Blodtrycket
- vad säger riktlinjer, hur gör vi i praktiken och hur ska det registreras i NDR?

Stefan Jansson distriktsläkare i Örebro och ordförande i nationella arbetsgruppen för diabetes inom kunskapsstyrningssystemet

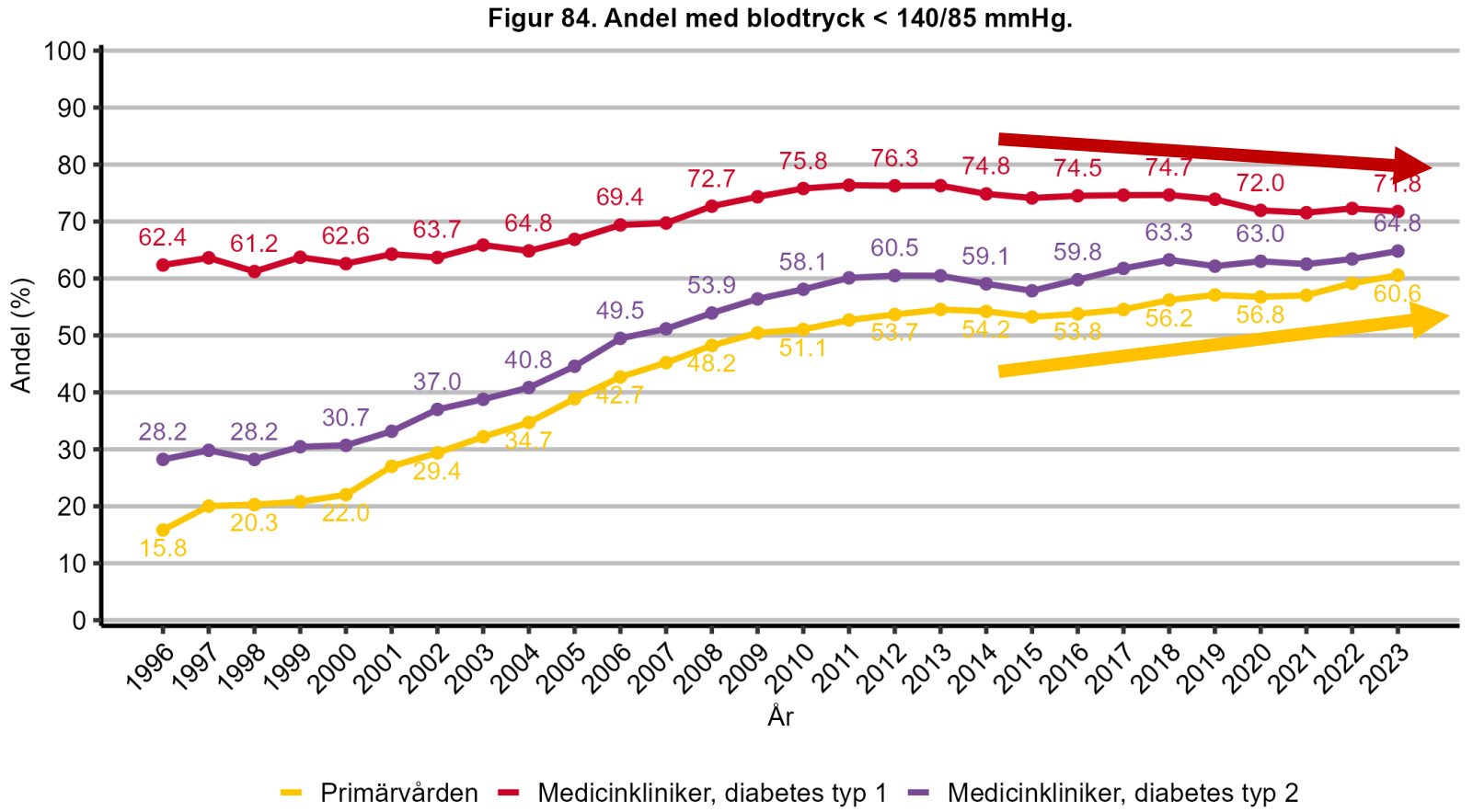
Katarina Eeg-Olofsson, överläkare Sahlgrenska universitetssjukhuset och registerhållare NDR

NDR NATIONELLA DIABETESREGISTRET

Blodtryck - högsta prioritet enligt Socialstyrelsen

- **Blodtryck under 140/85 mmHg**
  anpassas individuellt
- **Lägre blodtrycksmål kan övervägas**
  för unga patienter
  för patienter med förhöjd albuminutsöndring i urinen
  om behandling kan ges utan besvär för patienten
- **Högre blodtrycksmål kan övervägas**
  vid hög ålder
  vid risk för läkemedelsbiverkningar

