มหาวิทยาลัยมหิดล
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี

PRIMARY CARE · FAMILY MEDICINE

Hypertension & Dyslipidemia

Management in Primary Care

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Family Medicine Resident Lecture · Updated 2026

OVERVIEW

Learning objectives

01

Recognise prevalence & burden

Describe trends of hypertension and dyslipidemia in Thailand and their clinical implications.

02

Classify & diagnose

Apply office, home (HBPM) and ambulatory BP criteria; identify white-coat and masked hypertension.

03

Set individualised targets

Choose appropriate BP and LDL-C targets based on age, comorbidity and cardiovascular risk.

04

Prescribe rational drug therapy

Select first-line, combination, and add-on therapy for hypertension and dyslipidemia.

05

Support adherence

Identify barriers and apply practical strategies to improve long-term adherence.

PART 01

Hypertension

Epidemiology · Diagnosis · Targets · Treatment

Prevalence of hypertension in Thailand is rising

Overall prevalence (≥15 y)

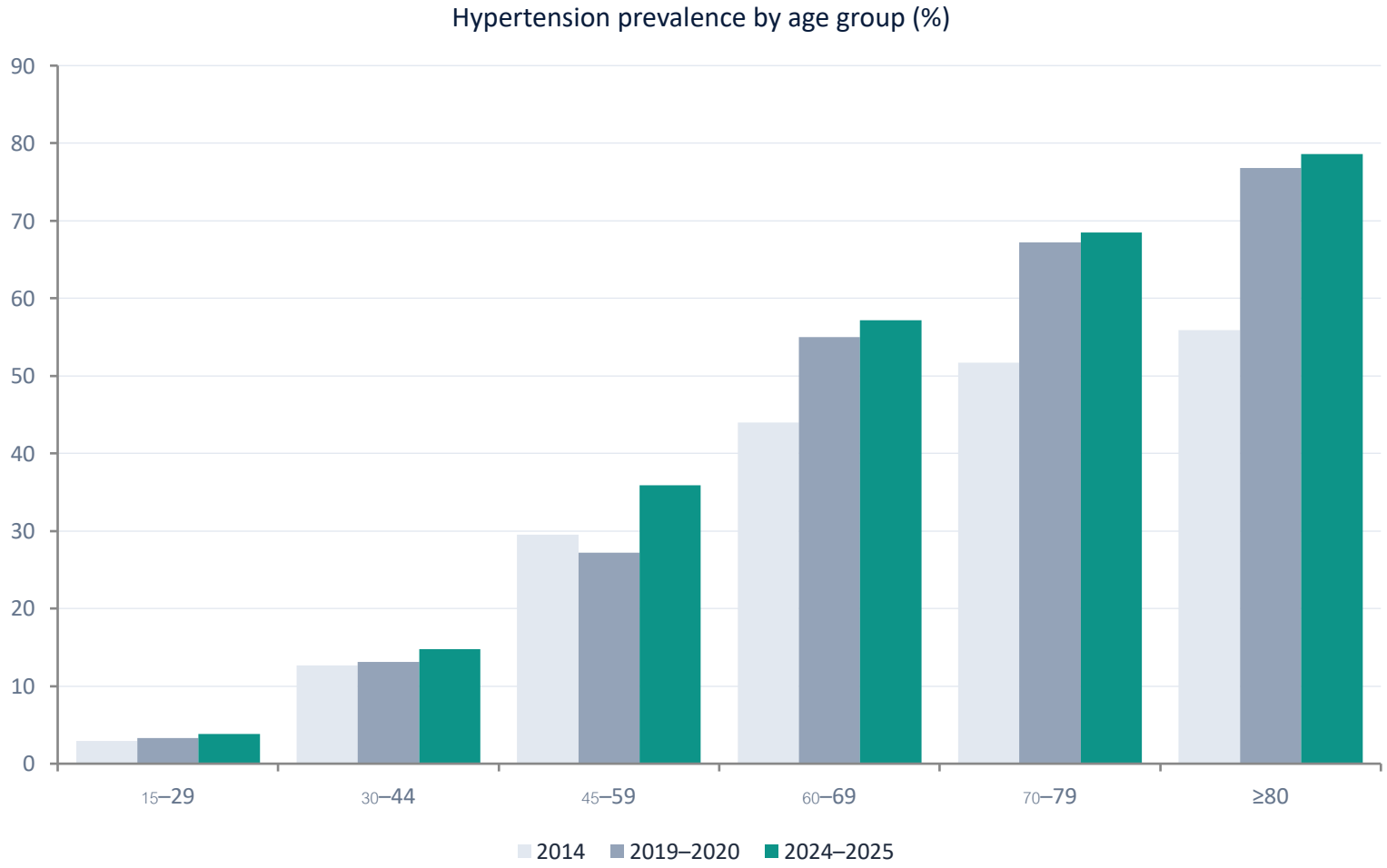
29.5%

of Thai adults in 2024–2025

↑ from 24.7% (2014)

↑ from 25.4% (2019–20)

Prevalence rises sharply with age — ~3 in 4 adults ≥70 y are affected.



Thai National Health Examination Survey V (2014), VI (2019–2020) and VII 2024–2025.

EPIDEMIOLOGY · THAILAND 2024–2025

Awareness and control of hypertension remain poor

47.8%

Unaware of diagnosis

5.5%

Aware, not treated

22.9%

Treated, not controlled

23.8%

Treated and controlled

Key message for primary care

About 3 of 4 Thai adults with hypertension are either unaware or uncontrolled — opportunistic screening and long-term follow-up are core primary-care tasks.

Thai National Health Examination Survey V (2014), VI (2019–2020) and VII 2024–2025.

DEFINITIONS

Classification of office BP (adults ≥18 years)

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	*and*	<80
Normal	120–129	*and*	80–84
BP at risk	130–139	*and/or*	85–89
Grade 1 HT	140–159	*and/or*	90–99
Grade 2 HT	160–179	*and/or*	100–109
Grade 3 HT	**≥180**	*and/or*	**≥110**
Isolated systolic HT	≥140	*and*	<90
Isolated diastolic HT	<140	*and*	≥90

Rule of thumb

Category is defined by the higher value of SBP or DBP.

