International Society of Hypertension

2020 ISH Global Hypertension Practice Guidelines

6th May 2020

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2020 ISH Global Hypertension Practice Guidelines

Introduction

Alta Schutte

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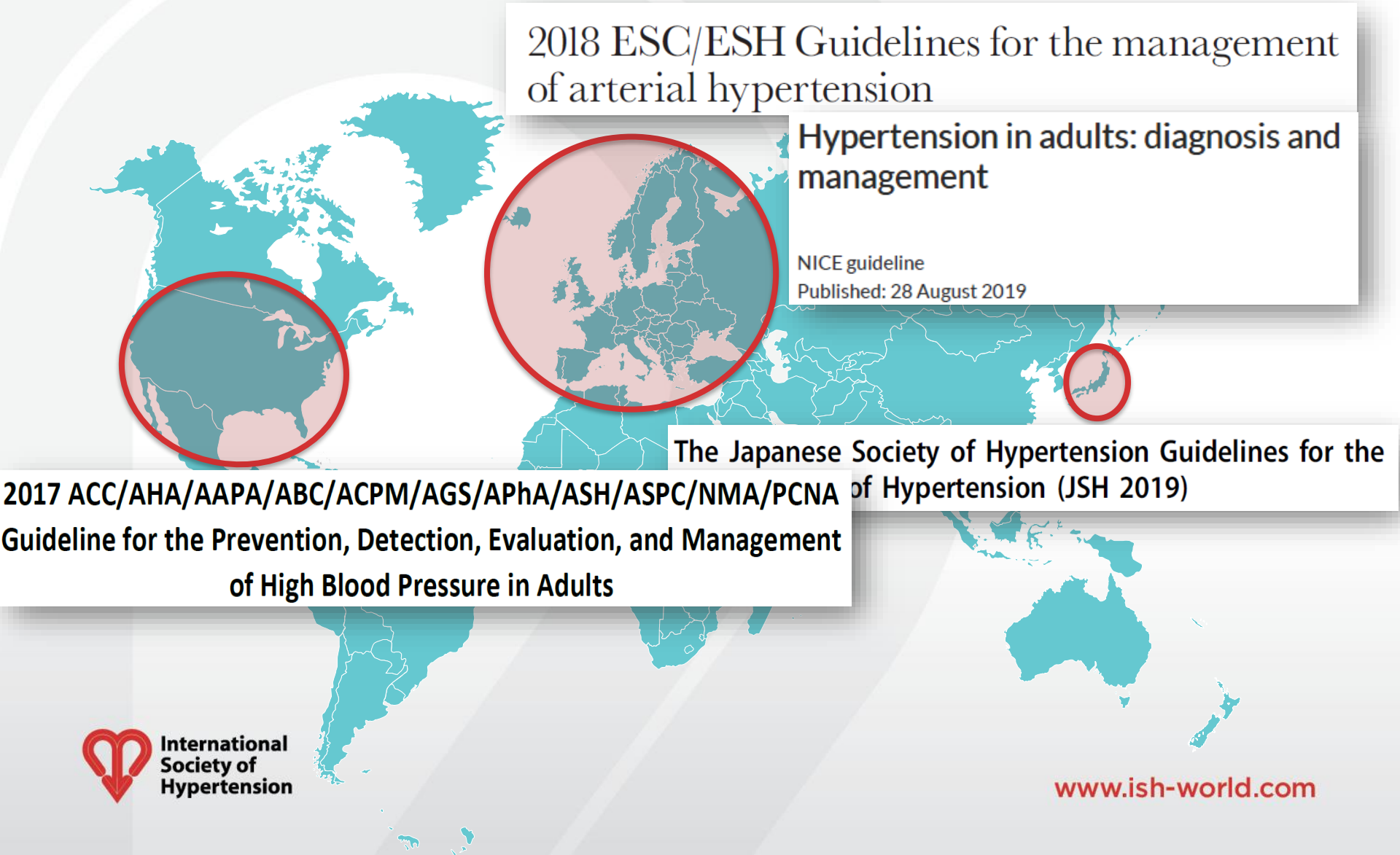
Introduction



2018 ESC/ESH Guidelines for the management of arterial hypertension

Hypertension in adults: diagnosis and management

NICE guideline
Published: 28 August 2019

The Japanese Society of Hypertension Guidelines for the
of Hypertension (JSH 2019)

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

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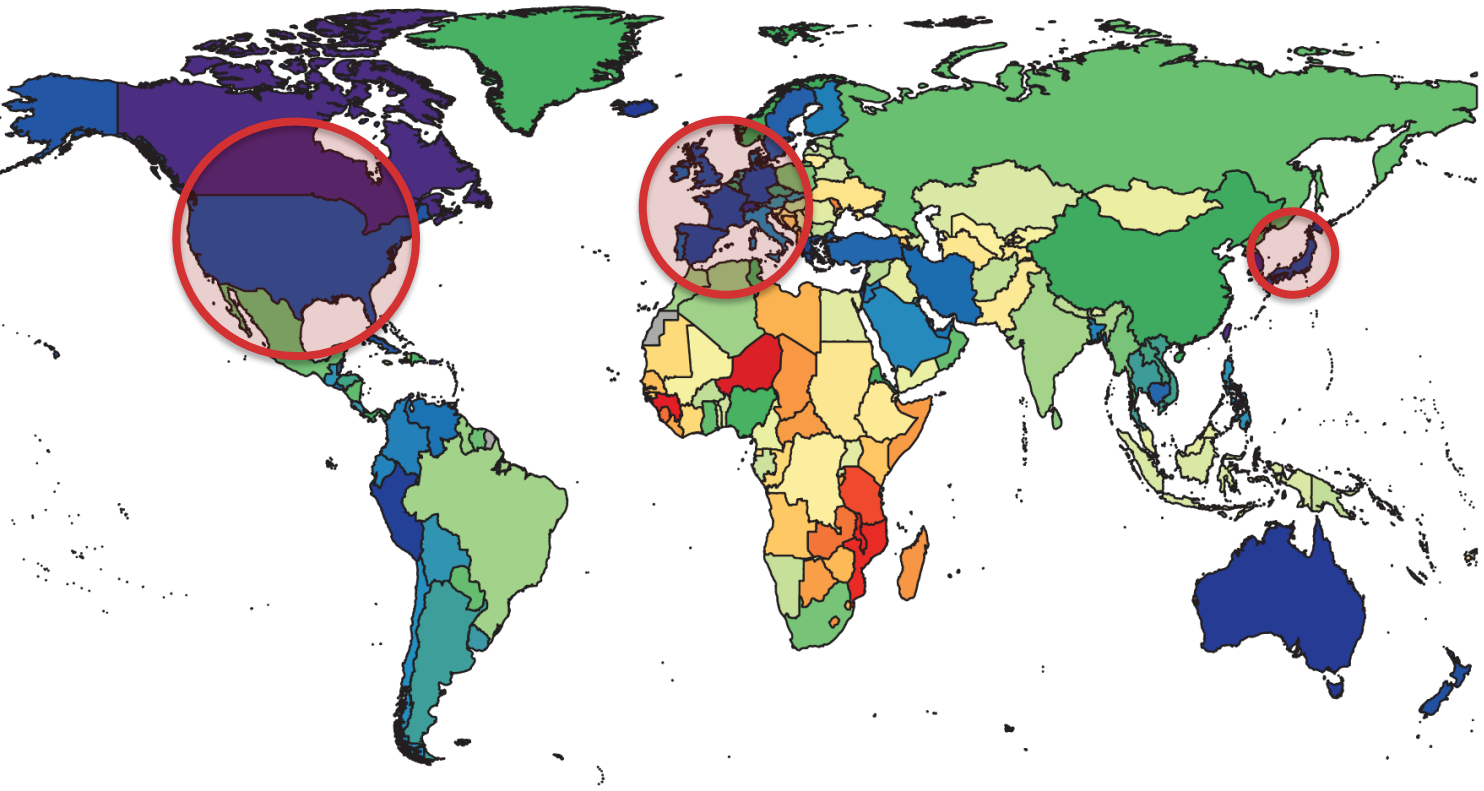

Lancet 2017; 389: 37–55

Age-standardised mean systolic blood pressure (mm Hg)

140
135
130
125
120
115
110

- 1.39 billion estimated with hypertension in 2010
- **349** million from HIC
- **1.04 billion** from LMIC

Circulation. 2016;134:441–450

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Introduction

- To align with the mission of the ISH:
  to **reduce the global burden of raised BP** –
  we developed the ***ISH 2020 Global Hypertension Practice Guidelines*** for adults.

- We extracted evidence-based content from recently published guidelines and tailored
  ESSENTIAL standards of care; and
  OPTIMAL standards of care

Introduction

The ***ISH 2020 Global Hypertension Practice Guidelines*** were thus developed based on evidence criteria,

a) to be used globally
b) to be fit for application in low-resource and high-resource settings by advising on ESSENTIAL and OPTIMAL standards of care; and
c) to be concise, simplified and easy to use by clinicians, nurses and community health workers, as appropriate.