Andel med blodtryck <140/85 mmHg

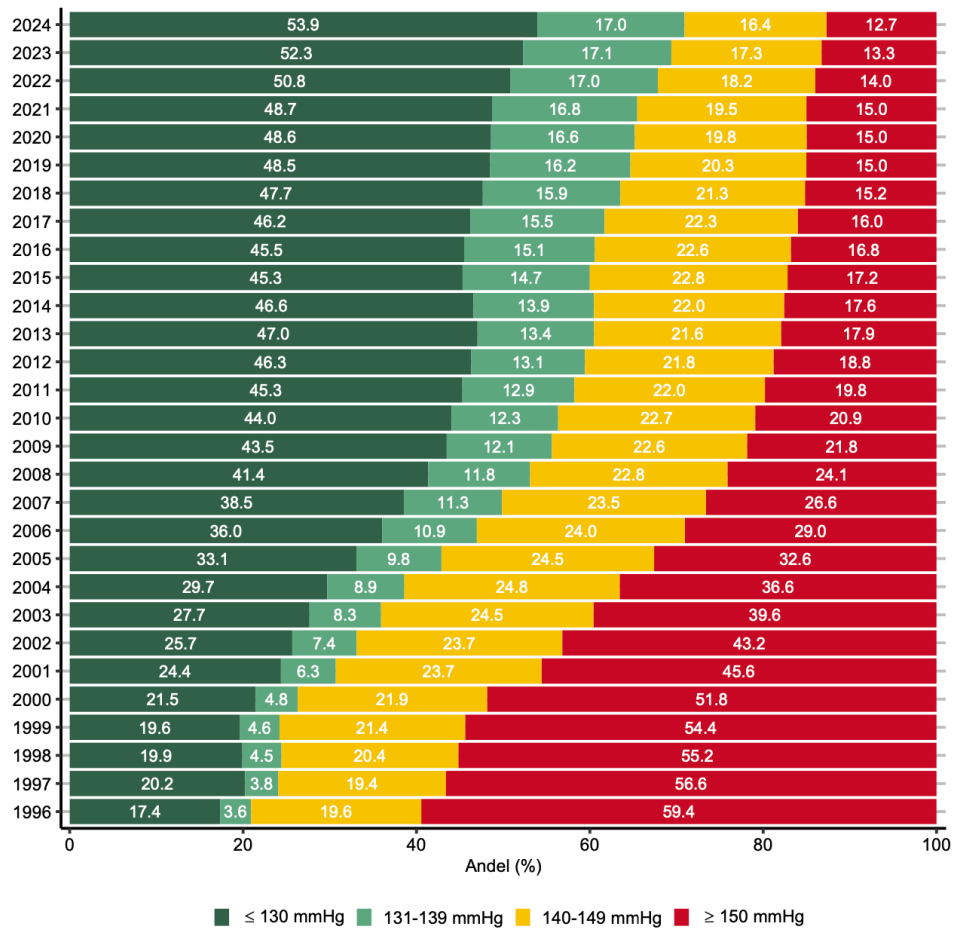


Typ 1 diabetes
Medicinklinikers pil

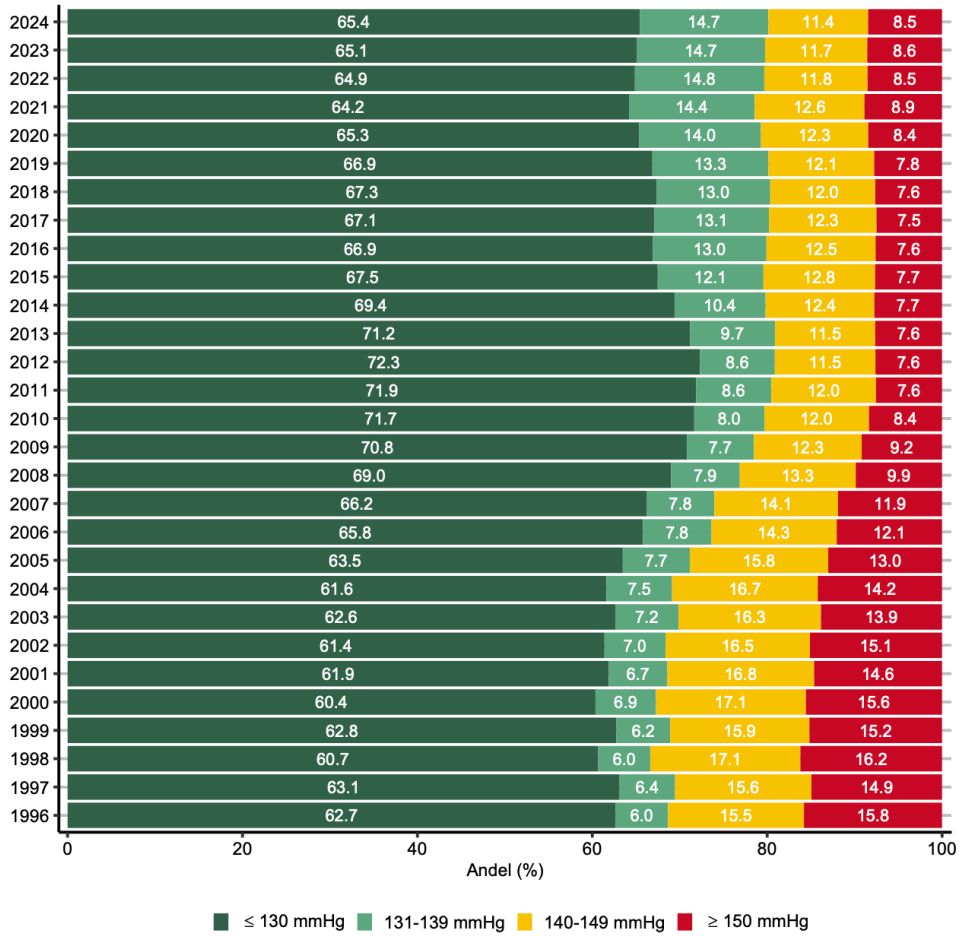
Primärvårdens pil

Systoliskt blodtryck primärvård och typ 1 diabetes medicinklinik

Figur 86. Fördelning av systoliskt blodtryck över tid. Primärvård.



Figur 88. Fördelning av systoliskt blodtryck över tid. Medicinkliniker, diabetes typ 1.



Diabetologia
https://doi.org/10.1007/s00125-021-05568-3

CONSENSUS REPORT

The management of type 1 diabetes in adults. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)

Richard I. G. Holt[1,2] · J. Hans DeVries[3,4] · Amy Hess-Fischl[5] · Irl B. Hirsch[6] · M. Sue Kirkman[7] · Tomasz Klupa[8] · Barbara Ludwig[9] · Kirsten Nørgaard[10,11] · Jeremy Pettus[12] · Eric Renard[13,14] · Jay S. Skyler[15] · Frank J. Snoek[16] · Ruth S. Weinstock[17] · Anne L. Peters[18]

The aim of diabetes care and management is to support people with type 1 diabetes to live a long and healthy life.

- Effectively delivering exogenous insulin to maintain glucose levels as close to the individual's target range as is safely possible
- Effectively managing cardiovascular risk factors
- Providing approaches, treatments and devices that minimise the psychosocial burden of living with type 1 diabetes

The Management of type 1 diabetes in adults. Holt et al Diabetologia 2021

The prevention of long-term complications of diabetes

- Extends beyond glycaemic management to include the optimal management of blood pressure and use of lipid-lowering
- There is an absence of high-quality data to guide blood pressure targets in type 1 diabetes
- Treatment of hypertension to a blood pressure <140/90 mmHg reduces cardiovascular events and microvascular complications.
- Target of <140/90 mmHg is appropriate for those with a lower risk for cardiovascular disease (10 year risk of <15%).
- A lower target of <130/80 mmHg is recommended for those at higher cardiovascular disease risk or with evidence of microvascular complications, particularly renal disease.
- ACE inhibitors or angiotensin receptor blockers are recommended first-line therapies.

The Management of type 1 diabetes in adults. Holt et al Diabetologia 2021

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

Julie R. Ingelfinger, M.D., *Editor*

Prevention of Cardiovascular Disease in Type 1 Diabetes

Camila Manrique-Acevedo, M.D., Irl B. Hirsch, M.D., and Robert H. Eckel, M.D.