Isolated systolic/diastolic HT is still graded 1–3 by SBP/DBP range.

2024 Thai HT guideline · 2023 ESH Guidelines (J Hypertens, 2023).

KEY SHIFTS

What's new? 2023 ESH / 2024 Thai HT guidelines

01

Wider use of out-of-office BP

Prefer HBPM (and ABPM where available) to confirm diagnosis, detect white-coat / masked HT, and monitor control.

02

Less conservative in older adults

Age alone does not preclude treatment; tailor targets and intensity with attention to frailty and orthostasis.

03

Simplified drug algorithm

Core therapy for most patients: RAAS blocker (ACEi or ARB) + CCB and/or thiazide/thiazide-like diuretic. β-blockers only for specific indications.

04

Detecting poor adherence

Adherence check is now an explicit step before labelling resistant hypertension.

05

Team-based chronic care

Nurses and pharmacists play a central role in long-term follow-up and counselling.

2023 ESH Guidelines (J Hypertens, 2023) · 2024 Thai HT guideline.

PHENOTYPES FROM OFFICE + OUT-OF-OFFICE BP

White-coat and masked hypertension

Normotension

Office normal · Out-of-office normal

White-coat HT

Office high · Out-of-office normal

Masked hypertension

Office normal · Out-of-office high

Sustained hypertension

Office high · Out-of-office high

≈ 30% of HT-clinic attendees have white-coat HT · Highest prevalence in Grade 1 · Confirm with HBPM / ABPM before labeling resistant HT.

2023 ESH Guidelines · 2024 Thai HT guideline.

OFFICE · HOME · AMBULATORY

How to measure BP correctly

Office BP (attended)

Patient rested 3–5 min, seated, back supported, feet flat.

Correct cuff size · arm at heart level · bare arm.

Take ≥2 readings 1–2 min apart · average last two.

Measure both arms at first visit — use higher-reading arm.

Home BP monitoring (HBPM)

Use a validated upper-arm automated device.

7 days (min 3) before each visit · morning and evening.

Duplicate readings, 1 min apart · discard day 1.

Average ≥135/85 mmHg = hypertension.

Ambulatory BP (ABPM)

Preferred when HBPM unreliable or suspected WCH/masked HT.

Daytime ≥135/85 · Night-time ≥120/70 · 24-h ≥130/80 mmHg.

Assesses dipping pattern and BP variability.

Thresholds for hypertension: Office ≥140/90 · Home average ≥135/85 · Daytime ABPM ≥135/85 · 24-h ABPM ≥130/80

2023 ESH Guidelines · 2024 Thai HT guideline.

PRACTICAL GUIDANCE

Home BP monitoring (HBPM) in practice

01

Use a validated upper-arm device

Check validatebp.org or stridebp.org. Avoid wrist devices for clinical decisions.

02

7 days before each visit (min 3)

Duplicate readings in the morning and evening, 1 minute apart.

03

Calculate the average — discard day 1

Home BP is diagnostic at ≥135/85 mmHg on average.

04

Use HBPM long-term

Improves adherence and BP control when combined with patient education.

Example HBPM log

Date	BP
Day 1 AM	**134 / 72**
Day 1 PM	**125 / 67**
Day 2 AM	**132 / 74**
Day 2 PM	**128 / 68**
Day 3 AM	**121 / 65**
Day 3 PM	**127 / 64**
Day 4 AM	**135 / 69**
Day 4 PM	**129 / 63**

2023 ESH Guidelines · 2024 Thai HT guideline.

THRESHOLDS & TARGETS BY AGE

When to start drug therapy — and what to aim for

18–64 years

Treatment threshold

≥ 140 / 90 mmHg

Office BP target

< 130 / 80 mmHg

Start drug therapy when sustained at or above threshold.

65–79 years

Treatment threshold

≥ 140 / 90 mmHg

Office BP target

< 140 / 80 mmHg

Treat to target only if well tolerated and no orthostasis.

≥ 80 years

Treatment threshold

≥ 160 SBP mmHg

Office BP target

SBP 140–150 mmHg

Check frailty; avoid aggressive lowering.

2023 ESH Guidelines · 2024 Thai HT guideline.

Target BP by comorbidity — comparing guidelines

Comorbidity	ESC/ESH	Thai HT Society	ACC/AHA	NICE (UK)	ADA (DM)
Established ASCVD	**<130/80**	**<130/80**	**<130/80**	<140/90	—
Heart failure	**<130/80**	**<130/80**	**<130/80**	<140/90	—
Diabetes mellitus	**<130/80**	**<130/80**	**<130/80**	<140/90	<130/80
Chronic kidney disease	**<130/80**	**<130/80**	**<130/80**	<140/90	—
High CV risk	**<130/80**	**<130/80**	**<130/80**	<140/90	—
Older adults (≥65 y)	<140/80	<140/80	**<130/80**	<140/90	—
No comorbidity	**<130/80**	**<130/80**	**<130/80**	<140/90	—

** ADA suggests <130/80 if high CV risk.*

Synthesised from ACC/AHA, ESC/ESH, JHS, NICE, ACP/AAFP, ADA, and Thai HT Society.

Lifestyle — the foundation of BP control

Intervention	How much	↓ SBP in HT	↓ SBP in normotension
Weight loss	Aim for ideal body weight · 1 mmHg per 1 kg lost	**−5 mmHg**	−2 to −3 mmHg
DASH-style diet	Fruits, vegetables, whole grains, low-fat dairy; low saturated fat	**−11 mmHg**	−3 mmHg
Reduce sodium	<1500 mg/day; at minimum −1000 mg/day	**−5 to −6 mmHg**	−2 to −3 mmHg
Aerobic exercise	90–150 min/week · 65–75% HR reserve	**−5 to −8 mmHg**	−2 to −4 mmHg
Dynamic resistance	90–150 min/week · 50–80% 1-RM · 6 exercises × 3 sets	**−4 mmHg**	−2 mmHg
Limit alcohol	Men ≤2 drinks/day · Women ≤1 drink/day	**−4 mmHg**	−3 mmHg

Clinical pearl — Combining two lifestyle interventions often lowers SBP by >10 mmHg, rivalling a single antihypertensive agent.