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Process of Writing

Thomas Unger

Process of Writing

Scepticism

- Is it necessary at all?
- Is this a hypersimplistic view?
- Is it strictly evidence-based?
- Is it helpful for low-income settings?

Process of Writing

1st Meeting of ISH Hypertension Guidelines Committee
Feb. 3, 2019 London, UK

Further Meetings: Paris, France (28.08.2019), Frankfurt, Germany (01.12.2019), Glasgow, UK (26.02.2020)

COMMITTEE:

13 ISH Scientific Council members

Thomas Unger *(Chair)*	The Netherlands
Claudio Borghi	Italy
Fadi Charchar	Australia
Nadia Khan	Canada
Neil Poulter	United Kingdom
Dorairaj Prabhakaran	India
Agustin Ramirez	Argentina
Markus Schlaich	Australia
George Stergiou	Greece
Maciej Tomaszewski	United Kingdom
Richard Wainford	USA
Bryan Williams	United Kingdom
Alta Schutte	S Africa/Australia

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Process of Writing

Define our goal (1):

- Not to review the current evidence again - done by ACC/AHA-, ESC/ESH- and other colleagues.
- Develop a balanced practical, realistic, feasible hands-on proposal **for global use** in line with the ISH mission.

Process of Writing

Define our Goal (2):

- Stick to recent guidelines (ESC/ESH, ACC/AHA, NICE) as background.
- **Define** ESSENTIAL **vs** OPTIMAL **criteria** of diagnosis and treatment according to resources availability in LMI vs HI settings.

Process of Writing

Practical questions to be addressed: ESSENTIAL OPTIMAL

- Definition of office hypertension
- Diagnosis of hypertension (office and out-of-of office)
- Investigation (essential vs optimal tests)
- Non-pharmacological measures
- Treatment initiation (duration of observation, BP level, high-risk groups)
- Stepwise drug choices – Combination therapies
- Goal of treatment
- When to refer to hypertension specialist
- Long-term follow-up plan (how often do you see Dr.)

Process of Writing: Contents

Process of Writing

Review Process

- **Internal Review:** Each section reviewed by another member of the Guidelines committee
- **External Review.** Two rounds with 24 Experts around the world with special consideration of colleagues from LMICs

Document Reviewers (24)

Hind Beheiry	Sudan	**Ana Mocumbi**	Mozambique
Irina Chazova	Russia	**Sanjeevi N. Narasingan**	India
Albertino Damasceno	Mozambique	**Elijah Ogola**	Kenya
Anna Dominiczak	UK	**Srinath Reddy**	India
Anastase Dzudie	Cameroon	**Ernesto Schiffrin**	Canada
Stephen Harrap	Australia	**Ann Soenarta**	Indonesia
Hiroshi Itoh	Japan	**Rhian Touyz**	UK
Tazeen Jafar	Singapore	**Yudah Turana**	Indonesia
Marc Jaffe	USA	**Michael Weber**	USA
Patricio Jaramillo-Lopez	Colombia	**Paul Whelton**	USA
Kazuomi Kario	Japan	**Xin Hua Zhang**	Australia
Giuseppe Mancia	Italy	**Yuqing Zhang**	China

Publication Schedule

May 6: Online in Journal of Hypertension, Hypertension

May 6: First Webinar: Global and Chinese

May 20: Second Webinar with Q & A.

Internet, Social Media:

Homepage ISH:

Translations:

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Definition of Hypertension

George Stergiou

International Society of Hypertension

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Definition of Hypertension

ESSENTIAL

Classification of hypertension based on Office blood pressure (BP) measurement

Category	Systolic (mmHg)		Diastolic (mmHg)
Normal BP	< 130	and	< 85
High-normal BP	130–139	and/or	85–89
Grade 1 Hypertension	140–159	and/or	90–99
Grade 2 Hypertension	≥ 160	and/or	≥ 100

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Definition of Hypertension

ESSENTIAL

Hypertension based on Office-, Ambulatory (ABPM)- and Home Blood Pressure (HBPM) measurement

		SBP / DBP (mmHg)
Office BP		≥ 140 and/or ≥ 90
ABPM	24h average	≥ 130 and/or ≥ 80
	Day Time (or awake) average	≥ 135 and/or ≥ 85
	Night Time (or asleep) average	≥ 120 and/or ≥ 70
HBPM		≥ 135 and/or ≥ 85

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Blood Pressure Measurement and Diagnosis of Hypertension

George Stergiou

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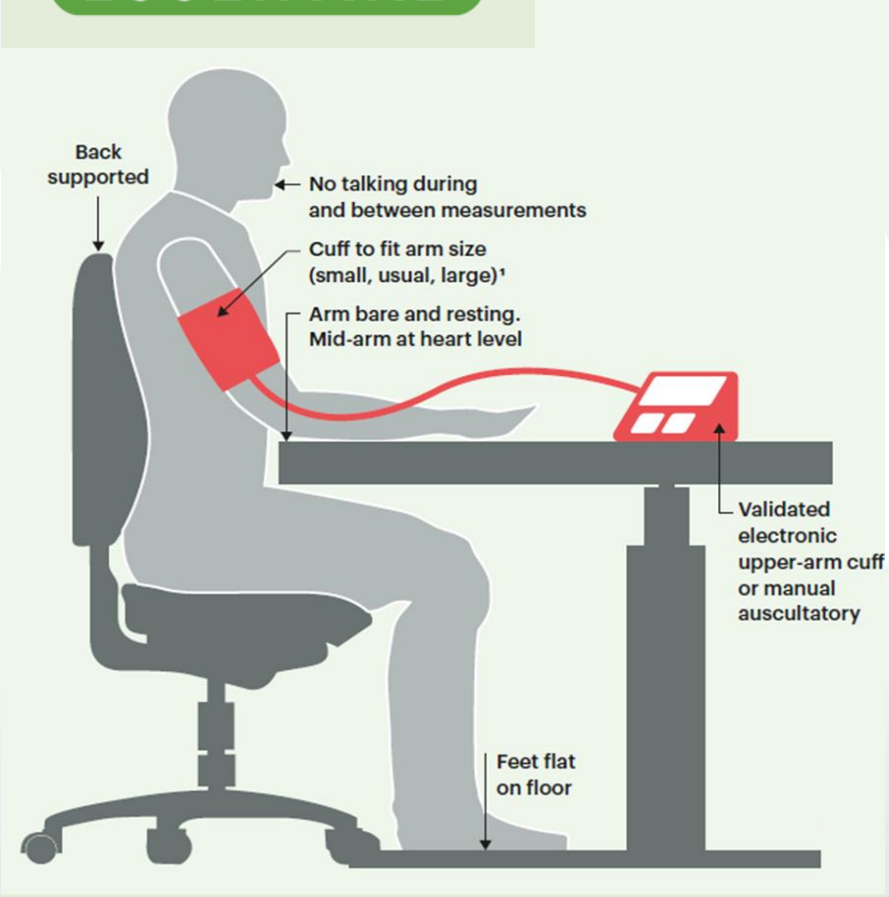
Blood Pressure Measurement and Diagnosis of Hypertension

ESSENTIAL



Office Blood Pressure Measurement

- 2-3 office visits at 1-4-week intervals.
- Whenever possible, the diagnosis should not be made on a single visit (unless BP ≥180/110 mmHg and CVD).
- If possible and available the diagnosis of hypertension should be confirmed by out-of-office measurement.

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Blood Pressure Measurement and Diagnosis of Hypertension

ESSENTIAL

OFFICE BP MEASUREMENT

Conditions	Device	Protocol
Position	**Cuff**	**Interpretation**
• Setting • Body position • Talking	• Validated electronic upper-arm cuff (www.stridebp.org) • Alternatively manual auscultatory device • Cuff size	• Average 2nd-3rd measurement • 2-3 office visits required

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Blood Pressure Measurement and Diagnosis of Hypertension

ESSENTIAL

BP Measurement Plan according to Office BP levels

Office blood pressure levels (mmHg)		
<130/85	130-159/85-99	>160/100
• Remeasure within 3 years (1 year if other risk factors).	• If possible confirm with out-of-office measurement. • Alternatively confirm with repeated office visits.	• Confirm within a few days/weeks.

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Blood Pressure Measurement and Diagnosis of Hypertension

OPTIMAL

Office Blood Pressure

Initial evaluation

- Measure BP in both arms. Difference >10 mmHg: use arm with higher BP; >20 mmHg: consider further investigation.

Standing BP

- In treated patients when symptoms of postural hypotension.
- At first visit in elderly and diabetics.

Unattended BP

- More standardized. Lower BP levels with uncertain threshold.
- Out-of-office BP again needed in most cases.