N Engl J Med 2024;390:1207-17.
DOI: 10.1056/NEJMra2311526

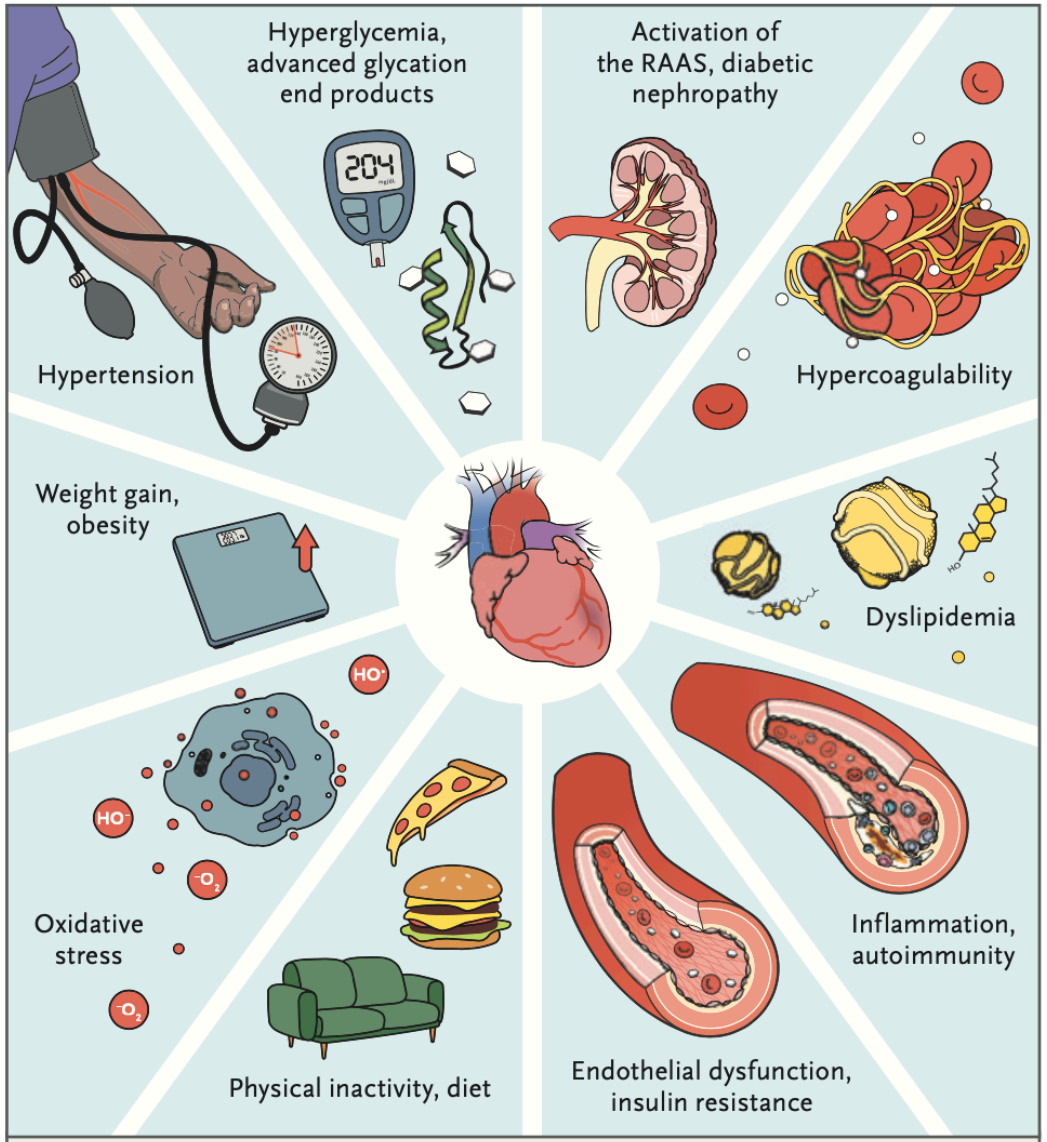


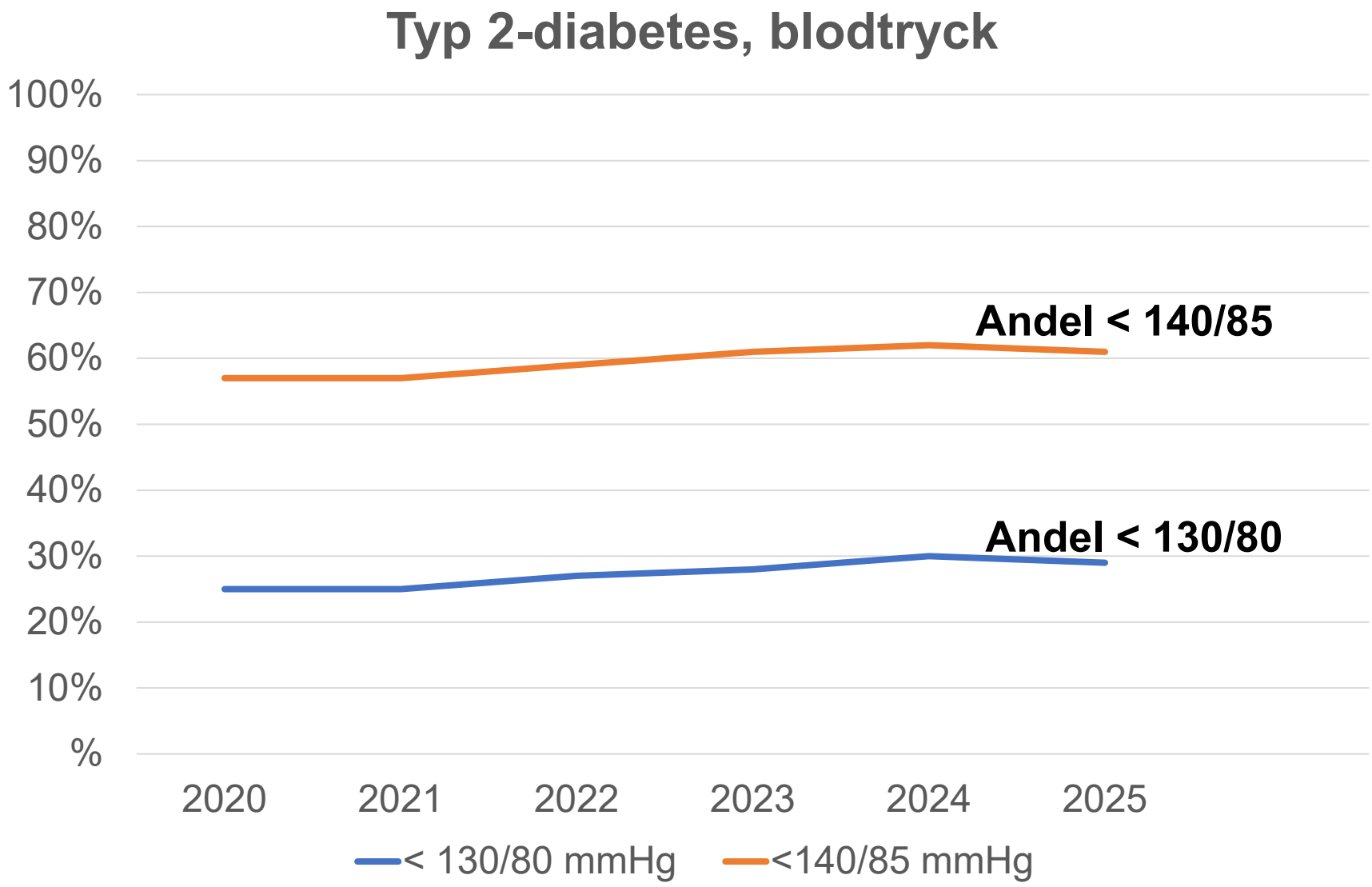
Figure 1. Pathophysiology of Cardiovascular Disease in Patients with Type 1 Diabetes.

The mechanisms involved in the development of cardiovascular disease in persons with type 1 diabetes are shown.

Table 2. Recommendations for Glycemic Control, Blood-Pressure Control, Antithrombotic Therapy, and Obesity in Patients with Type 1 Diabetes.

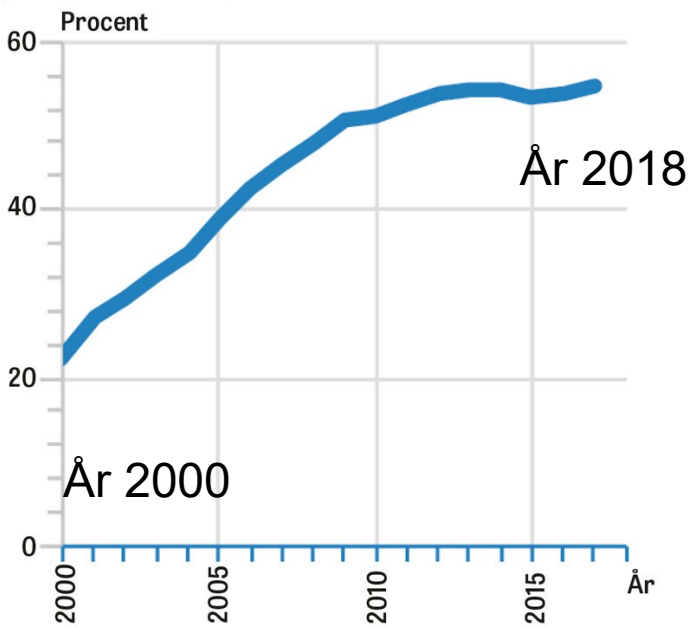
Purpose	Recommendations
Glycemic control	Glycated hemoglobin <7%, if attainable without increased hypoglycemia[37]
Hypertension or blood-pressure control	Lifestyle interventions, with consideration of ambulatory blood-pressure monitoring[37] Blood pressure of <130/80 mm Hg[36] (and ideally, <120/80 mm Hg[37,51]) is recommended as a goal of treatment in adults and adolescents >13 years of age[44] Treatment should include blockade of renin–angiotensin–aldosterone system, unless patient is planning pregnancy or is pregnant or lactating[36,37]
Antithrombotic therapy	Aspirin (75–162 mg) can be considered as primary prevention in patients >50 years of age who have additional risk factors[36,37] Aspirin (75–162 mg) is indicated as secondary prevention in patients with established atherosclerotic cardiovascular disease (clopidogrel indicated for aspirin intolerance)[36,37]
Obesity	Lifestyle modifications, including caloric restriction and increased physical activity, recommended to achieve minimal weight reduction of 5–10% Consider referral to an intensive lifestyle modification program Consider GLP-1 receptor agonist therapy, with shared decision making with the patient regarding potential side effects*

* GLP-1 denotes glucagon-like peptide 1.



Lång trend, NDR

Blodtryck <140/85 mmHg i primärvården



Riktlinjer vid hypertoni, målblodtryck

Socialstyrelsen oktober 2018: **<140/85 mmHg**

Innan 2015 var rekommendationen för målblodtryck för personer med typ 2-diabetes <130/80

Nationell arbetsgrupp hypertoni (**SKR**) ska arbeta fram ett personcentrerat sammanhållet vårdförlopp för hypertoni. Remiss avslutad 240415. Förslag för diabetes **<130/80 mmHg** (”Ogenomförbart” vårdförlopp siktar på comeback. Dagens medicin 30 april)

ADA (American Diabetes Association), 2025**, <130/80 mmHg**

ESC (European Society of Cardiology), 2024**, 120–129/70–79 mmHg**

IDF (International Diabetes Federation) april 2025, **<130/80 mmHg**, if it can be safely attained

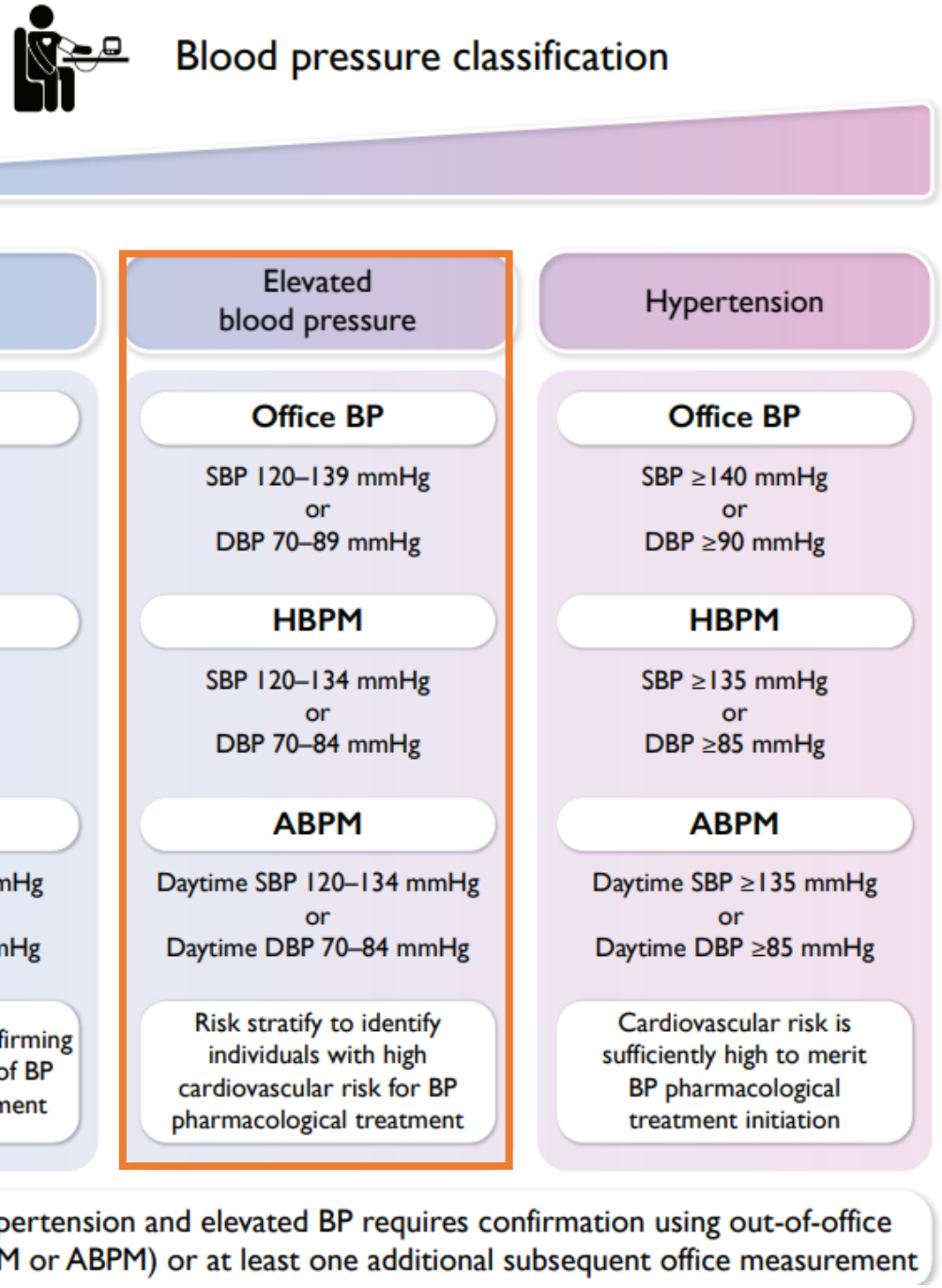
2024 ESC Guidelines for the management of elevated blood pressure and hypertension