2017 ACC/AHA Guideline on high blood pressure in adults.

TREATMENT STRATEGY

Principles of antihypertensive drug therapy

Dose–response is flat for most BP drugs

Doubling a dose usually gains only 2–3 mmHg extra but doubles side-effect risk. Prefer combination over up-titration.

Prefer once-daily dosing

Improves adherence; use long-acting formulations where available (e.g., amlodipine, losartan).

Morning vs evening dosing

No difference in CV outcomes; let patient preference decide — but avoid bedtime diuretics.

Start with combination therapy

For most patients: RAAS blocker + CCB or thiazide/thiazide-like. Add second agent rather than maximising one.

β-blockers only for specific indications

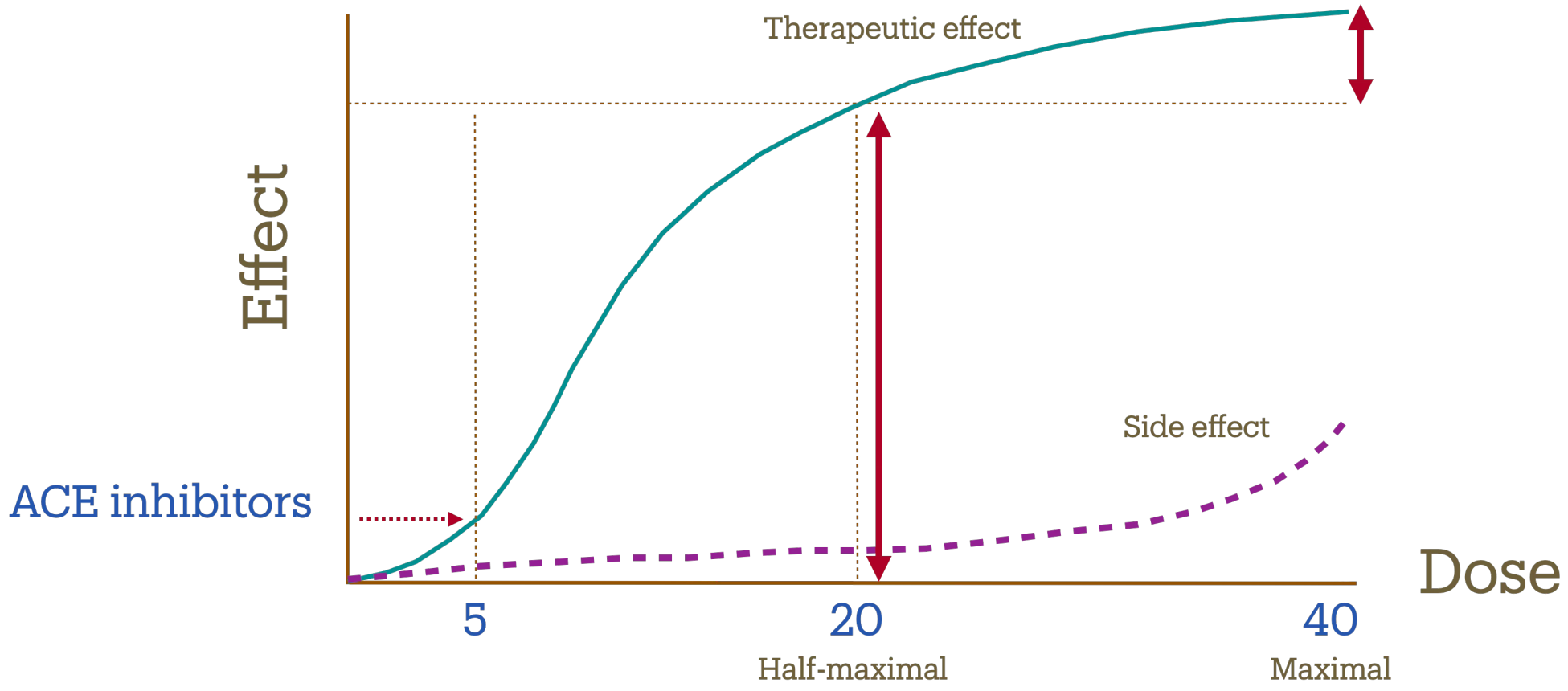
CAD, post-MI, HF, tachyarrhythmias, pregnancy, women planning pregnancy.

α-blockers are last-line

Use only when other options are exhausted; avoid as first-line therapy.

2023 ESH Guidelines · 2024 Thai HT guideline.

Dose–response is flat for most BP drugs



Heran BS, Wong MMY, Heran IK, Wright JM. Blood pressure lowering efficacy of angiotensin converting enzyme (ACE) inhibitors for primary hypertension. Cochrane Database of Systematic Reviews 2008, Issue 4. Art. No.: CD003823. DOI: 10.1002/14651858.CD003823.pub2

STEP-UP ALGORITHM (2023 ESH)

