HYPERTENSION NEWS

May 2026

Paediatric hypertension:

why it can no longer be ignored

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INTRODUCTION FROM THE PRESIDENT

GEORGE STERGIOU

President, International Society of Hypertension

Hypertension Center STRIDE-7, School of Medicine, University of Athens, Greece

Dear ISH members and friends,

I am delighted to present the May 2026 issue of ISH Hypertension News!

May is "our" month! On the 17th we have World Hypertension Day, and May Measurement Month (MMM) is running for its 10th year and is expected this May to make blood pressure measurements in almost a million people across about 100 countries. Now is the time for all of us to remind the public, patients, policy makers, and ourselves that we still need to do much more to bring hypertension under good control!

Before presenting the content of this issue of Hypertension News and why it might be of interest to you, I would like to make sure you have not missed two major announcements that ISH has recently made. First, Professor Kazuomi Kario from Japan was elected as the next President of ISH, to take over in October 2026. I am delighted that Kazu will succeed me. His international reputation, research excellence, passion for innovation, and unsurpassed energy are qualities ISH needs in its new President at a time when we are growing - as indeed we must and we will.

Second, our 2026 Scientific Meeting in collaboration with the Emirates Cardiac Society (ECS) will take place in Dubai as planned, from 22 to 25 October 2026. We carefully considered the current situation in the Middle East. Like everyone else, we cannot predict what will happen in the region in six months. However, we decided to support ECS and the Middle East and North Africa region and remain committed to holding a face-to-face meeting in Dubai. We will also offer the option of virtual participation for those who decide to avoid travelling. We have big plans for our meeting in Dubai, and we very much hope that most of you will join us in person. We will soon announce details regarding participation options and logistics.

In this issue of ISH Hypertension News, we have a strong focus on paediatric hypertension - a major and growing problem that deserves more attention from all of us. This section begins with a summary of an important ISH Position Paper we recently published. ISH is grateful to Joseph Flynn and Ruan Kruger, who led this major ISH project with great efficiency and speed. Three further paediatric articles follow, from China, Chile and Argentina, and Poland. Together, these articles demonstrate the urgent need to inform our colleagues worldwide about optimal strategies for detecting, evaluating, and managing hypertension in children and adolescents.

We feature a special article by ISH Council member Dagnovar Aristizabal presenting the concept of haemodynamic phenotypes of hypertension based on 24-hour ambulatory BP monitoring, as well as another on renal denervation by incoming ISH President Kazu Kario, focusing on night-time and morning BP.

In our perspectives section, we explore clinically relevant topics such as blood pressure targets in chronic kidney disease, ambulatory blood pressure thresholds in high-risk pregnancies, and diagnosis and treatment of paroxysmal hypertension, as well as reflections on 'rehumanising' hypertension care in a digital era.

Capacity building for our young members is an important task for ISH and a theme of this edition. We present a report by Peter Sever on an impactful summer school in the UK for

emerging hypertension leaders - an initiative of the Foundation for Circulatory Health and the British & Irish Hypertension Society. We also share the experience of an ISH member awarded an ISH Collaboration Exchange Scholarship in 2025. In addition, we are proud to report on two recent ISH webinars—on mentorship and on finding a scientific niche in research. Finally, we are glad to include a report by the Croatian Hypertension League on "Health on the islands".

George Stergiou – president@ish-world.com

I would like to thank all those who contributed to another great edition of Hypertension News. I urge all of you to engage with hypertension initiatives this May, and let us know what you have achieved. A link to downloadable ISH resources is included in this issue.

Enjoy reading!

George Stergiou
ISH President

WORLD HYPERTENSION DAY 2026

Celebrate World Hypertension Day this May

JOIN US IN MARKING WORLD HYPERTENSION DAY (WHD) THIS YEAR, ON SUNDAY 17 MAY 2026.