European Heart Journal (2024) 00, 1–107

Icke förhöjt
<120/70 mmHg
Ingen behandling

Förhöjt
120-139/70-89 mmHg
Behandla utifrån CVD-risk

Hypertoni
≥140/90 mmHg
Behandla alltid

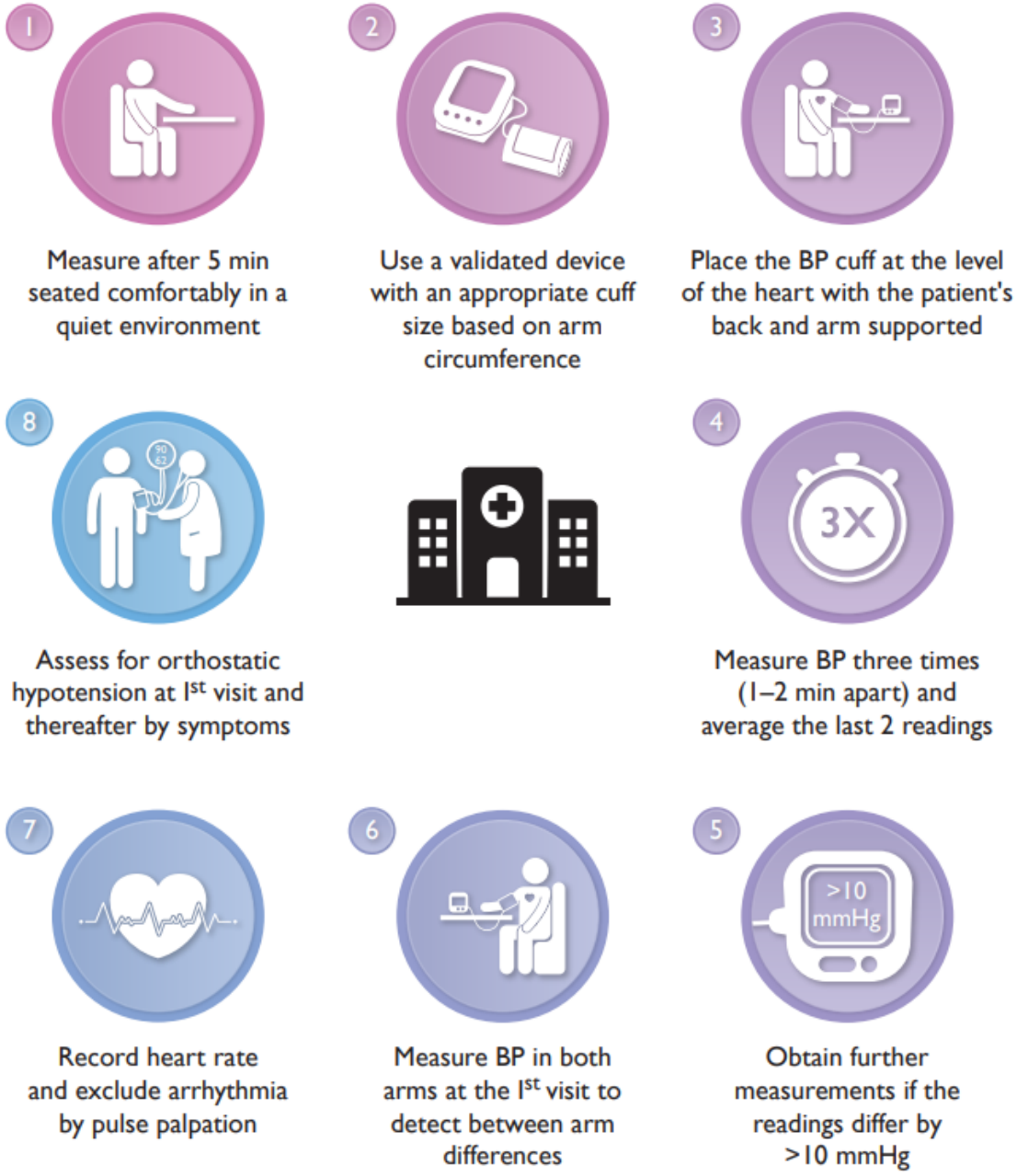


ABPM, ambulatory blood pressure monitoring;

HBPM, home blood pressure monitoring

Praktisk rekommendation för blodtrycksmätning ”Office BP”

European Heart Journal
(2024) 45, 3912–4018

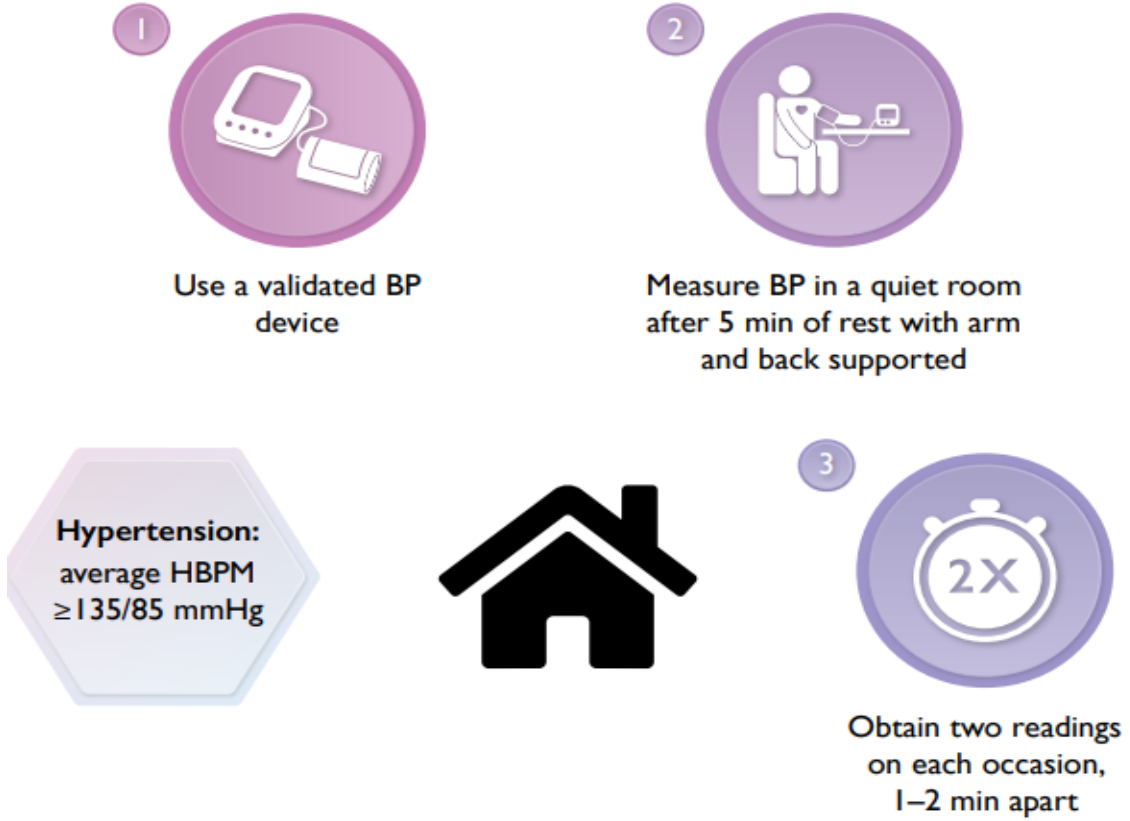


Postural/orthostatic hypotension: decrement of ≥20 mmHg in systolic BP and/or ≥10 mmHg in diastolic BP when BP is measured in the standing position at 1 and/or 3 min after standing following a 5-min period in the sitting or lying position

Office BP measurement in routine clinical settings is often not done using a standardized approach and, the routine office BP value may be **5–10 mmHg higher** than it would have been if measured using the recommended standardized approach.