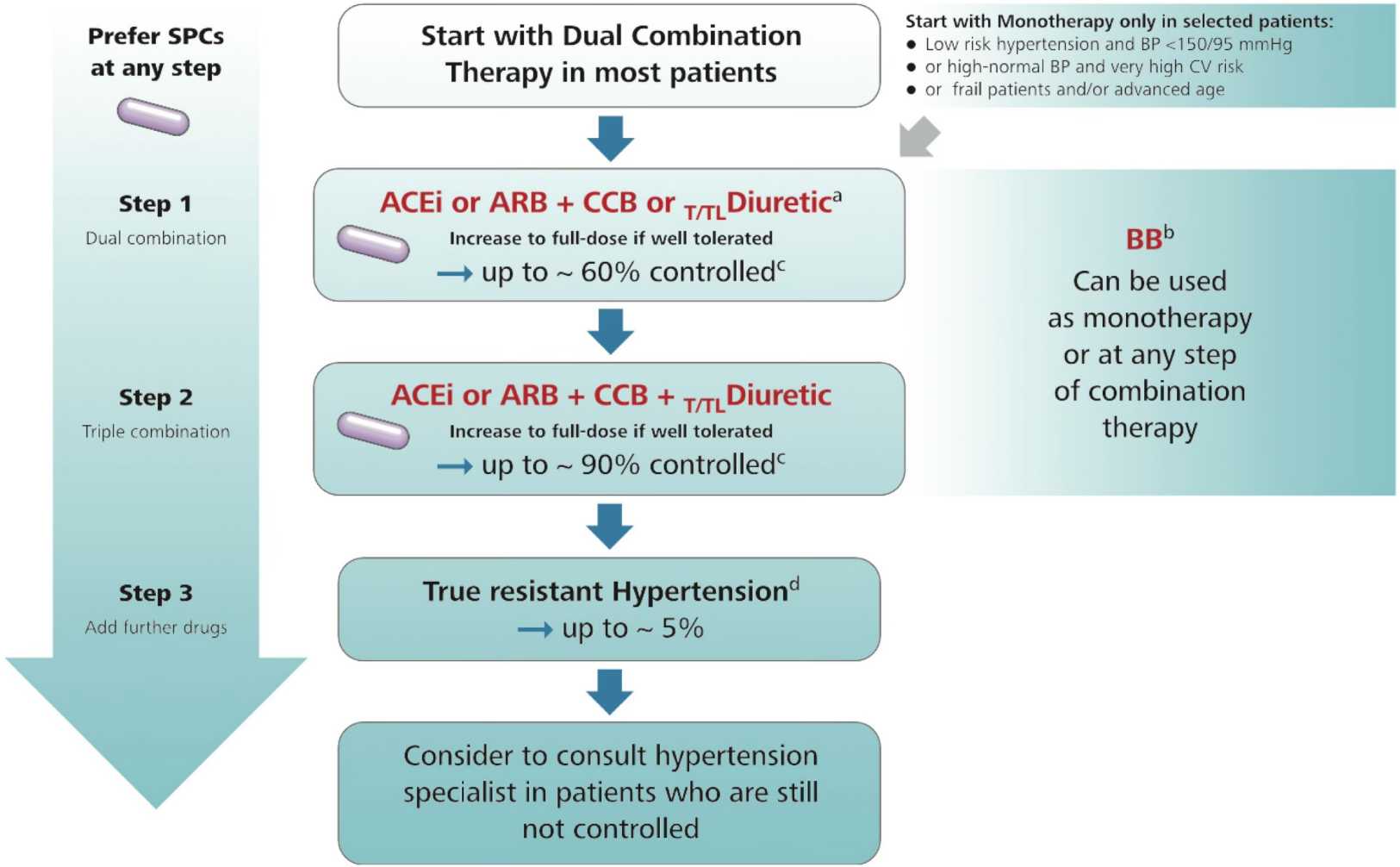
General BP-lowering strategy

Step 1	**Dual combination, low dose** **ACEi or ARB + CCB or Thiazide/Thiazide-like** *Consider monotherapy in frail ≥80 y or low-risk grade 1.*
Step 2	**Triple combination** **ACEi or ARB + CCB + Thiazide/Thiazide-like**
Step 3	**Add spironolactone / other** **+ Spironolactone 25–50 mg (or amiloride, doxazosin, β-blocker)** *Check adherence, exclude secondary HT and white-coat effect first.*
Step 4	**Refer for specialist care** **Consider renal denervation, device-based therapy, expert review.**

Check adherence, lifestyle, and white-coat effect at every step — most 'resistant' HT is actually pseudo-resistant.

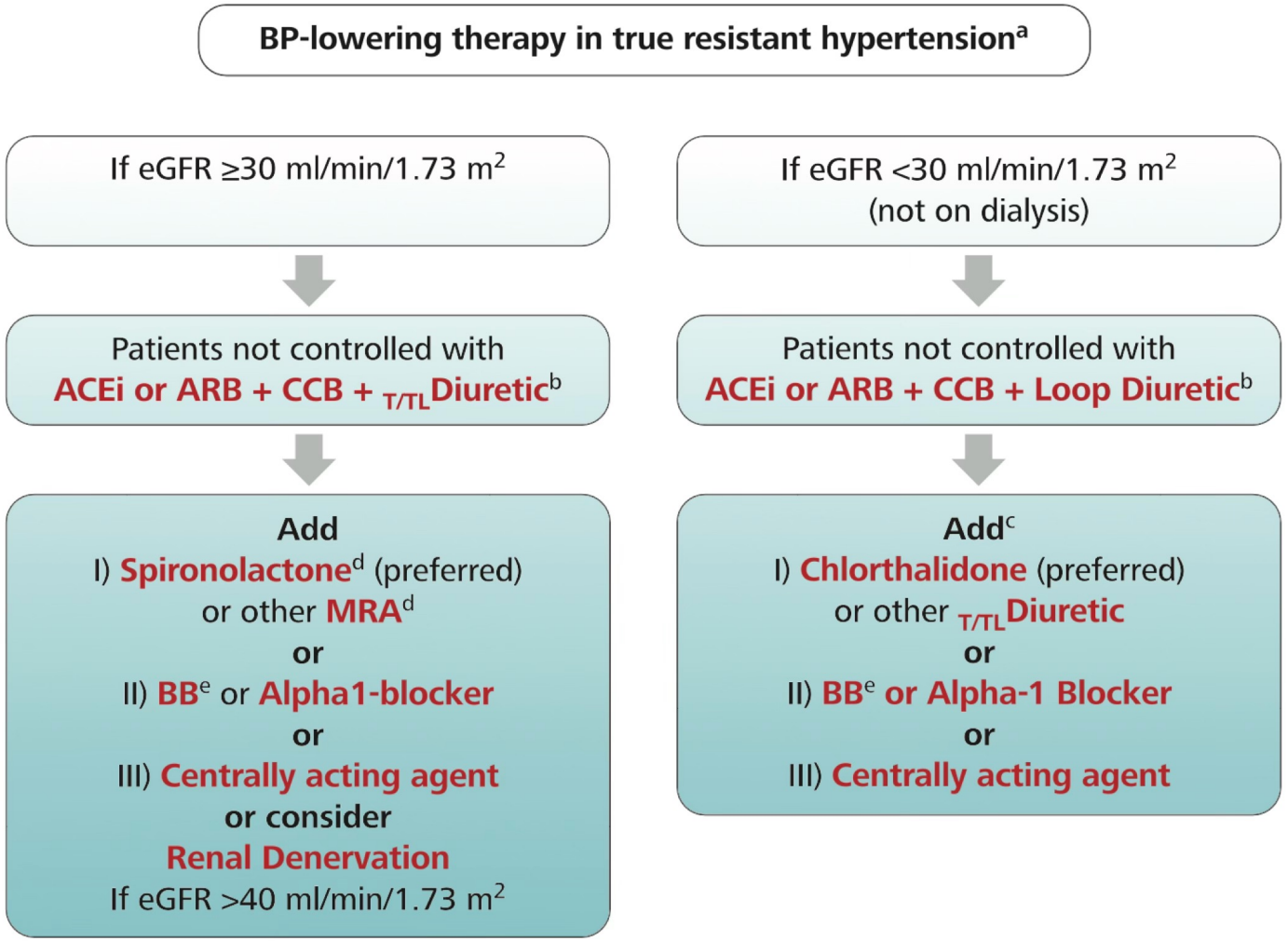
2023 ESH Guidelines for the management of arterial hypertension.