Blood Pressure Measurement and Diagnosis of Hypertension

OPTIMAL

Clinical Use of Home and Ambulatory BP Monitoring

Conditions	Device	Protocol
Position	Cuff	Interpretation

Blood Pressure Measurement and Diagnosis of Hypertension

OPTIMAL

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	Home BP Monitoring	Ambulatory BP Monitoring
Conditions	As for office blood pressure *(see above)*.	Routine working day.
Position	As for office BP *(see above)*.	Avoid strenuous activity. Arm still and relaxed during each measurement.
Device	Validated electronic (oscillometric) upper-arm cuff device (www.stridebp.org, and ***Section 11: Resources***)	
Cuff	Size according to the individual's arm circumference	
Measurement protocol	**Before each visit to the health professional:** • 3–7-day monitoring in the morning (before drug intake if treated) and the evening. • Two measurements on each occasion after 5 min sitting rest and 1 min between measurements. **Long-term follow-up of treated hypertension:** • 1–2 measurements per week or month.	• 24-hour monitoring at 15 – 30 min intervals during daytime and nighttime. • At least 20 valid daytime and 7 nighttime BP readings are required. If less, the test should be repeated.
Interpretation	• Average home blood pressure after excluding readings of the first day ≥ 135 or 85 mmHg indicates hypertension.	• 24-hour ambulatory blood pressure ≥ 130/80 mmHg indicates hypertension (primary criterion). • Daytime (awake) ambulatory blood pressure ≥ 135/85 mmHg and nighttime (asleep) ≥ 120/70 mmHg indicates hypertension

Blood Pressure Measurement and Diagnosis of Hypertension

OPTIMAL

White-coat Hypertension

- Intermediate CV risk.
- If low total CV risk and no organ damage, drug treatment may not be prescribed.
- Follow with lifestyle changes.

Masked Hypertension

- Similar CV risk as sustained hypertensives.
- Drug treatment may be required aiming to normalise out-of-office BP.

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Diagnostic and Clinical Tests

Markus Schlaich

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Diagnostic and Clinical Tests

ESSENTIAL

- **Medical History** (BP, risk factors, co-morbidities, signs/symptoms of secondary hypertension…)
- **Physical Examination** (circulation, heart, other systems)
- **Lab Investigations** (Na^+, K^+, creatinine, eGFR, dipstick lipids, Fasting Glucose where available)
- **12 lead ECG** (AF, LV hypertrophy, IHD…)

OPTIMAL

- **Additional tests to consider** (extended biochemistry, cardiac/kidney/brain/vascular imaging, fundoscopy…)

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Cardiovascular Risk Factors

Markus Schlaich

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Cardiovascular Risk Factors

- **More than 50% of hypertensive patients have additional CV risk factors**
- **Most commonly:** Met Syn, T2DM, lipid disorders, ↑ uric acid
- **CV risk assessment is important and should be assessed in all hypertensive patients**
- **Consider increased risk with:** chronic inflammatory disease, COPD, psychiatric disorders, psycho-social stressors

Cardiovascular Risk Factors

Other risk factors, HMOD, or disease	High-normal SBP 130–139 DBP 85–89	Grade 1 SBP 140–159 DBP 90–99	Grade 2 SBP ≥160 DBP ≥100
No other risk factors	Low	Low	Moderate -- High
1 or 2 risk factors	Low	Moderate	High
≥3 risk factors	Low -- Moderate	High	High
HMOD, CKD grade 3, diabetes mellitus, CVD	High	High	High

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Hypertension-mediated Organ Damage

Markus Schlaich

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Hypertension-mediated Organ Damage

- Hypertension-mediated organ damage **(HMOD)** defined as structural or functional alterations of arterial vasculature and/or organs it supplies caused by elevated BP.

- HMOD assessment can provide **important therapeutic guidance on:**
  1. management for hypertensive patients with low or moderate overall risk through re-classification due to presence of HMOD.
  2. preferential selection of drug treatment based on the specific impact on HMOD.

Hypertension-mediated Organ Damage

HMOD Assessment

ESSENTIAL

- Serum creatinine
- eGFR
- Dipstick urine test
- 12-lead ECG

OPTIMAL

- Brain
- Eyes
- Heart
- Kidneys
- Arteries

Serial assessment of HMOD
may help to determine efficacy of treatment

Exacerbators and Inducers of Hypertension

Nadia Khan

Exacerbators & Inducers of Hypertension

Non Steroidal Anti-Inflammatory Drugs (NSAIDs)	No difference or an increase of up to 3/1 mmHg with celecoxib 3/1 mmHg increase with non-selective NSAIDs No increase in Blood Pressure with aspirin NSAIDs can antagonize the effects of RAAS inhibitors and beta blockers
Combined Oral Contraceptive Pill	6/3 mmHg increase with high doses of estrogen (>50 mcg of estrogen and 1-4 mcg progestin)
Antidepressants	2/1 mmHg increase with SNRI (Selective Norepinephrine and Serotonin Reuptake Inhibitors) Increased Odds Ratio of 3.19 of hypertension with Tricyclic antidepressant use No increases in blood pressure with SSRI (Selective Serotonin Reuptake Inhibitors)
Acetaminophen	Increased relative risk of 1.34 of hypertension with almost daily acetaminophen use
Other Medications	Steroids Anti retroviral therapy: inconsistent study findings for increased blood pressure Sympathomimetics: pseudoephedrine, cocaine, amphetamines Anti-migraine serotonergics Recombinant human erythropoeitin Calcineurin inhibitors Anti-angiogenesis and kinase inhibitors 11 ß-hydroxysteroid dehydrogenase type 2 inhibitors
Herbal and Other Substances[44-45]	Alcohol, Ma-huang, Ginseng at high doses, Liquorice, St. John's Wort, Yohimbine

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Exacerbators & Inducers of Hypertension

- Specific medications and substances may increase BP or antagonize antihypertensive therapy.
- The effect on BP can vary widely between individuals.
- **All patients with or at risk for hypertension be screened for such medications and substances**.
- Where appropriate, consider reducing or eliminating these substances or medications.

Exacerbators & Inducers of Hypertension

Most common medications that can increase BP

- Non-selective or traditional NSAIDs
- Combined oral contraceptive pill
- Select anti depressant medications including tricyclic antidepressants and SNRIs
- Acetaminophen when used almost daily and for prolonged periods

Exacerbators & Inducers of Hypertension

- The effect of Anti-retroviral therapy is unclear as studies demonstrate either no effect on BP or some increase.
- Alcohol raises BP regardless of the type of alcoholic drink.
- Limited evidence on herbal and other substances.
- Ma Huang, Ginseng at high doses and St. John's Wort reported to increased BP.

Non-Pharmacological Treatment of Hypertension

Fadi Charchar

Non-pharmacological Treatment

- Healthy lifestyle choices can prevent or delay the onset of high BP and can reduce CV risk
- Lifestyle modification is often the first line of antihypertensive treatment.
- Modifications in lifestyle can also enhance the effects of antihypertensive treatment.

Non-pharmacological Treatment - Diet

- Reducing salt added when preparing foods and at the table. Avoid or limit consumption of high salt foods.
- Eating a diet rich in whole grains, fruits, vegetables, poly-unsaturated fats and dairy products, such as DASH diet.
- Reducing food high in sugar, saturated fat and trans fats.
- Increasing intake of vegetables high in nitrates (leafy vegetables and beetroot). Other beneficial foods and nutrients include those high in magnesium, calcium and potassium (avocados, nuts, seeds, legumes and tofu).

Non-pharmacological Treatment - Diet

- Moderate consumption of healthy drinks (coffee, green and black tea, Karkadé (Hibiscus) tea, pomegranate juice, beetroot juice and cocoa.

- Moderation of alcohol consumption and avoidance of binge drinking.
- Reduce weight and avoid obesity.
- Be careful with complementary, alternative or traditional medicines – little/no evidence.

Non-pharmacological Treatment - Lifestyle

- Smoking cessation.

- Engage in regular moderate intensity aerobic and resistance exercise, 30 minutes on 5 – 7 days per week or HIIT (High Intensity Interval Training).