European Heart Journal (2024) 45, 3912–4018

Home-based blood pressure measurement HBPM



En genomsnittlig HBPM på ≥135/85 mmHg (motsvarande ett office tryck på ≥140/90 mmHg) bör användas för att diagnostisera hypertoni och ett systoliskt medeltryck på 120–134 mmHg eller diastoliskt tryck på 70–84 mmHg bör användas för att diagnostisera förhöjt blodtryck. Observera att vi använder samma lägre BP-tröskel (120/70 mmHg) för både office och HBPM för att definiera förhöjt blodtryck

Före frukost och före intag av medicin men inte direkt efter uppvaknandet

European Heart Journal (2024) 45, 3912–4018

Ambulatory blood pressure measurement ABPM

1

Use a validated BP device

2

Device usually records BP at 15–30 min intervals during the day and 30–60 min at night

3

A minimum of 70% usable BP recordings is required

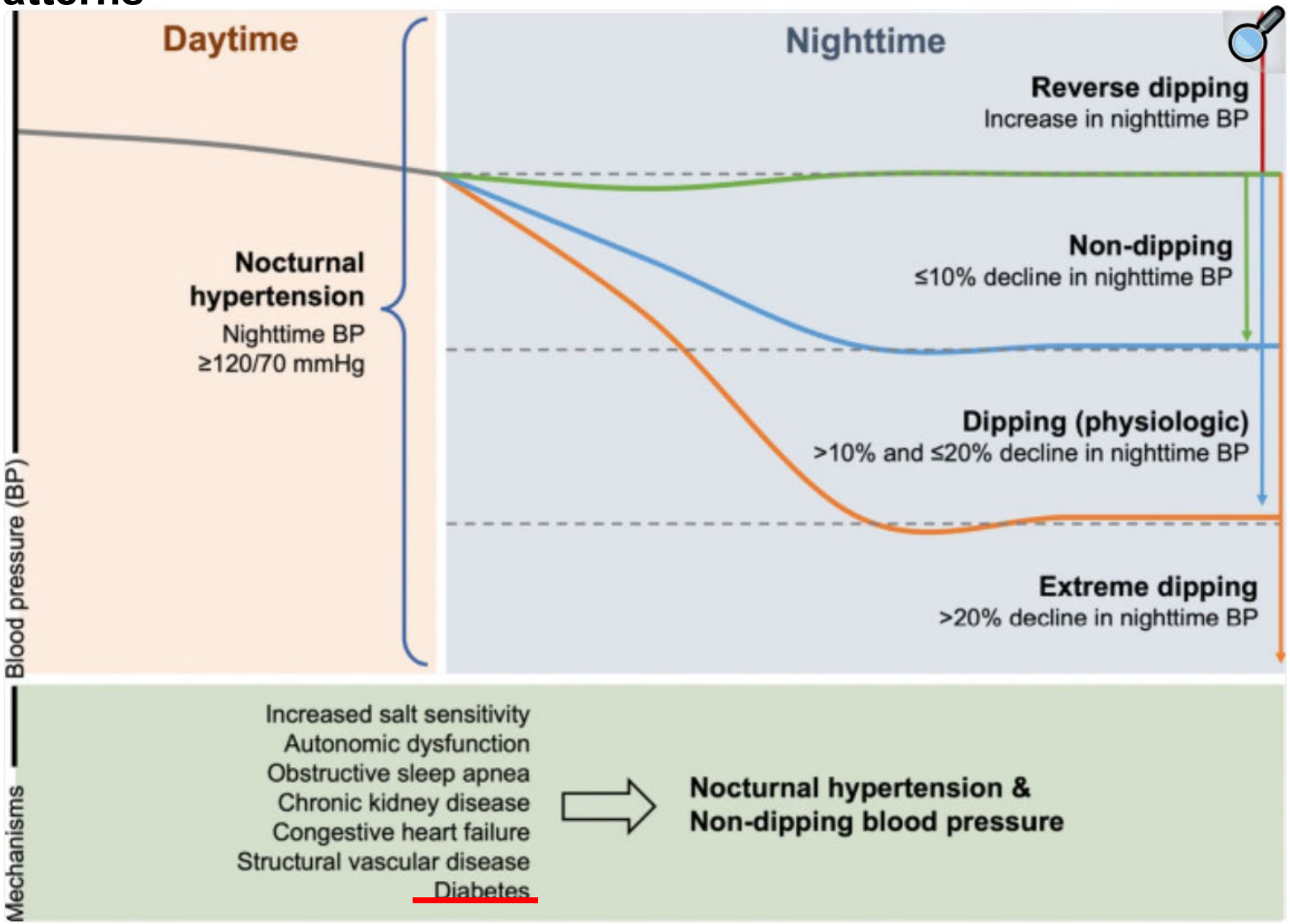
Hypertension:

ABPM ≥130/80 mmHg over 24 h
or
≥135/85 mmHg for the daytime average
or
≥120/70 mmHg for the night-time average

4

A diary of the patient's activities, intake of medications and sleep time should be completed

Definitions and potential mechanisms of nocturnal hypertension and different nighttime dipping patterns



Curr Hypertens Rep. 2023 Nov 13;26(1):21–30.

Comparison of office, home, and ambulatory blood pressure measurement thresholds for elevated blood pressure and HTN

	Office BP (mmHg)	Home BP (mmHg)	Daytime ABPM (mmHg)	24 h ABPM (mmHg)	Night-time ABPM (mmHg)
Non-elevated BP	<120/70	<120/70	<120/70	<115/65	<110/60
Elevated BP	120/70–<140/90	120/70–<135/85	120/70–<135/85	115/65–<130/80	110/60–<120/70
Hypertension	≥140/90	≥135/85	≥135/85	≥130/80	≥120/70

White-coat hypertension:
BP that is above the threshold for diagnosing hypertension in the office but below the threshold in home/ ambulatory settings, e.g. ≥140/90 mmHg in office but <135/85 mmHg at home/ambulatory daytime (or 24-h BP <130/80 mmHg).

Masked hypertension:
BP that is below the hypertension diagnostic threshold in the office but above the hypertension diagnostic threshold in home/ambulatory settings, e.g. <140/90 mmHg in clinic but ≥135/85 mmHg at home/ambulatory daytime (or 24-h BP ≥130/80 mmHg)

Comparison of ambulatory and home blood pressure monitoring (1)

Ambulatory monitoring
Advantages • Can identify white coat and masked hypertension • Measurement in real-life settings and during usual activities • Stronger prognostic evidence • Night-time readings • Abundant information from a single investigation, including short-term diurnal BP variability • Additional BP phenotyping (e.g. nocturnal dipping status) *Disadvantages* • Relatively expensive and sometimes limited availability • Can be uncomfortable and affect sleep

Comparison of ambulatory and home blood pressure monitoring (2)

Home monitoring

Advantages

- Identify white coat and masked hypertension
- Cheap and widely available
- Measurement at home, which may be more relaxed than doctor's office
- Patient engagement in BP measurement and telemedicine potential
- Easily repeated and used over longer periods to assess day-to-day BP variability

Disadvantages

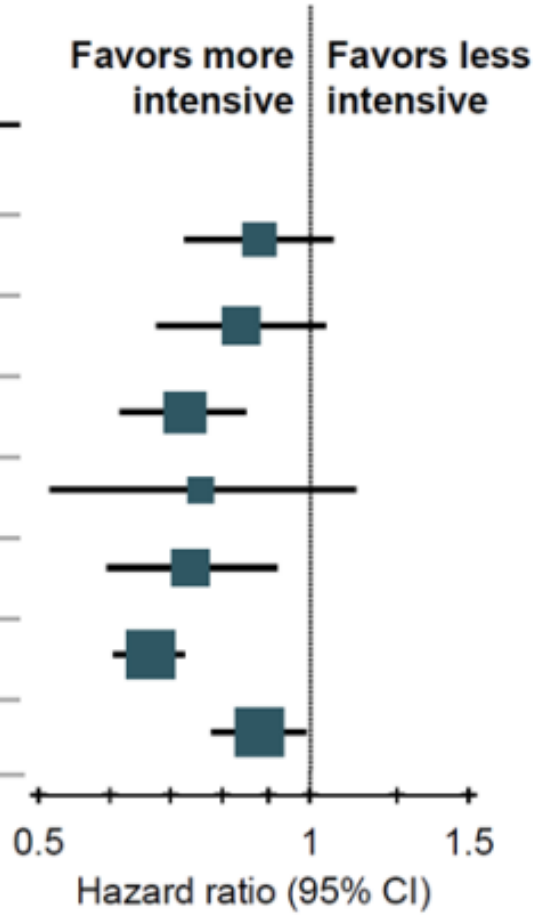
- Only static BP at rest is typically available
- Potential for measurement error due to improper measurement technique or unvalidated or poorly calibrated device
- Nocturnal readings not usually possible