General BP-lowering strategy



2023 ESH Guidelines for the management of arterial hypertension.

General BP-lowering strategy



2023 ESH Guidelines for the management of arterial hypertension.

DOSING AT A GLANCE

Oral antihypertensives — core agents

Thiazide / Thiazide-like diuretics		
Chlorthalidone	12.5–25 mg	once daily
Hydrochlorothiazide	25–50 mg	once daily
Indapamide	1.25–2.5 mg	once daily
ACE inhibitors		
Enalapril	5–40 mg	once or twice daily
Lisinopril	10–40 mg	once daily
Perindopril	4–16 mg	once daily
Ramipril	2.5–20 mg	once or twice daily
Angiotensin receptor blockers (ARBs)		
Losartan	50–100 mg	once or twice daily
Candesartan	8–32 mg	once daily
Valsartan	80–320 mg	once daily

2017 ACC/AHA guideline on high BP in adults (selected drugs).

DOSING AT A GLANCE

Oral antihypertensives — CCBs, β-blockers, other classes

Calcium channel blockers — dihydropyridines		
Amlodipine	2.5–10 mg	once daily
Felodipine	2.5–10 mg	once daily
Nifedipine SR	30–90 mg	once daily
Manidipine	5–20 mg	once daily
Lercanidipine	5–20 mg	once daily
β-blockers		
Bisoprolol (cardioselective)	2.5–10 mg	once daily
Metoprolol succinate	50–200 mg	once daily
Atenolol	25–100 mg	once or twice daily
Carvedilol (α + β)	12.5–50 mg	twice daily
Other classes		
Doxazosin (α-1 blocker)	1–16 mg	once daily
Methyldopa (central α_2-agonist)	250–1000 mg	twice daily

2017 ACC/AHA guideline on high BP in adults (selected drugs).

GUIDELINE-DIRECTED INDICATIONS

When should β-blockers be used in hypertension?

- ✓ Chronic coronary syndromes — anti-ischaemic therapy
- ✓ Post-myocardial infarction: arrhythmias, angina, incomplete revascularisation, HF
- ✓ HFrEF and HFpEF with coronary ischaemia, arrhythmias or tachycardia
- ✓ Atrial fibrillation — prevention, rhythm control, rate control
- ✓ Women of child-bearing potential / planning pregnancy
- ✓ Hypertensive disorders in pregnancy

Remember

β-blockers are NOT preferred first-line for uncomplicated hypertension.

They remain indicated when the patient also has one of the conditions on the left.

Atenolol has weaker stroke prevention than other β-blockers — consider bisoprolol, metoprolol succinate, or nebivolol.

2023 ESH Guidelines for the management of arterial hypertension.

Monitoring ACEi / ARB — what and how often

Parameter	Low risk	Moderate risk	High risk
SBP (mmHg)	≥120	110–119	<110
eGFR (mL/min/1.73 m²)	≥60	30–59	<30
Initial ↓ in eGFR (%)	<15	15–30	>30
Serum K⁺ (mmol/L)	≤4.5	4.6–5.0	>5.0
After starting or dose ↑	**4–12 weeks**	**2–4 weeks**	**<2 weeks**
Once at target / stable dose	**6–12 months**	**3–6 months**	**1–3 months**

A rise in creatinine up to 30% within the first 2–4 weeks of starting an ACEi/ARB is acceptable if potassium is stable. A larger jump warrants dose reduction and investigation for renovascular disease.

Thai CKD Clinical Practice Recommendation (2022 revised) · 2015 Thai HT guideline.

PRACTICAL APPROACH

Hypertension in the older adult

65–79 years

Start therapy when…

Start drug at ≥ 140 / 90 mmHg

Aim for…

< 140 / 80 mmHg

All drug classes acceptable. In isolated systolic HT, RCTs mainly used CCBs and thiazide/thiazide-like diuretics.

≥ 80 years

Start therapy when…

Start drug at SBP ≥ 160 mmHg

Aim for…

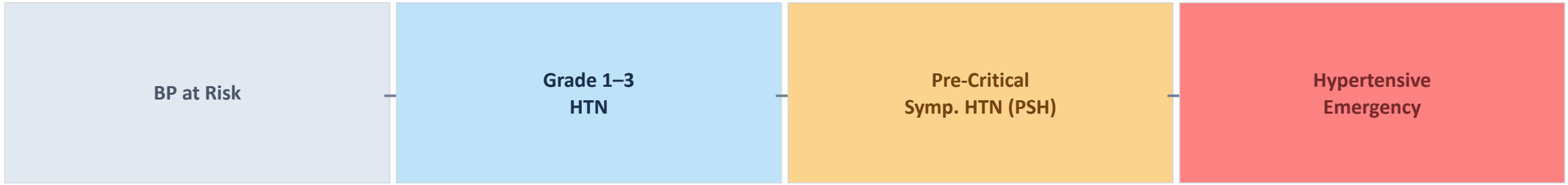
SBP 140–150 mmHg

Assess frailty, orthostasis, and polypharmacy. Lower targets only if well tolerated.