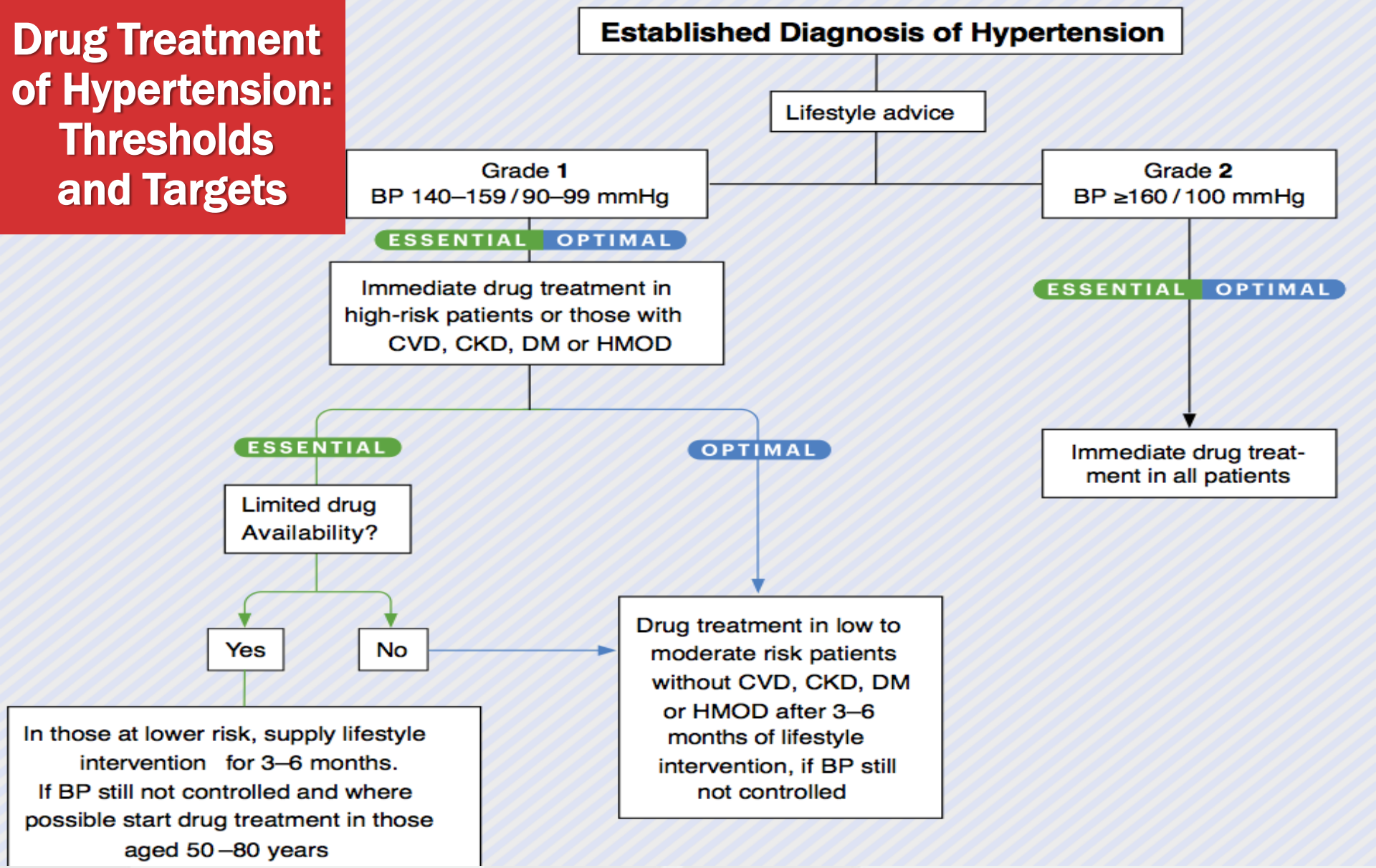
- Reduce stress and introduce mindfulness.

- Reduce exposure to air pollution and cold temperature.

Drug Treatment of Hypertension

Neil Poulter

Drug Treatment of Hypertension: Thresholds and Targets



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ESSENTIAL Target BP reduction by at least 20/10 mmHg, ideally to <140/90 mmHg

OPTIMAL <65 years : BP target <130 / 80 mmHg if tolerated (but >120 / 70 mmHg).
≥65 years : BP target <140 / 90 mmHg if tolerated but consider an individualised BP target in the context of frailty, independence and likely tolerability of treatment.

Aim for BP control within 3 months

Drug choice & Sequencing

ESSENTIAL

- Use whatever drugs are available with as many of the ideal characteristics (see ***Table 9***) as possible.
- Use free combinations if SPCs are not available or unaffordable
- Use thiazide diuretics if thiazide-like diuretics are not available
- Use alternative to DHP-CCBs if these are not available or not tolerated (i.e. Non-DHP-CCBs: diltiazem or verapamil).

OPTIMAL

Ideally Single Pill Combination Therapy (SPC)

Step 1 Dual low-dose# combination	**A + C** [a, b, c]
Step 2 Dual full-dose combination	**A + C** [a, b]
Step 3 Triple combination	**A + C + D**
Step 4 (Resistant Hypertension) Triple Combination + Spironolactone or other drug*	**A + C +D Add Spironolactone (12.5 – 50 mg o.d.)**[d]

ESSENTIAL and OPTIMAL

Consider beta-blockers at any treatment step when there is a specific indication for their use, e.g. heart failure, angina, post-MI, atrial fibrillation, or younger women with, or planning pregnancy.

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a) Consider monotherapy in low risk grade 1 hypertension or in very old (≥80 yrs) or frailer patients.
b) Consider A + D in post-stroke, very elderly, incipient heart failure or CCB intolerance.
c) Consider A + C or C + D in black patients.
d) Caution with spironolactone or other potassium sparing diuretics when estimated GFR <45 ml/min/1.73m² or K^+ >4.5 mmol/L.

A = ACE-Inhibitor or ARB (Angiotensin Receptor Blocker)
C = DHP-CCB (Dihydropyridine -Calcium Channel Blocker)
D = Thiazide-like diuretic

Drug Treatment of Hypertension

Ideal Drug Characteristics

1.	Treatments should be evidence-based in relation to morbidity/mortality prevention.
2.	Use a once-daily regimen which provides 24-hour blood pressure control.
3.	Treatment should be affordable and/or cost-effective relative to other agents.
4.	Treatments should be well-tolerated.
5.	Evidence of benefits of use of the medication in populations to which it is to be applied.

Drug Treatment of Hypertension

Summary 1

In established hypertension, uncontrolled by lifestyle measures:

Drug Treatment Threshold

≥140/90 mmHg (raising to ≥160/100 mmHg for those at lowest risk)

Drug Treatment Target

OPTIMAL

<65 years: <130/80 mmHg
≥65 years: <140/90 mmHg

ESSENTIAL

reduce BP by ≥20/10 mmHg

Drug Treatment of Hypertension

Summary 2

OPTIMAL

(i) Uptitration to target, of the following:
Low dose A+C → Full dose A+C → A+C+D → A+C+D + spironolactone

(ii) Consider other initial combinations for specific patient subgroups

(iii) Use SPC's where possible

(iv) Use thiazide-like diuretics preferentially

ESSENTIAL

- Where less ideal agents are available, focus on effective BP lowering (≥20/10 mmHg)

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Common and Other Comorbidities of Hypertension

Claudio Borghi

International Society of Hypertension

www.ish-world.com

Comorbidities of Hypertension

- Most Hypertensive patients have several comorbidities affecting CV risk profile and treatment strategies.
- The number of comorbidities increases with age, duration of hypertension and emerging clinical complexity.
- The management of comorbidities is insufficent.
- Common and uncommon comorbidities should be identified and managed according to the best available evidence.

Comorbidities of Hypertension

- Well established **common comorbidities** include CAD, stroke, CKD, Heart failure, COPD and HIV/AIDS.
- Emerging **uncommon comorbidities** include rheumatic/inflammatory diseases and psychiatric diseases.
- Uncommon comorbidities are largely underestimated by guidelines and often treated with self-prescribed drugs frequently interfering with BP control.

Comorbidities of Hypertension

In patients with **common comorbidities** the therapeutic strategy depends on CV risk profile and includes:

- **Lifestyle changes (diet, exercise, body weight, smoking).**
- **BP control to target.**
- **Effective treatment of CV risk factors (LDL-C, Fasting Glucose, SUA).**
- **Antiplatelet therapy in patients with CVD.**

Comorbidities of Hypertension

Additional co-morbidity	Recommended Drugs	Warning
Rheumatic disorders	• RAS-inhibitors and CCBs ± Diuretics • Biologic drugs not affecting blood pressure should be preferred (where available)	High doses of NSAID's
Psychiatric disorders	• RAS-inhibitors and diuretics • Beta-blockers (not metoprolol) if drug-induced tachycardia (antidepressant, antipsychotic drugs). • Lipid-lowering drugs/Antidiabetic drugs according to risk profile	Avoid CCBs if orthostatic hypotension (SRI's)

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Specific Circumstances: Resistant Hypertension

Maciej Tomaszewski

International Society of Hypertension

www.ish-world.com

Resistant Hypertension

- Suspect resistant hypertension if office BP >140/90 mmHg on treatment with at least 3 antihypertensives (in maximal or maximally tolerated doses) including a diuretic.
- Exclude pseudo-resistant hypertension (white-coat effect, non-adherence to treatment, incorrect BP measurements, errors in antihypertensive therapy) and substance-induced hypertension as contributors.
- Optimise health behaviours and lifestyle.