European Heart Journal (2024) 45, 3912–4018

Elevated BP Category

Major CVD Events

	No. of events/total No. More Intensive	Less Intensive	Hazard ratio (95% CI)
<130 mm Hg vs ≥130 mm Hg			
ACCORD, 2010	208/2362	237/2371	0.88 (0.73-1.06)
SPS3, 2013	160/1501	188/1519	0.84 (0.68-1.04)
SPRINT, 2015/2021	264/4678	354/4683	0.73 (0.62-0.85)
RESPECT, 2019	46/633	59/630	0.76 (0.52-1.12)
STEP, 2021	147/4243	196/4268	0.74 (0.60-0.92)
CRHCP, 2023	808/17407	1127/16588	0.67 (0.61-0.73)
ESPRIT, 2024	547/5624	623/5631	0.88 (0.78-0.99)

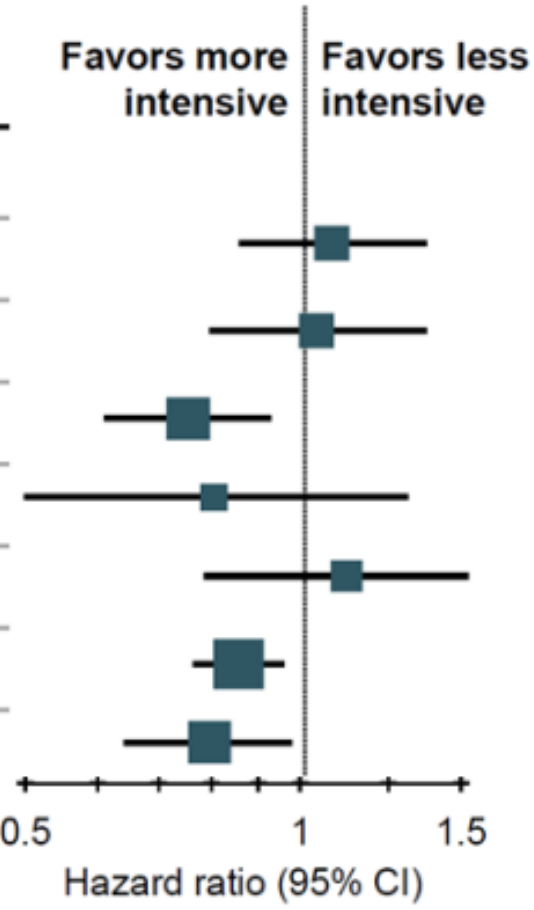


European Heart Journal
(2024) 45, 3912–4018

Elevated BP Category

Death

	No. of events/total No.		
	More Intensive	Less Intensive	Hazard ratio (95% CI)
<130 mm Hg vs ≥130 mm Hg			
ACCORD, 2010	150/2362	144/2371	1.07 (0.85-1.35)
SPS3, 2013	106/1501	101/1519	1.03 (0.79-1.35)
SPRINT, 2015/2021	163/4678	215/4683	0.75 (0.61-0.92)
RESPECT, 2019	30/633	37/630	0.80 (0.49-1.29)
STEP, 2021	67/4243	64/4268	1.11 (0.78-1.56)
CRHCP, 2023	691/17407	776/16588	0.85 (0.76-0.95)
ESPRIT, 2024	160/5624	203/5631	0.79 (0.64-0.97)

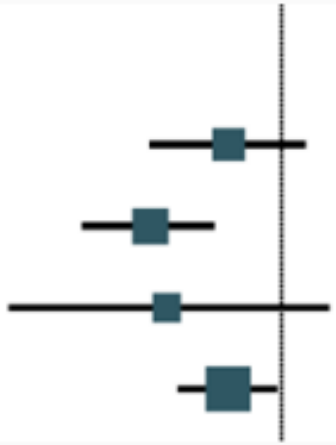


Elevated BP Category

European Heart Journal (2024) 45, 3912–4018

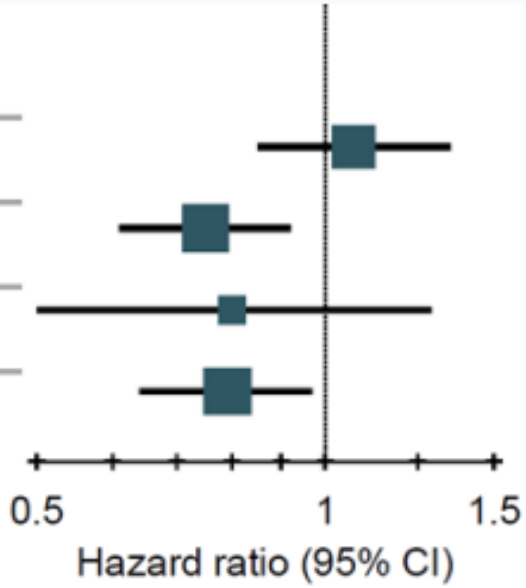
Major CVD Events

<120 mm Hg vs <140 mm Hg			
ACCORD, 2010	208/2362	237/2371	0.88 (0.73-1.06)
SPRINT, 2015/2021	264/4678	354/4683	0.73 (0.62-0.85)
RESPECT, 2019	46/633	59/630	0.76 (0.52-1.12)
ESPRIT, 2024	547/5624	623/5631	0.88 (0.78-0.99)



Death

<120 mm Hg vs <140 mm Hg			
ACCORD, 2010	150/2362	144/2371	1.07 (0.85-1.35)
SPRINT, 2015/2021	163/4678	215/4683	0.75 (0.61-0.92)
RESPECT, 2019	30/633	37/630	0.80 (0.49-1.29)
ESPRIT, 2024	160/5624	203/5631	0.79 (0.64-0.97)



STEP Study, stor kinesisk blodtrycksstudie.
Vid baslinjen hade cirka **19 % diabetes**,
37 % hyperlipidemi och 6 % CVD

75 % åldern 60-69 år
25 % åldern 70-80 år
kvinnor 53 %

Vid studiestopp var medelsystoliskt BT
126,7 mmHg i interventionsgruppen och
135,9 mmHg i kontrollgruppen

Primära utfallet, en sammanslagning av stroke, koronart syndrom, hjärtsvikt, koronar revaskularisering, förmaksflimmer och CVD död, inträffade signifikant lägre i interventionsgruppen jmf kontrollgruppen

MEN vi ska inte se BT som en isolerad riskfaktor utan som en del i hela patientens riskprofil.

N Engl J Med 2021;385:1268-79

RESEARCH SUMMARY

Trial of Intensive Blood-Pressure Control in Older Patients with Hypertension

Zhang W et al. DOI: 10.1056/NEJMoa2111437

CLINICAL PROBLEM

Clinical guidelines vary in their systolic blood-pressure targets for older adults, with some recommending intensive treatment aimed at a systolic blood pressure of less than 130 mm Hg. Although randomized trials show impressive cardiovascular benefits with intensive blood-pressure control in older adults, observational studies suggest that caution is warranted.

CLINICAL TRIAL

Design: A prospective, multicenter, randomized, controlled trial examined whether intensive blood-pressure control offers a greater cardiovascular benefit than standard blood-pressure control in older patients with hypertension.

Intervention: 8511 Chinese patients 60 to 80 years of age who had a systolic blood pressure of 140 to 190 mm Hg or were taking antihypertensive medication were randomly assigned to intensive treatment (systolic blood-pressure target, 110 to <130 mm Hg) or standard treatment (target, 130 to <150 mm Hg). The primary outcome was a composite of stroke, acute coronary syndrome, acute decompensated heart failure, coronary revascularization, atrial fibrillation, or death from cardiovascular causes.

RESULTS

Efficacy: During a median follow-up of 3.34 years, primary-outcome events occurred significantly less often in the intensive-treatment group than in the standard-treatment group.

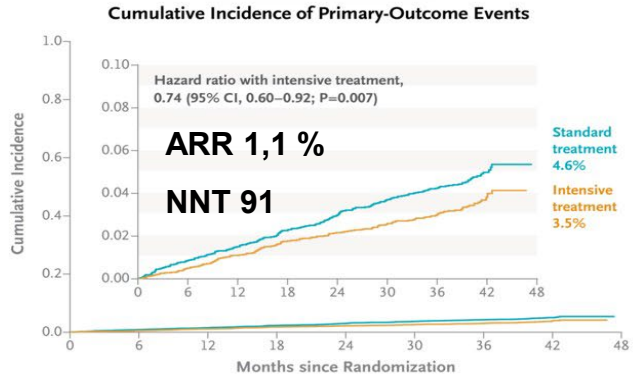
Safety: The results for most safety outcomes did not differ significantly between the two groups. Hypotension, however, occurred more often with intensive treatment.

LIMITATIONS AND REMAINING QUESTIONS

- Only Han Chinese persons were included in the trial, which limits the generalizability of the findings.
- Adults with a history of stroke were excluded.
- Additional research is needed to understand the effects of intensive blood-pressure control on quality of life, cost effectiveness, and long-term clinical outcomes.