2023 ESH Guidelines for the management of arterial hypertension.

PRACTICAL APPROACH

The Hypertensive Crisis Spectrum



Pre-Critical Symptomatic HTN (PSH)

- Severe elevation (often > grade 3) + minor symptoms (headache, dizziness)
- No acute target organ damage
- Previously called 'hypertensive urgency' — term now discouraged
- Oral antihypertensives; gradual reduction over 24–48 hrs; investigate and follow-up

Hypertensive Emergency

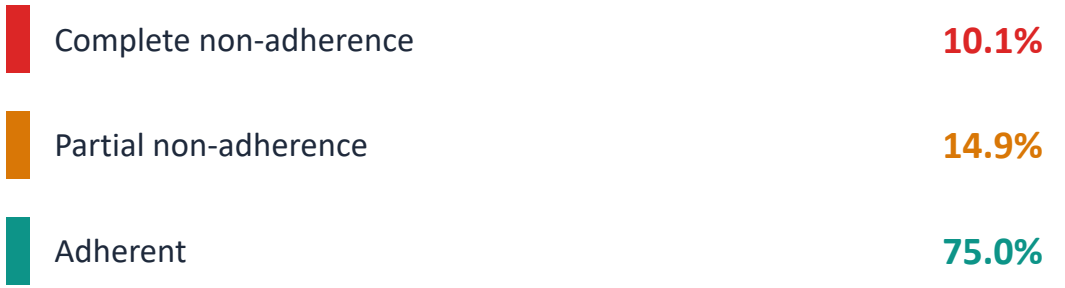
- Rapid severe BP elevation + ACUTE target organ damage
- Requires IV drugs + ICU monitoring
- Reduce MAP by 20–25% in 1st hour ONLY
- DO NOT normalize BP too rapidly — risk of ischemia

2024 Thai HT guideline.

Adherence — the silent failure mode

1 in 4

hypertensive patients are not taking their medications as prescribed.



Factors that reduce adherence

Patient & disease

Asymptomatic chronic condition
Social isolation, disrupted home situation
Depression and other psychiatric illness

Treatment

Long duration of therapy · complicated regimens
Cost of medications and side effects
Multiple behavioural modifications requested

System

Lack of specific appointment times
Long waiting time in clinic

Tomaszewski M. Heart 2014;100:855–861.

PART 02

Dyslipidemia

Risk assessment · Lifestyle · Statins · Beyond statins

EPIDEMIOLOGY · THAILAND 2024–2025

Prevalence of dyslipidemia in Thailand

TC > 200 MG/DL

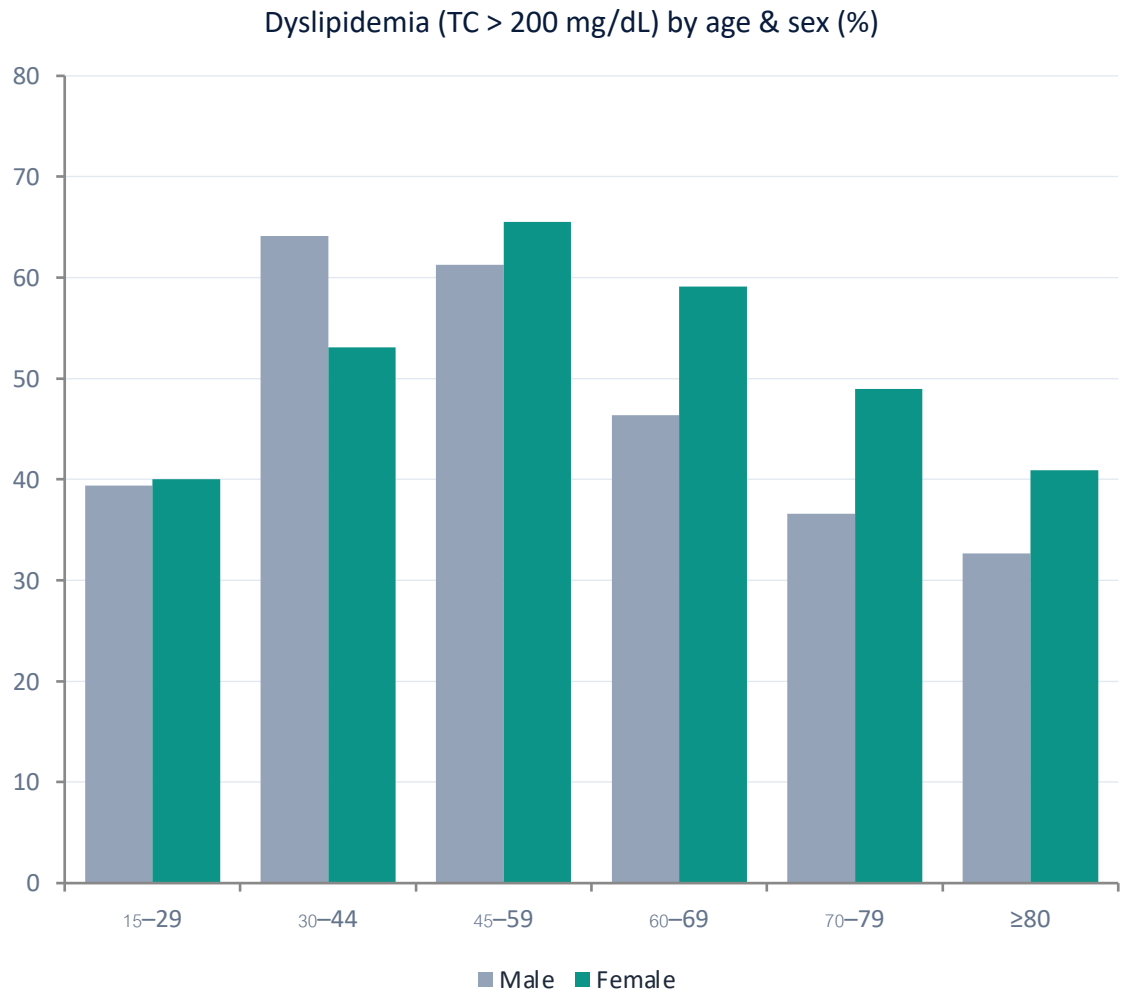
53%

About half of Thai adults have elevated total cholesterol.

TC > 240 MG/DL

19.8%

Around 1 in 5 have clearly high cholesterol warranting evaluation.



Thai National Health Examination Survey VII (2024–2025).

RISK-BASED APPROACH

When does dyslipidemia need medication?

Dyslipidemia does not require drug therapy in everyone.