Resistant Hypertension

- Consider changes in the diuretic-based treatment prior to adding the fourth antihypertensive medication.
- Add a low dose of spironolactone (if serum potassium is <4.5 mmol/L and eGFR is >45 ml/min/1.73 m^2).
- Consider amiloride, doxazosin, eplerenone, clonidine and beta-blockers as alternatives to spironolactone. If unavailable, consider any antihypertensive class not already in use.
- Optimally, consider referring to a specialist centre with sufficient expertise/resources.

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Specific Circumstances: Secondary Hypertension

Maciej Tomaszewski

International Society of Hypertension

www.ish-world.com

Secondary Hypertension

- **Consider screening for secondary hypertension in:**
  early onset hypertension, resistant hypertension, sudden BP control deterioration, hypertensive urgencies and emergencies, high clinical probability of secondary hypertension.

- **Exclude:**
  pseudo-resistant hypertension and drug/substance-induced hypertension prior to investigations for secondary hypertension.

Secondary Hypertension

ESSENTIAL

Basic screening for secondary hypertension

thorough history + physical examination (clinical clues) + basic blood biochemistry (including serum sodium, potassium, eGFR, TSH) + dipstick urine analysis.

OPTIMAL

Arrange other investigations for secondary hypertension (additional biochemistry/imaging/others) based on information from history, physical examination and basic clinical investigations and/or if feasible refer to a specialist centre

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Specific Circumstances: Hypertension in Pregnancy

Nadia Khan

International Society of Hypertension

www.ish-world.com

Hypertension in Pregnancy

- Pre-existing hypertension
- Gestational hypertension
- Pre-eclampsia
- Eclampsia
- HELLP syndrome

Hypertension in Pregnancy

- Affects 5-10% of pregnancies worldwide.
- Maternal risks include placental abruption, stroke and long term risk of cardiovascular disease.
- Fetal and newborn risks include fetal growth restriction, pre-term delivery, increased fetal and neonatal morbidity and mortality.

Hypertension in Pregnancy

BP Measurement in Pregnancy

ESSENTIAL

- Use either: office manual auscultation or an office automated upper arm BP device validated specifically in pregnancy (www.stridebp.com).

OPTIMAL

- Use either 24hr ABPM or home BP monitoring validated in pregnancy to evaluate white coat hypertension.

Hypertension in Pregnancy

Investigation of Hypertension in Pregnancy

ESSENTIAL

- Urinalysis, complete blood count, liver enzymes, serum uric acid and serum creatinine.
- Test for proteinuria in early and the second half of pregnancy. A positive urine dipstick should be followed with a spot UACR.

OPTIMAL

- Ultrasound of kidneys, doppler ultrasound of uterine arteries

Hypertension in Pregnancy

Prevention of Pre-eclampsia

In women at increased risk of pre-eclampsia:

- **Aspirin** (75-162 mg/day) and
- **Oral calcium** (1.5-2 g/day if low dietary intake)

- **Increased Risk:** 1st pregnancy >40 y age, pregnancy interval >10 y, BMI >35 kg/m^2, multiple pregnancy, chronic hypertension, diabetes, CKD, autoimmune disease, hypertension in previous pregnancy or family history of pre-eclampsia

Hypertension in Pregnancy

Management (1)

Initiate Drug treatment if BP persistently:

- >150/95 mmHg in all women
- >140/90 mmHg if gestational hypertension or subclinical HMOD

First Line Drug Therapy Options

Methyldopa, beta-blockers (labetalol), and Dihydropyridine-Calcium Channel Blockers (DHP-CCBs)

Hypertension in Pregnancy

Management (2)

If SBP ≥170mmHg or DBP ≥110mmHg (Emergency):

- **Immediately hospitalize**
- **Initiate IV labetalol** (alternative i.v. nicardipine, esmolol, hydralazine, urapidil), or oral methyldopa or DHP-CCBs)
- **Magnesium**
- **If pulmonary edema, IV nitroglycerin**

Hypertension in Pregnancy

Delivery in Gestational Hypertension or Pre-Eclampsia

- At 37 weeks if asymptomatic
- Expedite delivery in women with pre-eclampsia with visual disturbances or haemostatic disorders or HELLP syndrome.

Post Partum

- ESSENTIAL Lifestyle adjustment
- OPTIMAL Lifestyle adjustment with annual BP checks

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Specific Circumstances: Hypertensive Emergencies

Nadia Khan

International Society of Hypertension

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Hypertensive Emergencies

Emergency:

- Severely elevated BP associated with **acute** hypertension mediated organ damage (HMOD).
- Requires immediate BP lowering, usually with IV therapy.

Urgency:

- Severely elevated BP without acute HMOD.
- Can be managed with oral antihypertensive agents.

Hypertensive Emergencies

Assessment

ESSENTIAL

- Clinical exam: Evaluate for HMOD including fundoscopy
- Investigations: Hemoglobin, platelets, creatinine, sodium, potassium, lactate dehydrogenase, haptoglobin, urinalysis for protein, urine sediment, ECG.

Hypertensive Emergencies

Assessment

OPTIMAL

In addition, context specific testing:

- Troponins (chest pain or anginal equivalent)
- Chest x-ray (congestion/fluid overload)
- Transthoracic echocardiogram (cardiac structure and function)
- CT/MRI brain (cerebral hemorrhage/stroke)
- CT-angiography thorax/abdomen (acute aortic disease)

Hypertensive Emergencies

Management

- Requires immediate BP lowering to prevent or limit further HMOD
- Sparse evidence to guiding management – recommendations largely consensus based.
- Time to lower BP and magnitude of BP reduction depends on clinical context.
- IV Labetalol and nicardipine generally safe to use in all hypertensive emergencies

Hypertensive Emergencies

Clinical presentation	Timeline and target BP	1st line treatment	Alternative
Malignant hypertension with or without TMA or acute renal failure	Several hours, MAP – 20 % to – 25 %	Labetalol Nicardipine	Nitroprusside Urapidil
Hypertensive encephalopathy	Immediate, MAP – 20 % to – 25 %	Labetalol Nicardipine	Nitroprusside
Acute ischemic stroke and BP > 220 mmHg systolic or >120 mmHg diastolic	1 h, MAP – 15 %	Labetalol Nicardipine	Nitroprusside
Acute ischemic stroke with indication for thrombolytic therapy and BP > 185 mmHg systolic or > 110 mmHg diastolic	1 h, MAP – 15 %	Labetalol Nicardipine	Nitroprusside
Acute hemorrhagic stroke and systolic BP >180 mmHg	Immediate, systolic 130 < BP < 180 mmHg	Labetalol Nicardipine	Urapidil
Acute coronary event	Immediate, systolic BP < 140 mmHg	Nitroglycerine Labetalol	Urapidil
Acute cardiogenic pulmonary edema	Immediate, systolic BP <140 mmHg	Nitroprusside or Nitroglycerine (with loop diuretic)	Urapidi (with loop diuretic)
Acute aortic disease	Immediate, systolic BP <120 mmHg and heart rate <60 b.p.m.	Esmolol and Nitroprusside or Nitroglycerine or Nicardipine	Labetalol or Metoprolol
Eclampsia and severe pre-eclampsia/HELLP	Immediate, systolic BP < 160 mmHg and diastolic BP < 105 mmHg	Labetalol or Nicardipine and Magnesium sulphate	

International Society of Hypertension

Ethnicity, Race and Hypertension

Doraidaj Prabhakaran

Ethnicity, Race and Hypertension

Prevalence, treatment and control rates vary significantly according to ethnicity

Mainly attributed to:

- Genetic differences
- Contextual and cultural practices
  - *Lifestyle and socio-economic status differences*
  - *Health behaviors such as diet, alcohol and PA*
- Access to health system
- Availability and Distribution of essential drugs

Ethnicity, Race and Hypertension

Populations from African descent

- Hypertension & associated organ damage at younger ages.
- ⬆ Resistant & nighttime hypertension.
- ⬆ Risk of kidney disease, stroke, HF & mortality.

- ? Physiological differences (⬇ RAAS, altered renal sodium handling, ⬆ CV reactivity & early vascular aging).