Links: Full Article | NEJM Quick Take | Editorial

Intensive Treatment 110 to <130 mm Hg | *Target Systolic Blood Pressure* | Standard Treatment 130 to <150 mm Hg



Safety Outcomes	Intensive Treatment (N=4243)	Standard Treatment (N=4268)	Relative Risk (95% CI)	P Value
	no. of patients (%)			
Adverse events				
Hypotension	146 (3.4)	113 (2.6)	1.31 (1.02–1.68)	0.03
Dizziness	45 (1.1)	49 (1.1)	0.92 (0.61–1.39)	0.70
Serious adverse events				
Syncope	6 (0.1)	2 (<0.1)	3.02 (0.61–14.97)	0.18
Fracture	15 (0.4)	19 (0.4)	0.79 (0.40–1.56)	0.50

CONCLUSIONS

Intensive antihypertensive treatment targeting a systolic blood pressure of less than 130 mm Hg resulted in a lower incidence of cardiovascular events than standard treatment in older patients with hypertension in China.

Intensive Blood-Pressure Control in Patients with Type 2 Diabetes
BPROAD

NEJM. 2025 Mar 27;392(12):1155-1167

Kvinnor 45 %, ålder 64, ≥65 år 44 %
BT 140/76
Duration diabetes 10 år,
HbA1c 60 mmol/mol
Rökare 25 %
BMI 27
ARB 44 %, CCB 59 %, Insulin 48 %,
Metf 66 %, SGLT2 10 %, GLP1 4 %
Statin 65 %

WHY WAS THE TRIAL DONE?

Clinical guidelines recommend reducing elevated blood pressure in patients with type 2 diabetes to lower the risk of cardiovascular disease. However, effective targets for systolic blood-pressure reduction in this population are unclear.

HOW WAS THE TRIAL CONDUCTED?

Adults 50 years of age or older who had type 2 diabetes, elevated systolic blood pressure, and increased risk of cardiovascular disease were assigned to receive intensive antihypertensive treatment (systolic blood-pressure target, <120 mm Hg) or standard treatment (target, <140 mm Hg) for up to 5 years. The primary outcome was a composite of the first occurrence of nonfatal stroke, nonfatal myocardial infarction, treatment or hospitalization for heart failure, or death from cardiovascular causes.

TRIAL DESIGN

- Parallel-design
- Randomized
- Location: 145 clinical sites in China

RESULTS

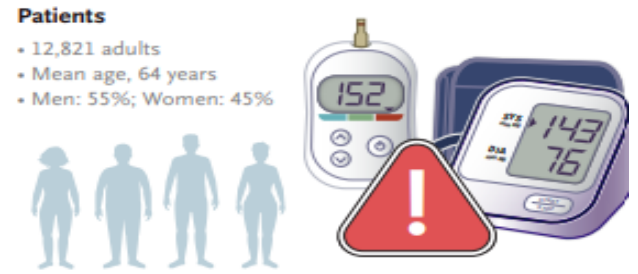
During a median follow-up of 4.2 years, the incidence of the composite primary outcome was significantly lower with intensive treatment than with standard treatment. The incidence of serious adverse events did not differ between the groups, although symptomatic hypotension and hyperkalemia occurred more often with intensive treatment than with standard treatment.

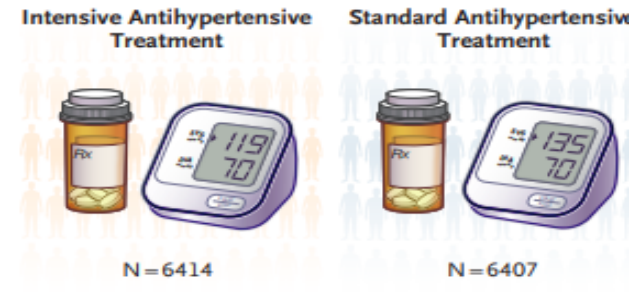
LIMITATIONS AND REMAINING QUESTIONS

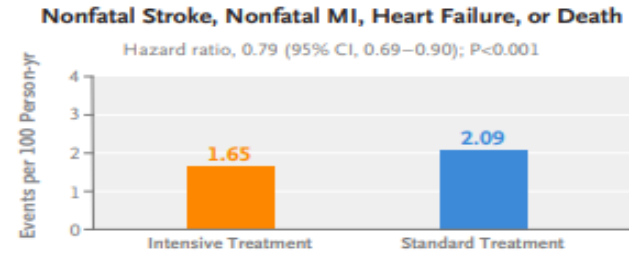
- Patients and trial physicians were aware of treatment group assignments.
- Telephone interviews were used to collect data, especially during lockdowns due to the Covid-19 pandemic, during which standard blood-pressure monitoring at home was encouraged.
- Only approximately 60% of patients in the intensive-treatment group met the target systolic blood pressure after 1 year.

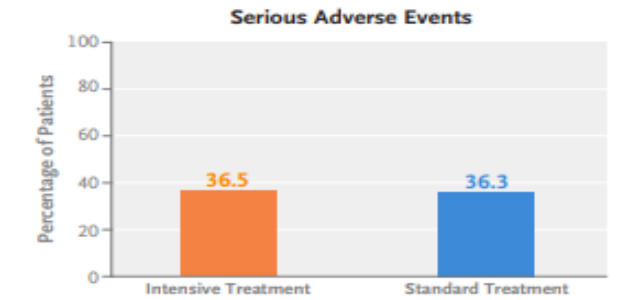
CONCLUSIONS

In patients with type 2 diabetes and increased risk of cardiovascular disease, the incidence of major cardiovascular events was significantly lower with intensive antihypertensive treatment targeting a systolic blood pressure of less than 120 mm Hg than with standard treatment targeting a systolic blood pressure of less than 140 mm Hg.

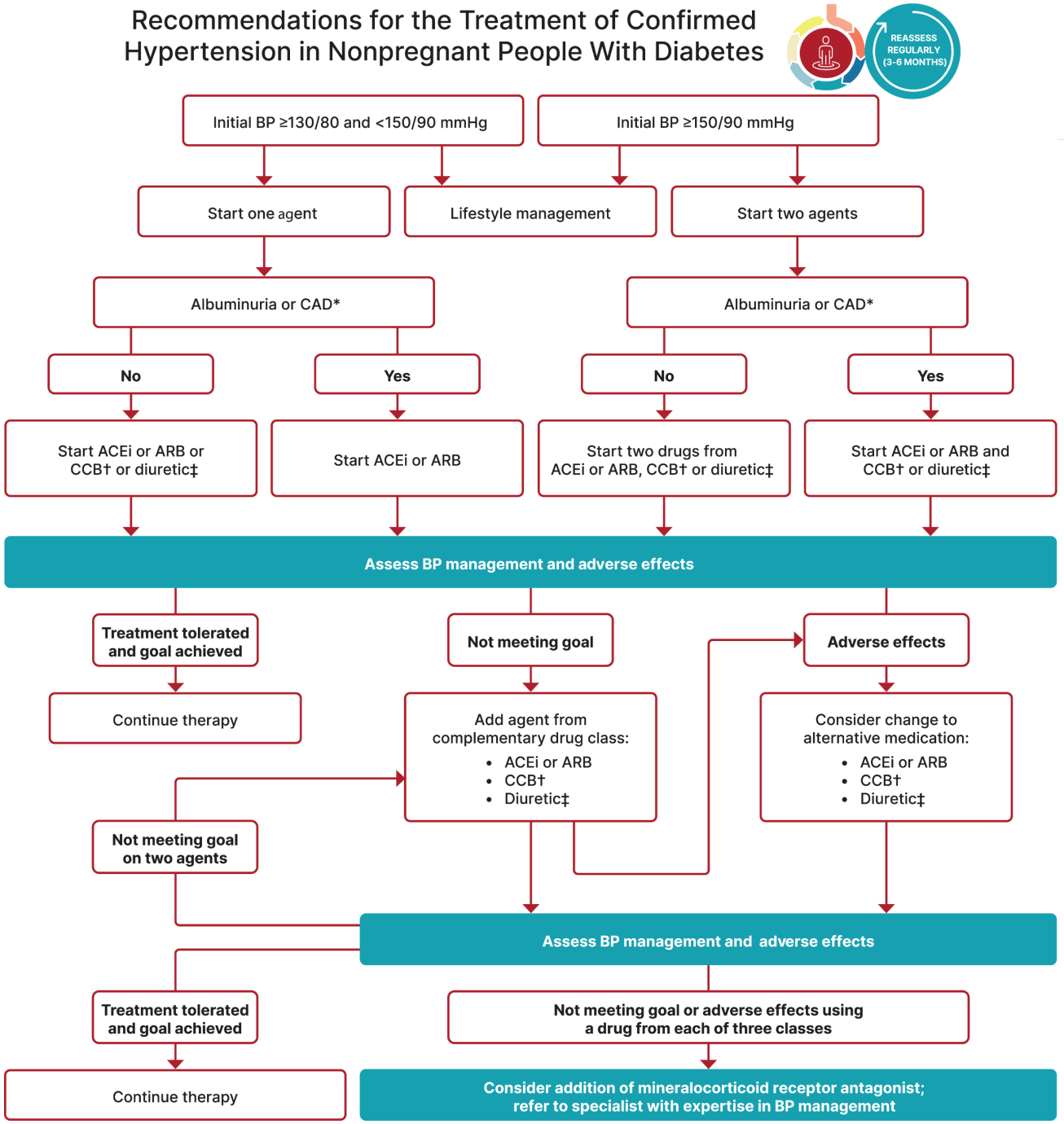








Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025



Diabetes Care. 2024;48(Supplement_1):S207-S238. doi:10.2337/dc25-S010

Steno T1 Risk Engine

Steno Diabetes Center Copenhagen | T1 Risk Engines | Calculator | Research | About | Contact

Individualised interactive CVD & ESKD risk calculator

This risk calculator applies to adult type 1 diabetes patients.