2026 WORLD HYPERTENSION DAY MAY 17

Controlling Hypertension Together

Initiated by the World Hypertension League WHLeague.org

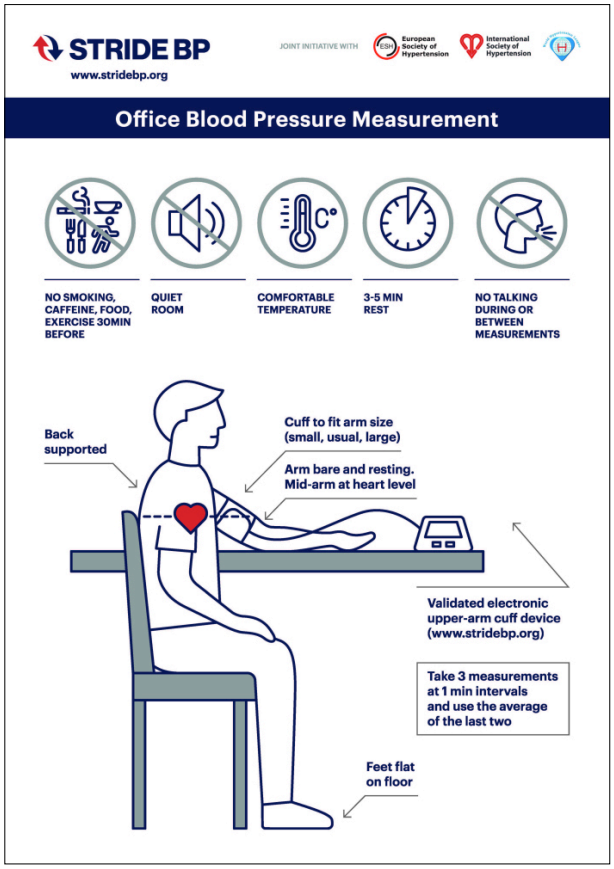
The theme of this year's WHD, initiated by the World Hypertension League, is 'controlling hypertension together'.

May Measurement Month (MMM), established in 2017 by the ISH, will also run from 1 May to 31 July 2026. In addition, World Salt Awareness Week 2026 will run from 12 to 18 May 2026.

All three initiatives highlight the importance of better prevention, detection and treatment of high blood pressure.

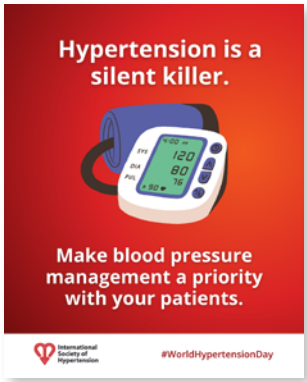
In line with these campaigns, the ISH will once again be encouraging all healthcare professionals to do all they can to support reductions in the burden of hypertension – including through accurate blood pressure measurement and proper management of hypertension.

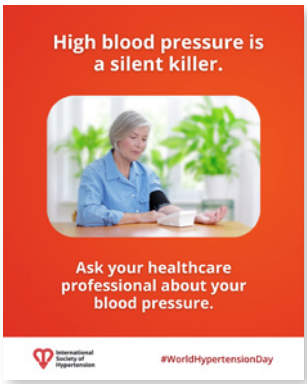
We will also be providing information and resources for patients and the public. We will encourage everyone – no matter who they are – to get their blood pressure checked, and if they do have high blood pressure, to follow what their healthcare professional advises.

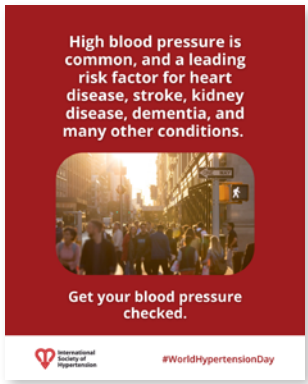


ISH posters and graphics

In advance of WHD and MMM, access the resources area of the ISH website for downloadable posters and graphics aimed at healthcare professionals and the public. We encourage you to share these graphics on WHD and during MMM.







Let us know your plans

We want to know what you are planning for World Hypertension Day, May Measurement Month and Salt Awareness Week.

Share your campaign plans, and photos of your activities, with comms@ish-world.com, and we will promote your activities wherever we can.

WORLD ADHERENCE DAY 2026

Global organisations mark World Adherence Day

The ISH was one of several global health bodies to mark World Adherence Day on 27 March 2026.

The campaign, co-ordinated by the World Heart Federation, and now in its second year, raises awareness of the importance of adherence to medication and lifestyle changes to prevent cardiovascular disease.

In advance of the day, the ISH was part of a taskforce which developed a survey of healthcare professionals (HCPs) to understand their experience and attitudes around adherence.

Physicians, nurses, community health workers, pharmacists, and other HCPs took part in the survey, which found:

- HCPs routinely discuss adherence with patients – but have limited time for the discussion
- Adherence is not strongly embedded in formal clinical frameworks
- One third said they had received no training in medication adherence
- Overall, HCPs said their biggest training need was for communication and motivational interviewing
- 60% of HCPs said they need staffing support and funding to support adherence
- They said structured follow up systems rather than opportunistic discussion during office visits would help with ensuring patient adherence.