Ethnicity, Race and Hypertension

Populations from AFRICAN descent

Management of hypertension:

- Annual screening (for adults ≥18 years)
- Lifestyle modification
- First line pharmacological therapy – single pill combination (thiazide-like diuretic + CCB or CCB + ARB)

ARBs preferred over ACEIs among black patients
(3x chances of angioedema with ACEIs)

Ethnicity, Race and Hypertension

Populations from ASIA

- ⬆ Morning & nighttime hypertension vs Europeans

EAST ASIAN populations

- ⬆ Likelihood of salt-sensitivity + mild obesity in hypertensive patients
- ⬆ Stroke prevalence (esp. hemorrhagic) & non-ischemic HF vs Western populations

SOUTH ASIAN populations (Indian subcontinent)

- ⬆ Risk for CV & metabolic diseases (CAD & T2DM)

Management of hypertension

SOUTH EAST ASIA: Standard treatment until more evidence becomes available

2020 ISH Global Hypertension Practice Guidelines

Hypertension Management at a Glance

Thomas Unger

International Society of Hypertension

www.ish-world.com

Hypertension Management at a Glance

ESSENTIAL

Diagnosis

Single office BP measurement*

- Normal BP level (<130/85 mmHg) → Remeasure after 3 years (1 year in those with other risk factors)
- High-normal BP level (130–139/85–89 mmHg) → Take 2 more readings – use the average of 2nd–3rd
- Hypertension BP level (≥140/90 mmHg) → Take 2 more readings – use the average of 2nd–3rd

Take 2 more readings – use the average of 2nd–3rd → ≥130/85 mmHg → Remeasure in 2–3 office visits. If possible confirm with home or ambulatory BP monitoring → Repeated office BP ≥140/90 mmHg indicates hypertension, particularly if home BP ≥135/85 mmHg or 24 h ambulatory BP ≥130/80 mmHg

* Use a validated upper arm-cuff device with appropriate cuff size for the individual patient.

Evaluation

History & Physical Exam
- Exclude drug-induced hypertension
- Evaluate for organ damage
- Assess total cardiovascular risk
- Search for symptoms/signs of secondary hypertension

Lab Tests
- Serum sodium, potassium & creatinine
- Lipid profile & glucose
- Urine dipstick
- 12 lead ECG

Additional Tests
- If necessary for suspected organ damage or secondary hypertension

Treatment

Grade 1 Hypertension:
140–159/90–99 mmHg
1. Start lifestyle interventions
2. Start drug treatment in:
   – High-risk patients (CVK,CKD, diabetes, organ damage, or aged 50-80 years)
   – All others with persistent BP elevation after 3–6 months of lifestyle intervention

Grade 2 Hypertension:
≥160/100 mmHg
1. Start drug treatment immediately
2. Start lifestyle intervention

Lifestyle Interventions
- Stop smoking
- Regular exercise
- Lose weight
- Salt reduction
- Healthy diet and drinks
- Lower alcohol intake

Drug Therapy Steps
Use any drugs available and include as many of those below as possible. Consider monotherapy in low-risk grade 1 hypertension and in patients aged >80 years or frail. Simplify regimen with once daily dosing and single pill combinations.

Non-Black Patients
1. Low dose ACEI/ARB* + dCCB
2. Increase to full dose
3. Add thiazide/thiazide-like diuretic
4. Add spironolactone or, if not tolerated or contraindicated, amiloride, doxazosin, eplerenone, clonidine or beta-blocker

Black Patients
1. Low dose ARB* + dCCB or dCCB + thiazide/thiazide-like diuretic
2. Increase to full dose
3. Add diuretic or ARB /ACEI
4. Add spironolactone or, if not tolerated or contraindicated, amiloride, doxazosin, eplerenone, clonidine or beta-blocker

* No ACEI/ARB in women with or planning pregnancy

Monitoring

Target
- Reduce BP by at least 20/10 mmHg, ideally to < 140/90 mmHg
- Individualize for elderly based on frailty

Monitor
- BP control (achieve target within 3 months)
- Adverse effects
- Long-term adherence

Referral
- If BP still uncontrolled, or other issue, refer to care provider with hypertension expertise

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Hypertension Management at a Glance

OPTIMAL

Diagnosis

Office BP measurement
(3 readings – use the average of 2nd–3rd)*

- <130/85 mmHg → Remeasure after 3 years (1 year in those with other risk factors)
- ≥130/85 mmHg → Confirm with home or ambulatory BP monitoring
  - Home BP <135/85 mmHg or 24 h ambulatory BP <130/80 mmHg → Remeasure after 1 year
  - Home BP ≥135/85 mmHg or 24 h ambulatory BP ≥130/80 mmHg → Hypertension diagnosis

* Use a validated automated upper arm-cuff device with appropriate cuff size for the individual patient. At first visit measure BP in both arms simultaneously. If consistent difference use the arm with the higher BP.

Evaluation

History & Physical Exam
- Exclude drug-induced hypertension
- Evaluate for organ damage
- Consider additional CV risk factors
- Assess total cardiovascular risk
- Search for symptoms/signs of secondary hypertension
- Check adherence

Lab Tests
- Serum sodium, potassium & creatinine, uric acid
- Lipid profile & glucose
- Urine dipstick
- 12 lead ECG

Additional Tests
- If necessary for suspected organ damage or secondary hypertension

Treatment

Grade 1 Hypertension:
140–159/90–99 mmHg
1. Start lifestyle interventions
2. Start drug treatment:
- ***Immediately:*** In high-risk patients (CVD, CKD, diabetes or organ damage)
- ***After 3–6 months of lifestyle intervention:*** In low-moderate risk patients with persistent BP elevation

Grade 2 Hypertension:
≥160/100 mmHg
1. Start drug treatment immediately
2. Start lifestyle intervention

Lifestyle Interventions
- Stop smoking
- Regular exercise
- Lose weight
- Salt reduction
- Healthy diet and drinks
- Lower alcohol intake
- Lower stress
- Reduce exposure to air pollution

Drug Therapy Steps
Simplify regimen with once daily dosing and single pill combinations.
Consider monotherapy in low-risk grade 1 hypertension and in patients aged >80 years or frail

Non-Black Patients
1. Low dose ACEI/ARB* + dCCB
2. Increase to full dose
3. Add thiazide-like diuretic
4. Add spironolactone or, if not tolerated or contraindicated, amiloride, doxazosin, eplerenone, clonidine or beta-blocker

Black Patients
1. Low dose ARB* + dCCB or dCCB + thiazide-like diuretic
2. Increase to full dose
3. Add diuretic or ACE/ARB
4. Add spironolactone or, if not tolerated or contraindicated, amiloride, doxazosin, eplerenone, clonidine or beta-blocker

* No ACEI/ARB in women with or planning pregnancy

Monitoring

Target
- BP <130/80 mmHg
- Individualise for elderly based on frailty

Monitor
- BP control (achieve target within 3 months)
- Adverse effects
- Long-term adherence

Referral
- If BP still uncontrolled, or other issue, refer to care provider with hypertension expertise

International Society of Hypertension

ISH- vs European Guidelines

Bryan Williams

ISH vs European Guidelines

	ESC-ESH 2018	ISH 2020
Target Population	Focus on Optimal Care	**Optimal Care** when possible **Essential Care** as a minimum
BP Classification and Definition of Hypertension	Based of office BP Hypertension ≥140/90mmHg	Based on Office BP Hypertension ≥140/90mmHg
Diagnosis of Hypertension	**Screening:** Office BP **Confirmation:** ABPM, Home, or repeated office BP	**Optimal: Same as ESC-ESH** **Essential:** Office BP, confirm with ABPM or Home BP if possible
Cardiovascular Risk Assessment	**High Risk**: CV disease, CKD3, Diabetes, HMOD **CV risk assessment** in all others	**Same as ESC-ESH** CV risk assessment tool not specified
Drug Treatment BP Threshold	**Drug Treatment & Lifestyle for**: Grade 2 hypertension Grade 1 & High risk Grade 1 & low risk after 3-6 months lifestyle intervention	**Same as ESC-ESH** **Essential:** Focus on Grade 2 and high-risk Grade 1 if resources limited

ISH vs European Guidelines

	ESC-ESH 2018	ISH 2020
Lifestyle Interventions	Smoking cessation, healthy diet/drinks, reduce salt, alcohol moderation, weight control and regular exercise	**Same as ESC-ESH** **Optimal:** In addition, stress reduction and avoid air pollution
Initial Drug Treatment	**Dual therapy single pill combination** (SPC) for most patients - **Usually A+C or A+D** Beta-blockers when indicated Other Drugs for Specific indications	**Optimal:** Ideally A+C SPC for most, or C+D in Black patients. Other drugs same as ESC-ESH **Essential:** As above if possible, or any available drugs proven to lower BP
Further Drug Treatment	**Triple therapy: A+C+D, ideally as SPC** Four drugs (Resistant Hypertension) e.g. spironolactone, or other drugs if needed	**Optimal: Same as ESC-ESH** **Essential:** As above if possible, or any available drugs proven to lower BP

ISH vs European Guidelines

	ESC-ESH 2018	ISH 2020
Treatment Targets	**Target Ranges** **18-65yrs** <140/90mmHg down to to 130/80mmHg or lower if tolerated **65+yrs** <140/90mmHg down to 130/80mmHg, if possible and if tolerated	**Optimal:** <130/80 but individualize in the elderly based on frailty **Essential:** Reduce BP by at 20/10mmHg and ideally to <140/90 and individualize in the elderly based on frailty
Monitoring Treatment	Aim for BP control within 3 months Monitor for side effects Check adherence if BP not controlled	**Optimal** and **Essential:** Aim for BP control within 3 months Monitor for side effects Monitor adherence
Cardiovascular Risk Management	Statins for all high-risk patients Consider statins for moderate/low risk patients Antiplatelets for secondary prev.	No specific recommendation

ISH- vs ACC/AHA Guidelines

Richard Wainford

ISH vs ACC/AHA Guidelines

- Blood pressure definitions of normal blood pressure **stages of hypertension are different**.
- Inclusion of **high-normal blood pressure** category.
- Blood pressure value **thresholds for treatment are therefore different** (i.e., treatment initiated at lower blood pressure in ACC/AHA guidelines).
- Adoption of ESSENTIAL vs. OPTIMAL throughout ISH guidelines.