Pharmacotherapy is indicated when cardiovascular risk is high — not based on the LDL-C number alone.

1 Assess global CV risk

Thai CV Risk Score (www.rama.mahidol.ac.th/cardio_vascular_risk) or ASCVD 10-year risk (tools.acc.org).

2 Lifestyle first

Saturated & trans fat restriction, fibre, physical activity — baseline for everyone.

3 Statin if high risk

Identify the 'statin benefit' patient group and select intensity accordingly.

2024 RCPT Clinical Practice Guideline on Dyslipidemia.

DIET & EXERCISE

Therapeutic lifestyle change for dyslipidemia

Dietary changes to lower LDL-C

Saturated fat ≤ 7% of daily calories
(animal fat, lard, palm and coconut oil, butter)

Replace saturated with unsaturated fats
(olive, rice bran, soybean oil)

Avoid trans fats
(margarine, shortening, some baked goods — now banned in Thailand)

Increase dietary fibre
Fruit, vegetables, whole grains, legumes

Consider plant stanol/sterol (2 g/day)

Exercise — effect on lipids

↑ **HDL-C**

Significant increase with regular aerobic exercise.

↓ **Triglycerides**

Meaningful reduction with aerobic training.

↓ **LDL-C (modest)**

Smaller effect; greater when combined with weight loss and diet.

2024 RCPT Dyslipidemia Guideline · UpToDate: Exercise, lipoproteins and hemostatic factors, 2021.

Assessing cardiovascular risk

Thai CV Risk Score

For Thai adults aged 35–70 y

Inputs
Age, sex, SBP, total cholesterol, waist circumference, diabetes, smoking.

Output
10-year risk of coronary heart disease and stroke in Thai population.

Access
rama.mahidol.ac.th/cardio_vascular_risk/thai_cv_risk_score

The American Heart Association PREVENT™

For adults aged 40–79 y without established ASCVD

Inputs
Age, sex, BMI, BP (treated or not), TC, HDL-C, LDL-C, eGFR, diabetes, smoking.

Output
10-year ASCVD risk — stratifies patients for statin therapy decisions.

Access
https://professional.heart.org/en/guidelines-and-statements/prevent-calculator

Thai CV Risk Score (Rama) · ACC ASCVD Risk Estimator Plus.

WHO GETS A STATIN?

'Statin benefit' patient groups

01	≥ 21 y	**Established ASCVD**	*Secondary prevention — statin for all.*
02	≥ 21 y	**LDL-C ≥ 190 mg/dL**	*Likely familial hypercholesterolaemia.*
03	≥ 35 y	**10-y ASCVD risk ≥ 10% AND LDL-C > 100 mg/dL**	*Primary prevention in intermediate–high risk.*
04	≥ 40 y	**Diabetes AND LDL-C > 100 mg/dL**	*Diabetes itself confers risk equivalent.*
05	≥ 50 y	**CKD AND LDL-C > 100 mg/dL**	*Non-dialysis CKD benefits from statin therapy.*

2024 RCPT Dyslipidemia Guideline · 2018 AHA/ACC Blood Cholesterol Guideline.

DOSE MATTERS

Statin intensity — expected LDL-C reduction

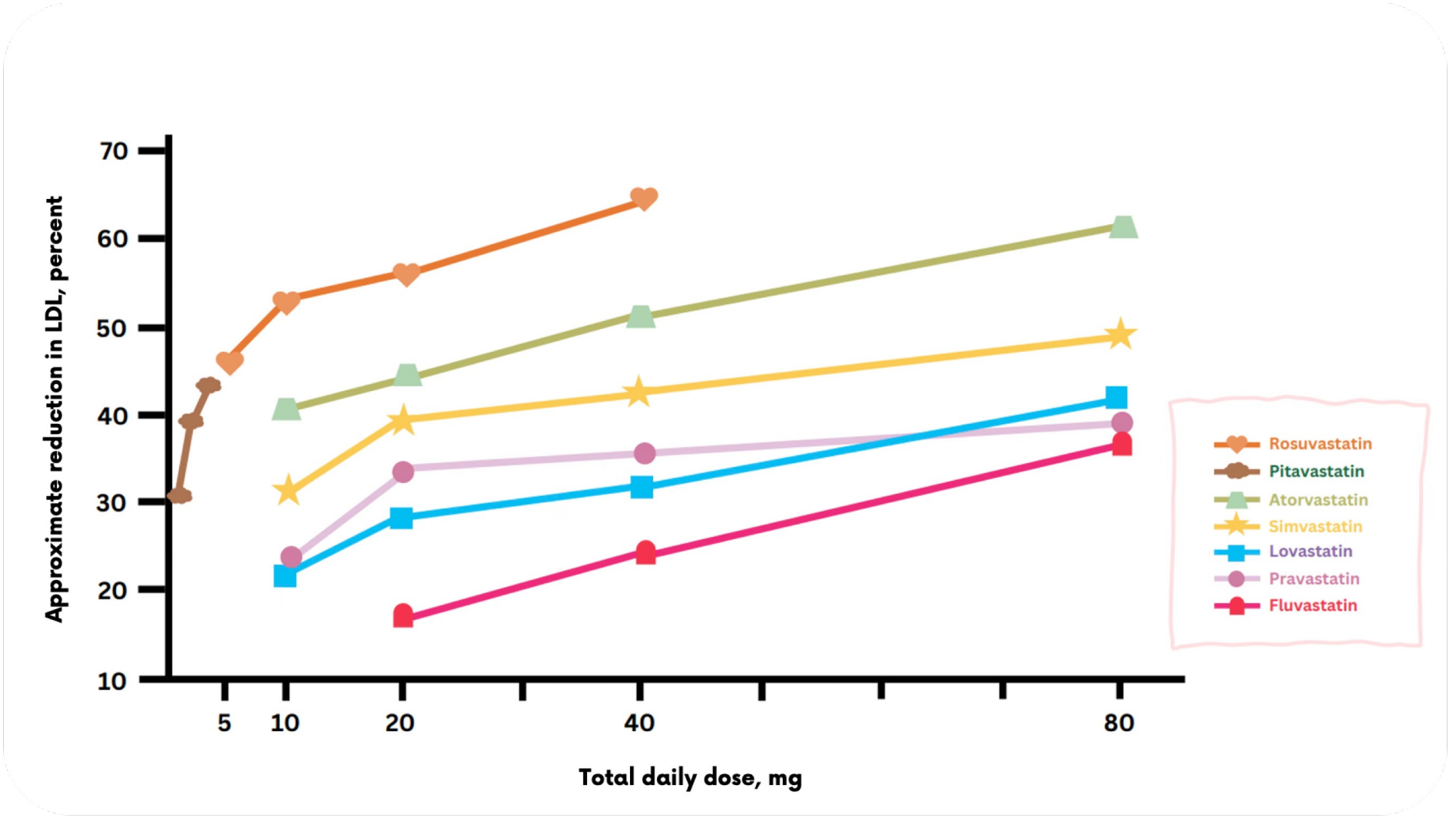
	High intensity	Moderate intensity	Low intensity
LDL-C lowering	**≥ 50%**	**30–49%**	< 30%
Atorvastatin	40 mg · 80 mg	10 mg · 20 mg	—
Rosuvastatin	20 mg · 40 mg	5 mg · 10 mg	—
Simvastatin	—	20–40 mg	10 mg
Pitavastatin	—	1–4 mg	—
Pravastatin	—	40 mg	10–20 mg
Fluvastatin	—	40 mg BID · XL 80 mg	20–40 mg