Read the full survey results.

The survey results will guide future advocacy efforts organised by the global partners involved in World Adherence Day, including the ISH.

In the December 2025 edition of *Hypertension News*, we carried a special series of articles on the topic of adherence. Read the December 2025 edition.

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NEW PAPERS

Noninvasive hemodynamic phenotyping in hypertension: Integrating ambulatory hemodynamics into a mechanism-based framework

DAGNOVAR ARISTIZABAL

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For decades, hypertension has been classified and treated primarily according to numerical blood pressure (BP) thresholds. This paradigm has contributed substantially to reductions in cardiovascular morbidity and mortality worldwide[1], despite persistently suboptimal BP control rates across many communities. Yet an important physiological question remains insufficiently addressed: why do patients with similar BP values exhibit distinct hemodynamic profiles and divergent risk trajectories?

Hypertension is traditionally staged according to office BP cut-offs.[1] Although risk stratification is essential, it does not explicitly account for the physiological determinants of arterial pressure. BP values reflect the interaction between cardiac output (CO), systemic vascular resistance (SVR), and arterial compliance. These determinants vary substantially among individuals meeting identical diagnostic criteria.[2] As classical hemodynamic studies demonstrated, elevated pressure may arise from different combinations of CO and SVR.[3]

Emerging evidence indicates that BP subtypes may originate from fundamentally different circulatory mechanisms. We have previously shown that isolated systolic hypertension and isolated diastolic hypertension differ markedly in total arterial compliance, SVR, and cardiac hemodynamics using validated noninvasive estimates derived from 24-hour ambulatory BP monitoring (ABPM), without pulse waveform analysis.[2] Thus, comparable BP levels may reflect distinct physiological substrates, reinforcing the need for a mechanism-based framework.

ABPM offers a practical platform to operationalize this heterogeneity (4). Beyond refining diagnosis and risk stratification, ABPM captures the temporal dimension of BP regulation – circadian variation, dipping patterns, variability, and morning surge.[5] We hypothesized that routinely collected ABPM variables contain sufficient physiological information to derive reproducible circulatory phenotypes.

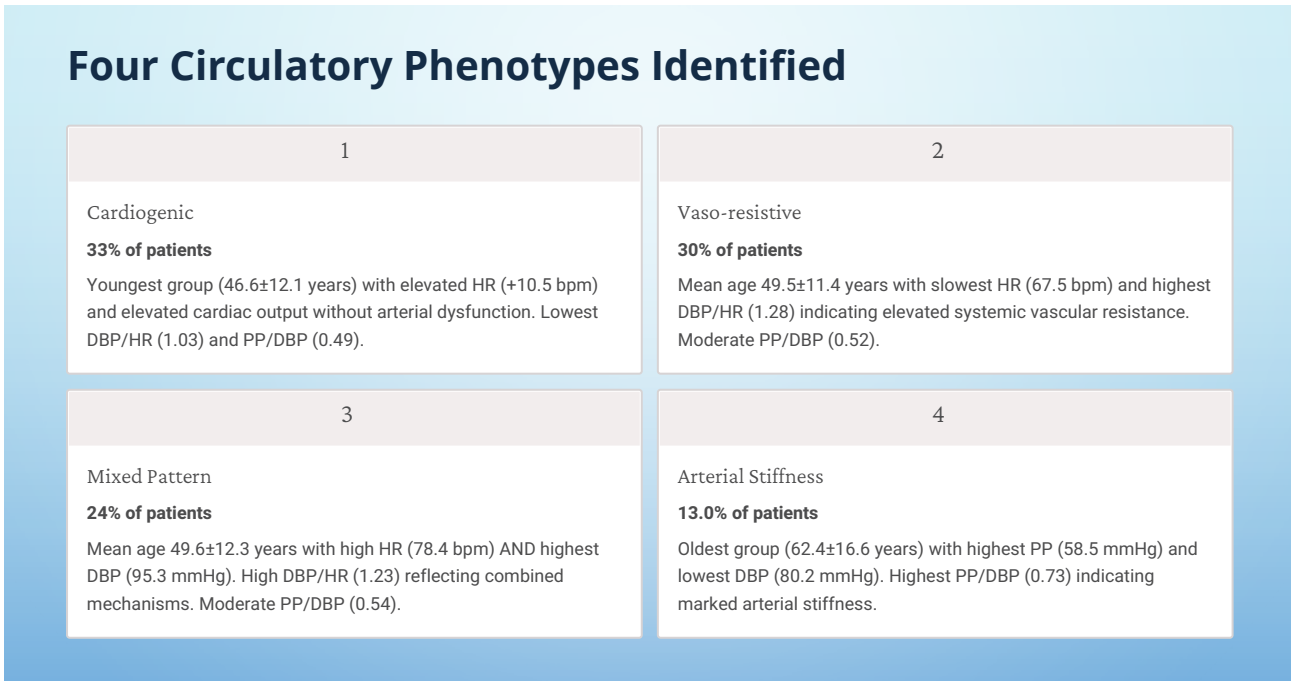
Hemodynamic Phenotypes Derived from ABPM