Please select patient characteristics

Previous CVD: No

If the patient has had a previous CVD event, only ESKD risk can be assessed.

Age (years): 50

Sex: Female

Diabetes duration (years): 30

HbA1c: 70

Enter unit: mmol/mol

Systolic blood pressure (mmHg): 130

Current smoker: No

Albuminuria[1]: Normal

eGFR (ml/min/1.73m^2): 100

The following risk factors are only used for CVD risk calculation:

LDL cholesterol: 2

Enter unit: mmol/l

Regular excercise (≥3.5 hours/week): Yes

Calculate risk

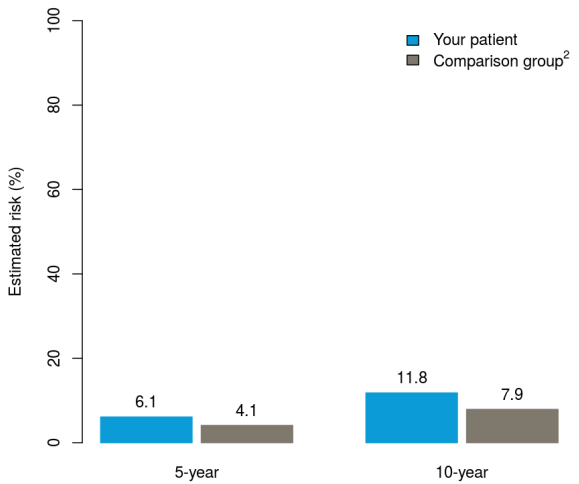
CVD | ESKD

Risk profile

Only applies to patients without previous CVD.

Patient's 10-year CVD risk is:

MEDIUM



Categorisation of risk based on NICE guidelines:

- low: <10%
- medium: 10-20%
- high: ≥ 20%

See European guidelines for CVD prevention.

[1]Normoalbuminuria is defined as spot urinary albumin–to–creatinine ratio (UACR) < 30 mg/g, microalbuminuria is defined as 30-299 mg/g, macroalbuminuria is defined as UACR ≥ 300 mg/g. (Standards of Medical Care in Diabetes - 2016)

[2]Same age and sex, but having 0 yrs of T1D and upper limit of normal values of modifiable risk factors (HbA1c: 57 mmol/mol (7.4%); SBP: 135 mmHg; Albuminuria: normal; eGFR: 90 ml/min/1.73m2; Current smoker: no; and for CVD risk calculation, further LDL-C: 2.5 mmol/L (99 mg/dl); Regular exercise: yes).

ESC European Society of Cardiology

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CLINICAL RESEARCH
Epidemiology, prevention, and health care policies

SCORE2-Diabetes: 10-year cardiovascular risk estimation in type 2 diabetes in Europe

SCORE2-Diabetes Working Group and the ESC Cardiovascular Risk Collaboration*†

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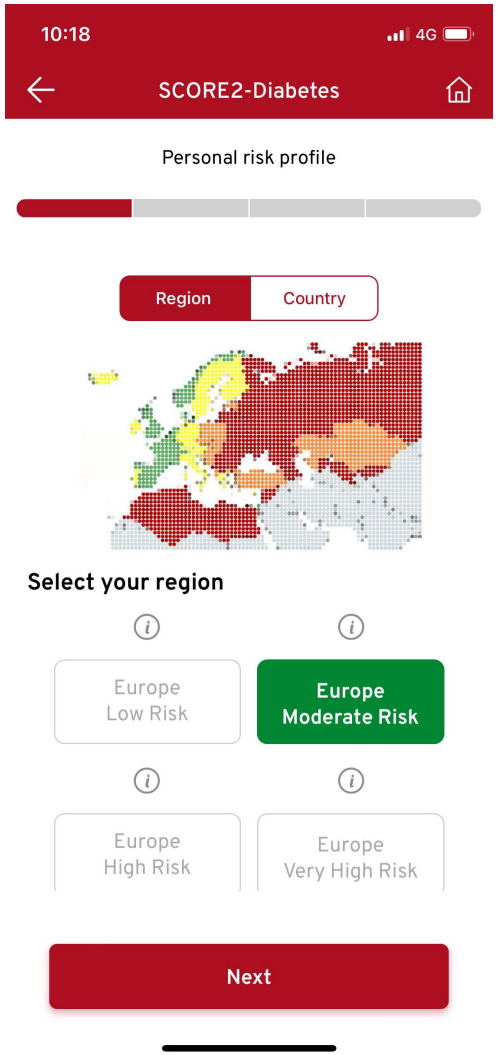
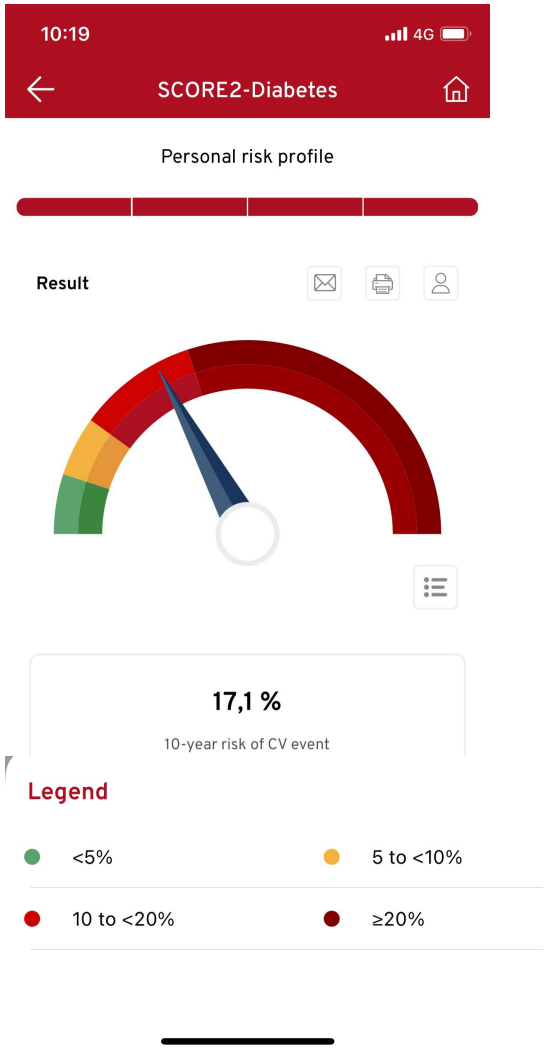
See the editorial comment for this article 'Risk prediction in patients with diabetes: is SCORE 2D the perfect solution?', by L. Rydén *et al.*, https://doi.org/10.1093/eurheartj/ehad263.

Score2-Diabetes calculator





	A	B
	Risk Predictor	**Value (please enter values below)**
	Risk Region	Moderate risk region
	Sex	Female
	Age (yrs)	53
	Diabetes age at diagnosis (yrs)	30
	Current smoker	yes
	SBP (mm Hg)	130
	Total cholesterol (mmol/L)	4,5
	HDL cholesterol (mmol/L)	1,4
0	HbA1c (mmol/mol)	55
1	eGFR (ml/min/1.73m^2)	95
2		
3	10-year CVD risk estimate	11,6

42 årig man med typ 2 diabetes sedan 5 år

- Tablettbehandlad diabetes sedan 5 år.
- Metformin 500mgx2
- HbA1c 60 mmol/mol
- Hypertoni med blodtryck 140/85
- Hyperlipidemi med kolesterol på 5 och HDL på 1 mmol/L.
- Ingen tidigare hjärtinfarkt eller stroke
- Röker inte. BMI 30.
- eGFR 70
- Ingen albuminuri

	A	B
1	**Risk Predictor**	**Value (please enter values below)**
2	Risk Region	Moderate risk region
3	Sex	Male
4	Age (yrs)	42
5	Diabetes age at diagnosis (yrs)	37
6	Current smoker	no
7	SBP (mm Hg)	140
8	Total cholesterol (mmol/L)	5
9	HDL cholesterol (mmol/L)	1
10	HbA1c (mmol/mol)	60
11	eGFR (ml/min/1.73m^2)	70
12		
13	10-year CVD risk estimate	6,8

Nu 10 års Risk med SCORE 2 Diabetes

Take home message

- Blodtryck är en viktig och behandlingsbar riskfaktor vid diabetes
- Standardisera mätningen
- Individualisera behandlingen
- Inte överbehandla och inte underbehandla
- Journalför blodtryck
- Rapportera officeblodtryck till NDR