ISH vs ACC/AHA Guidelines

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	Systolic (mmHg)		Diastolic (mmHg)
Normal BP	<130	and	<85
High-normal BP	130-139	and/or	85-89
Grade 1 Hypertension	140-159	and/or	90-99
Grade 2 Hypertension	≥160	and/or	≥100

American Heart Association. AMERICAN COLLEGE of CARDIOLOGY

	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	*or*	80–89 mm Hg
Stage 2	≥140 mm Hg	*or*	≥90 mm Hg

ISH- vs Latin American Guidelines

Agustin Ramirez

ISH vs Latin American Guidelines

LA and Challenges Referring Arterial Hypertension

- Among the challenges common to all parts of the world, in LA there are **growing global burden of morbidity and premature mortality associated with NCDs** and the **financial constraints and inefficiencies** that traditional healthcare models have for coping with chronic diseases.
- Specific challenges result from the fact that LA is one of the world regions with the **greatest disparities in socio-economic conditions and availability of healthcare.**

ISH vs Latin American Guidelines

- In general, more congruence than discrepancy between the new ISH 2020 Guidelines and the last Latin America Guidelines of 2017.
- Diagnosis and use of Office and Out of Office blood pressure measurements, Ambulatory or Home Blood Pressure Monitoring are points of agreement.

ISH vs Latin American Guidelines

Categories	ISH SBP/DBP (mmHg)
	Not Considered
Normal	<130/<85
High Normal	130-139/85-89
Arterial Hypertension	
Grade 1	140-159/90-99
Grade 2	≥160/≥100
Isolated Systolic	Included in Text

Classification	LASH SBP/DBP (mmHg)
Optimal	<120/<80
Normal	120-129/80-84
High Normal	130-139/85-89
Arterial Hypertension	
Grade 1	140-159/90-99
Grade 2	160-179/100-109
Grade 3	>180/>110
Isolated Systolic	≥140/<90

ISH vs Latin American Guidelines

Non-Pharmacological Treatment

- Despite the differences in the usual daily diet in LA, there is agreement on the benefit of lifestyle changes to the general population.

Common and Other Comorbidities

- Due to the prevalence of specific pathologies, the LA Guidelines emphasize the accuracy in diagnosis and treatment of **malnutrition**, especially in children and adolescents.

Relating to Ethnic Populations

- In addition to Afro-descendants, the LA Guidelines give directives for people living on **high altitude** in the Andes Mountain Range (Andinean populations).

ISH- vs Japanese Guidelines

Hiroshi Itoh

Japanese Society of Hypertension

Hypertens Res 2019;42:1235-1481.

Classification	Office blood pressure (mmHg)			Home blood pressure (mmHg)		
	SBP		DBP	SBP		DBP
Normal blood pressure	<120	and	<80	<115	and	<75
High normal blood pressure	120–129	and	<80	115–124	and	<75
Elevated blood pressure	130–139	and/or	80–89	125–134	and/or	75–84
Grade I hypertension	140–159	and/or	90–99	135–144	and/or	85–89
Grade II hypertension	160–179	and/or	100–109	145–159	and/or	90–99
Grade III hypertension	≥180	and/or	≥110	≥160	and/or	≥100
(Isolated) systolic hypertension	≥140	and	<90	≥135	and	<85

- Office BP ≥140/90 mmHg is the criterion of hypertension in JSH 2019, which the same in ISH 2020.
- Normal BP <120/80 mmHg, in contrast to ISH 2020 <130/85 mmHg.
- JSH 2019 has a category of “Elevated BP,” which implies a disease -state required for intervention.
- JSH 2019 shows the criteria of both office and home BP with equal values for BP classification.

Japanese Society of Hypertension

Hypertens Res 2019;42:1235-1481.

	Elevated BP SBP 130-139 mmHg DBP 80-89 mmHg	Grade I hypertension SBP 140-159 mmHg DBP 90-99 mmHg	Grade II hypertension SBP 160-179 mmHg DBP 100-109 mmHg	Grade III hypertension SBP ≧180 mmHg DBP ≧110 mmHg
Category I No prognostic factor	Low risk	Low risk	Moderate risk	High risk
Category II At least one of age (≧65), sex (man), dyslipidemia and smoking	Moderate risk	Moderate risk	High risk	High risk
Category III At least 1 cardiovascular disease, nonvalvular atrial fibrillation, diabetes, CKD with proteinuria, or 3 or more of Category II risk factors	High risk	High risk	High risk	High risk

- "Elevated BP" in JSH 2019 is regarded as having high risk when it is complicated with CVD, diabetes, CKD with proteinuria, nonvalvular atrial fibrillation or >3 risk factors.
- That is the case with "high-normal BP" in ISH 2020. It can be high risk if it is complicated with hypertension-mediated organ damage, CKD grade 3, diabetes mellitus, or CVD.

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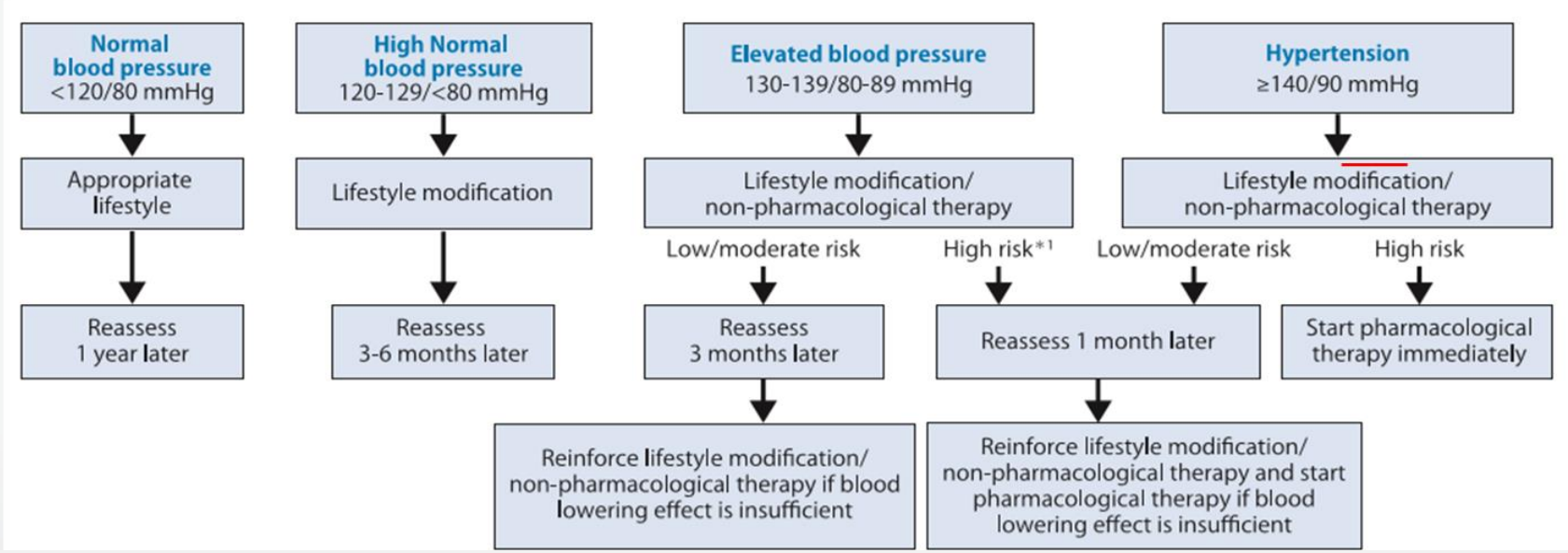
Hypertens Res 2019;42:1235-1481.