In a cohort of over nine thousand untreated hypertensive individuals, we applied unsupervised clustering to three minimally collinear ABPM-derived variables: diastolic BP (DBP), pulse pressure (PP), and heart rate (HR). These parameters reflect SVR, arterial compliance, and cardiac response. Distinct and reproducible clusters emerged, corresponding to recognizable physiological patterns.[6]

Four principal phenotypes were identified:

1. **Cardiogenic (hyperdynamic)** (33%); elevated HR and DBP with preserved PP, consistent with increased CO and preserved compliance.
2. **Vaso-resistive** (30%); markedly elevated DBP with lower HR, suggesting increased SVR.
3. **Mixed** (24%); elevated HR and DBP, reflecting combined increases in CO and SVR.
4. **Stiffness-predominant** (13%); widened PP with lower DBP, consistent with reduced arterial compliance and increased pulsatile load.

Figure: the four circulatory phenotypes identified. See reference 6.



These phenotypes are grounded in cardiovascular physiology.[7] Mean arterial pressure is largely determined by CO and SVR, whereas PP reflects arterial stiffness and wave reflections.[8] DBP, particularly relative to HR, provides insight into the arterial time constant (τ = compliance × resistance) and diastolic runoff. Importantly, this mechanistic interpretation requires no additional testing beyond standard ABPM.

ABPM Reveals a Time-Structured Circulatory Response

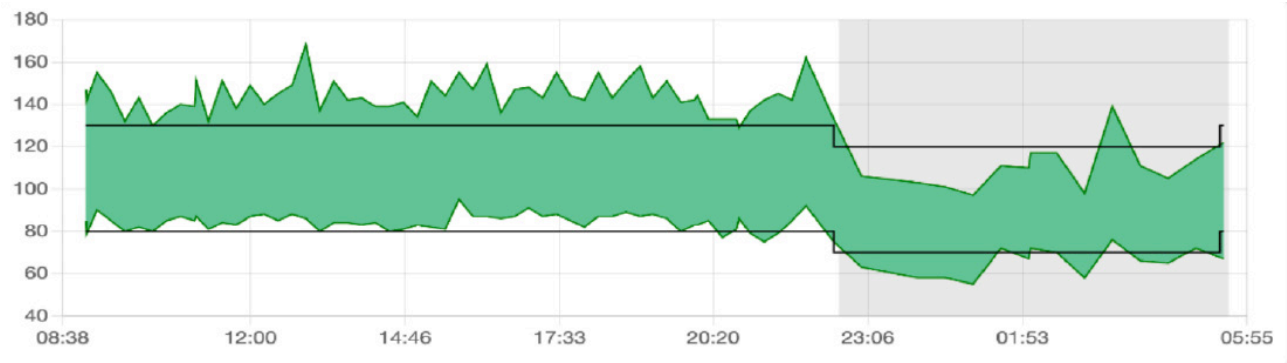
ABPM further reveals that hypertension is not a static value but a temporally structured physiological state. Reduced nocturnal dipping, exaggerated morning surge, and increased short-term variability independently predict adverse outcomes.[5]

Clinical Illustration:

