mmHg.
2. Although HYVET and most other RCTs in older patients have recruited relatively fit and independent patients, the SPRINT study also suggested that the benefits of more-intensive treatment extended to older patients who were at the frailer end of the spectrum of patients meeting the recruitment criteria, with reduced gait speed.

Based on the new data, the targets suggested by the previous guidelines now appear too conservative for many old and very old patients, especially those who are active and independent. Consequently, we recommend that in older patients treated for hypertension, BP should be lowered to

< 140/80 mmHg, but not below a systolic BP of 130 mmHg. Importantly, the impact of BP-lowering on the wellbeing of the patient should be closely monitored because the increased risk of adverse events (e.g. injurious falls) with lower BP values could be more pronounced in older patients in the real-life setting, rather than in the closely monitored conditions of RCTs.

## Office versus home BP monitoring (HBPM) and ambulatory blood pressure monitoring (ABPM) targets

No outcome-based RCT has used ABPM or HBPM to guide treatment of hypertension. Thus, ABPM and HBPM BP targets are based on extrapolation from observational data rather than on outcome trials. Although we do not provide formal ABPM or HBPM BP targets for treated patients, it should be noted that:

1. In population studies, the difference between office and out-of-office BP levels decreases as office BP decreases, to a point of around 115–120/70 mmHg, at which office and 24-h ABPM mean BP values are usually similar.
2. This convergence has also been confirmed in treated patients in whom the difference between office BP and ambulatory BP values diminish and become negligible at systolic BP of approximately 120 mmHg.
3. In treated patients, a target office systolic BP of 130 mmHg might therefore correspond to a slightly lower mean 24-h systolic BP, i.e. approximately 125 mmHg.
4. Although there are no available data, the home systolic BP target, to be equivalent to an office systolic BP target of 130 mmHg, might also be lower than 130 mmHg.

The evidence for office BP treatment targets are summarized in *Table 3*.

*Table 3. Office BP treatment targets in hypertensive patients*

| Recommendations | Class[a] | Level[b] |
|---|---|---|
| It is recommended that the first objective of treatment should be to lower BP to < 140/90 mmHg in all patients, and provided that the treatment is well tolerated, treated BP values should be targeted to 130/80 mmHg or lower, in most patients. | I | A |
| In patients < 65 years receiving BP lowering drugs, it is recommended that systolic BP should be lowered to a BP range of 120 to < 130 mmHg in most patients. | I | A |
| In older patients (aged ≥ 65 years) receiving BP-lowering drugs: | | |
| • It is recommended that systolic BP should be targeted to a BP range of 130 to < 140 mmHg. | I | A |
| • Close monitoring of adverse effects is recommended. | I | C |
| • These BP targets are recommended for patients at any level of CV risk and in patients with and without established CVD. | I | A |
| In patients with diabetes receiving BP-lowering drugs: | | |
| • Systolic BP target range of 120–130 mmHg should be considered. | IIa | B |
| • In older patients (aged ≥ 65 years) systolic BP target range of 130 to < 140 mmHg is recommended. | I | A |
| Diastolic BP target of < 80 mmHg should be considered for all hypertensive patients, independent of the level of risk and comorbidities. | IIa | B |

*BP = blood pressure; CV = cardiovascular*
*[a] Class of recommendation.*
*[b] Level of evidence.*
*[c] Less evidence is available for this target in low–moderate-risk patients.*