Blood Pressure Measurement Plan According to Office Blood Pressure levels

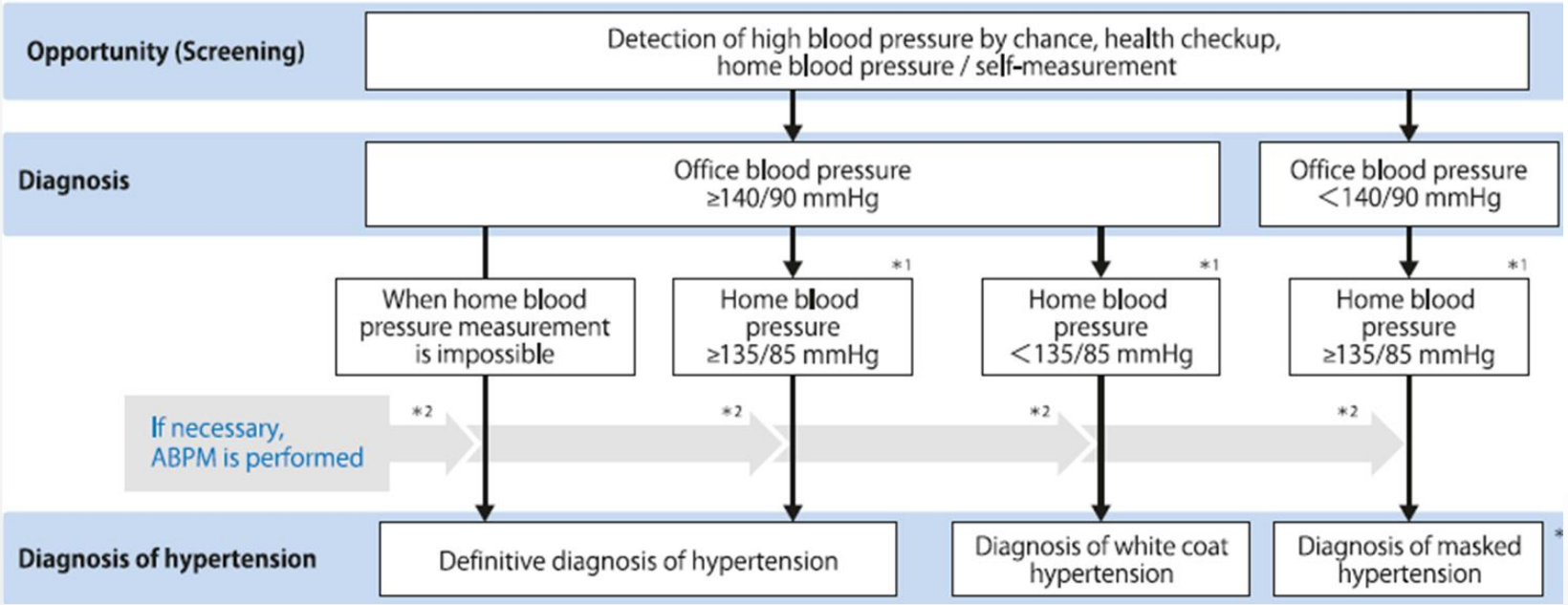


- In patients with" elevated BP", pharmacological therapy can be initiated when CV risk is high and BP control is insufficient with non-pharmacological therapy.
- That is the case with "high-normal BP" in ISH 2020 and 2018 ESC/ESH guidelines, which indicate that drug treatment should be considered if CV risk is very high.

Japanese Society of Hypertension

Hypertens Res 2019;42:1235-1481.

Diagnosis of Hypertension



- In ISH 2020, the diagnosis of hypertension is made by repeated office BP but not home BP.
- In JSH 2019, the diagnosis of hypertension is made by office BP and home BP.
- When an office BP-based diagnosis differs from a home BP-based diagnosis, the latter is prioritized.

Japanese Society of Hypertension

Hypertens Res 2019;42:1235-1481.

Target of Blood Pressure Control

	Office blood pressure (mmHg)	Home blood pressure (mmHg)
Adults younger than 75[*1] **Patients with cerebrovascular disease** (without bilateral carotid artery stenosis and cerebral main artery occlusion) **Patients with coronary artery disease** **Patients with CKD (proteinuria positive)**[*2] **Diabetic patients** **Patients using antithrombotic drugs**	<130/80	<125/75
Older patients aged 75 and over[*3] **Patients with cerebrovascular disease** (bilateral carotid artery stenosis or cerebral main artery occlusion present or unevaluated) **Patients with CKD (proteinuria positive)**[*2]	<140/90	<135/85

- In ISH 2020 the BP target differs at age 65 years, but in JSH 2019 at 75 years.
- In JSH 2019, BP of patients with CVD, CAD, diabetes, CKD with proteinuria or on antithrombotic drugs should be lowered to <130/80, even if in age ≥75 years.
- In ISH 2020, the lower limit (120/70) is shown.
- JSH 2019 calls attention against excessive BP lowering.

Japanese Society of Hypertension

Hypertens Res 2019;42:1235-1481.

Lifestyle Modifications

JSH 2019

- **Salt** reduction <6 g/day
- **Diet:** Increase vegetables/fruit intake; reduce saturated fatty acids and cholesterol; increase polyunsaturated fatty acids and low fat dairy products
- **Weight:** Maintain BMI <25 kg/m^2
- **Exercise:** Mild aerobic (dynamic/static muscle load) ≥30'/day or 180'/week
- **Alcohol:** Reduce intake; ethanol ≤20-30 mL/day in men; ≤10-20 in women
- **Smoking cessation**

ISH 2020

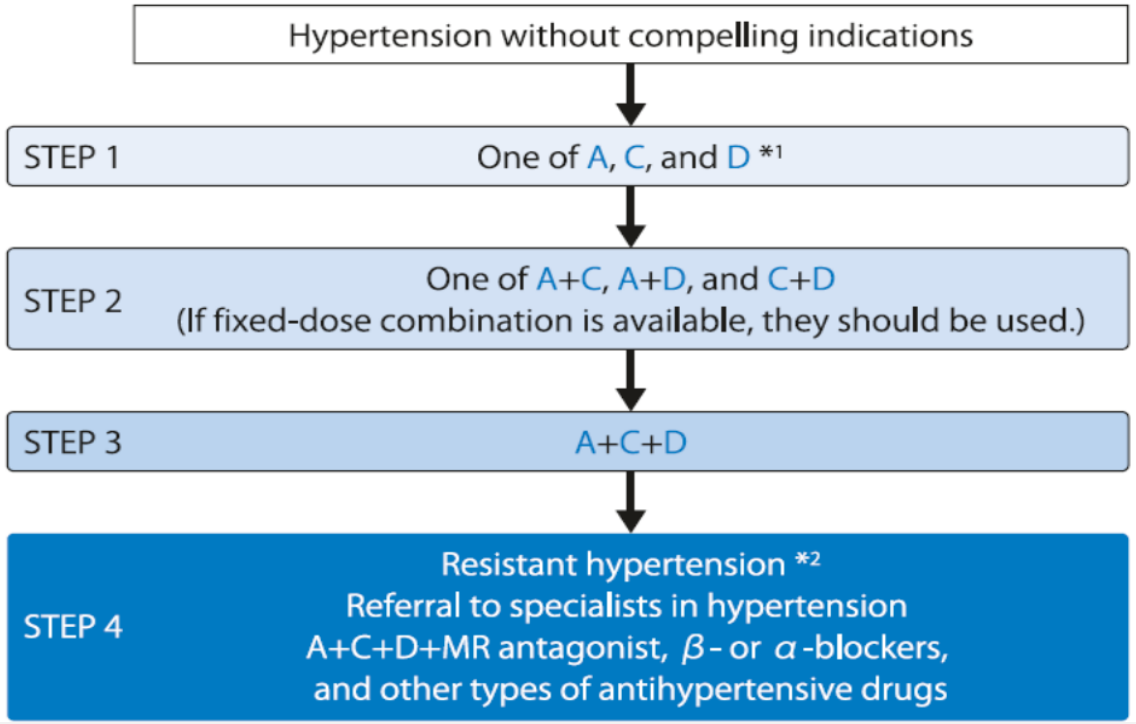
- **Salt** reduction
- Healthy **diet**
- Healthy **drinks**
- Moderate **alcohol** consumption
- **Weight** reduction
- **Smoking** cessation
- Regular **physical activity**
- Reduce stress – Mindfulness
- Complementary, alternative or traditional medicines
- Reduce exposure to indoor cold
- Temperature - Air pollution

- JSH 2019 gives concrete values to the goals.
- ISH 2020 gives additional goals.

Japanese Society of Hypertension

Hypertens Res 2019;42:1235-1481.

Drug Treatment Strategy



First-line drugs

A: ARBs, ACE inhibitors,
C: CCBs
D: Thiazide diuretics

- As 1st line, JSH recommends monotherapy, whereas ISH 2020 recommends combination therapy using combination tablet.
- In JSH 2019, thiazide diuretics are included in 1st line drugs.
- JSH 2019 does not mention triple combination using single pill.
- In JSH 2019, β- and α-blockers are equally recommended as MR antagonist at step 4.