Tip — simvastatin 80 mg is no longer recommended due to the high risk of myopathy.

2024 RCPT Dyslipidemia Guideline · 2018 AHA/ACC Blood Cholesterol Guideline.

DOSE MATTERS

Statin intensity — expected LDL-C reduction



UpToDate: Statins — actions, side effects, administration (2023).

Properties of common statins

Property	Atorvastatin	Rosuvastatin	Simvastatin	Pitavastatin	Pravastatin
LDL-C reduction (%)	38–54	52–63	28–41	31–48	19–40
Half-life (h)	15–30	19	2–3	12	1.3–2.8
Solubility	Lipophilic	Hydrophilic	Lipophilic	Lipophilic	Hydrophilic
CYP metabolism	3A4	Limited	3A4	Limited	Limited
Food affects absorption	No	No	No	↓	↓
Optimal time	Anytime	Anytime	Evening	Anytime	Evening
Renal excretion (%)	2	10	13	< 2	20

Hydrophilic statins (rosuvastatin, pravastatin) have less muscle penetration.

UpToDate: Statins — actions, side effects, administration (2023).

WHAT TO WATCH FOR

Statin-associated side effects (SASE)

Muscle (SAMS)

1–5% RCT · 5–10% real-world

Myalgia with normal CK is most common. Myositis (CK > ULN), rhabdomyolysis, and autoimmune myopathy are rare.

Predisposing factors

Older age, female, low BMI, Asian ancestry, CYP3A4 / OATP1B1 inhibitors, hypothyroidism, heavy exercise.

New-onset diabetes

Depends on risk profile

Modest absolute risk; highest with high-intensity statins in patients with BMI > 30, FBG > 100, HbA1c > 6%, or metabolic syndrome.

Predisposing factors

Benefit still outweighs risk in the statin-benefit group.

Liver

Transaminase ↑ 0.5–2%

Transient rise in ALT/AST, usually asymptomatic. Hepatic failure is very rare.

Predisposing factors

Check baseline LFT; no routine monitoring without symptoms or risk factors.

CNS / other

Rare

Memory or cognitive complaints are rare and generally reversible. No definitive cancer association.

Predisposing factors

Reassure — proven CV benefit far exceeds these concerns.

2018 AHA/ACC Blood Cholesterol Guideline (Circulation 2019;139:e1082).

TG 150–1000 MG/DL

Hypertriglyceridemia — step-wise approach

Mild–moderate (150–499 mg/dL)

Look for and treat secondary causes: obesity, metabolic syndrome, DM, hypothyroidism, nephrotic syndrome, alcohol, drugs.

Lifestyle: stop alcohol, reduce carbohydrates, limit sugar to <10% of energy, weight loss.

Statin is the first drug if concurrent ASCVD risk ≥10% — treat the global risk, not the TG number.

Severe (≥ 500 mg/dL)

Acute pancreatitis risk — start a fibrate plus lifestyle measures promptly.

Very severe (≥1000 mg/dL): very-low-fat diet, avoid alcohol and refined carbs, consider omega-3.

Address reversible causes (alcohol, uncontrolled DM, oestrogens, corticosteroids).

Fibrate pearls: fenofibrate may be added to statin in DM (retinal outcomes) · *avoid gemfibrozil + statin* (rhabdo risk) · adjust dose for eGFR.

2024 RCPT Dyslipidemia Guideline · 2018 AHA/ACC Blood Cholesterol Guideline.

Adherence to statin therapy — a parallel challenge

52.5%

of patients are adherent (PDC > 80%)

Non-adherent (PDC < 20%)	**23.4%**
Partial (PDC 20–80%)	**24.1%**

≈ Half of patients fail to take their statin as prescribed within 1 year.

Practical ways to support adherence

- Explain clearly what the drug is for and why it matters
- Prefer once-daily, low-cost, generic regimens
- Simplify — use fixed-dose combinations where possible
- Screen for depression and cognitive impairment
- Ask non-judgementally at every visit
- Involve family, nurse, pharmacist in long-term follow-up
- Use HBPM / pill count / pharmacy refill to monitor

Ann Pharmacother 2007;41(11):1805–1811.

SUMMARY

Take-home messages

1 Diagnose with out-of-office BP

Prefer HBPM · confirm white-coat and masked HT before starting or escalating.

2 Set individualised targets

<130/80 for most · <140/80 in 65–79 y · SBP 140–150 if ≥80 y · always weigh frailty.

3 Use rational combinations

ACEi/ARB + CCB or thiazide is the backbone · step up with spironolactone before labelling resistant HT.

4 Treat global CV risk

Statin decisions rest on risk category — not LDL alone. Use Thai CV risk or ASCVD calculator.

5 Match statin to intensity

High-intensity for secondary prevention and high-risk primary prevention; intensify before adding ezetimibe or PCSK9i.

6 Support adherence

Half of patients stop within a year — simplicity, cost, communication, and team follow-up matter as much as the drug choice.

THANK YOU

Questions & discussion

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