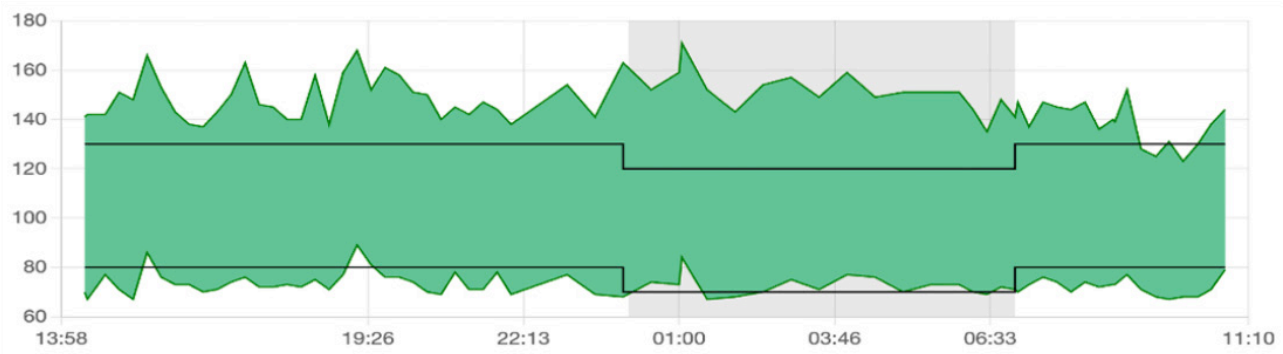
Table X. Distinct 24-Hour Hemodynamic Signatures in Hypertension Revealed by Ambulatory Monitoring

	Case 1	Case 2	Case 3
ABPM features	Elevated daytime mean arterial pressure (MAP) Widened pulse pressure (PP) during active hours Preserved nocturnal dipping with near-normal nighttime BP	Disproportionately elevated systolic BP (SBP) Low diastolic BP (DBP) troughs Persistently widened PP across the 24-hour cycle with blunted nocturnal normalization	Parallel elevations of SBP and DBP A narrower PP Preserved nocturnal dipping
Interpretation	Widened PP occurs mainly during periods of elevated pressure load and normalizes overnight, suggesting pressure-dependent (functional) rather than structural arterial stiffening. Increased daytime CO and/or SVR raises distending pressure, shifting the arterial wall toward a stiffer segment of the pressure–diameter curve.	The widened PP persists independent of circadian modulation, suggesting intrinsic reductions in arterial compliance (i.e., significant arterial stiffness). This reflects structural vascular remodeling with increased pulsatile load and reduced Windkessel function.	This pattern reflects increased SVR as the dominant driver of BP elevation. The preserved temporal modulation suggests intact circadian regulation despite elevated baseline vascular tone.
Phenotypic Alignment	Often reflecting a hyperdynamic or mixed phenotype.	Stiffness-predominant phenotype	Vaso-resistive phenotype.

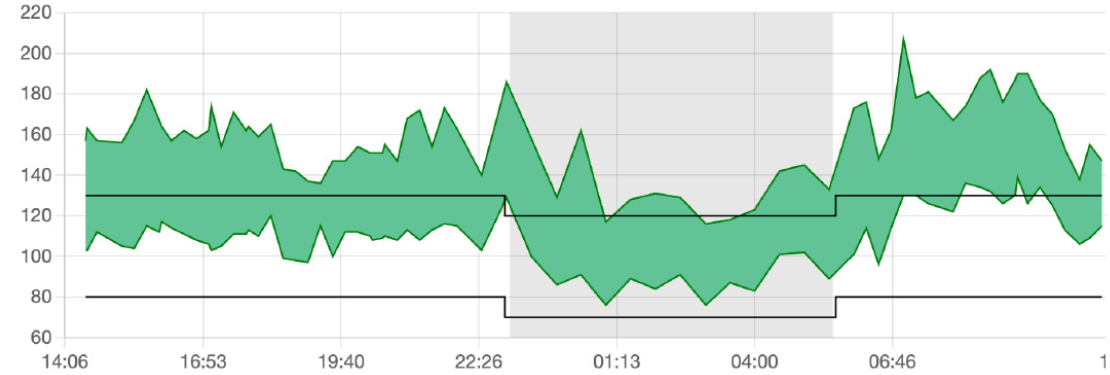
Case 1



Case 2



Case 3



These temporal patterns reflect the interplay among renal volume control, sympathetic activity, neurohormonal modulation, and vascular structure.[9] Persistent nighttime elevation may signal impaired circulatory adaptation, whereas increased variability may indicate diminished buffering capacity or heightened autonomic fluctuation.

Thus, interpreting 24-hour BP profiles allows movement beyond static thresholds toward a physiologically grounded understanding of circulatory adaptation – or maladaptation – to internal and environmental demands.

Regulatory Axes and Mechanistic Overlays

Primary hypertension is multifactorial. Renal sodium handling, sympathetic activation, and vascular remodeling act as interacting regulatory axes. The observed phenotype represents the surface expression of these underlying mechanisms.

This layered interpretation complements, rather than replaces, guideline-based care. Threshold-based treatment remains foundational.[1] However, recognizing mechanistic diversity may help explain differential therapeutic responses and provide additional insight into resistant or refractory hypertension.

Toward Precision Without Added Complexity

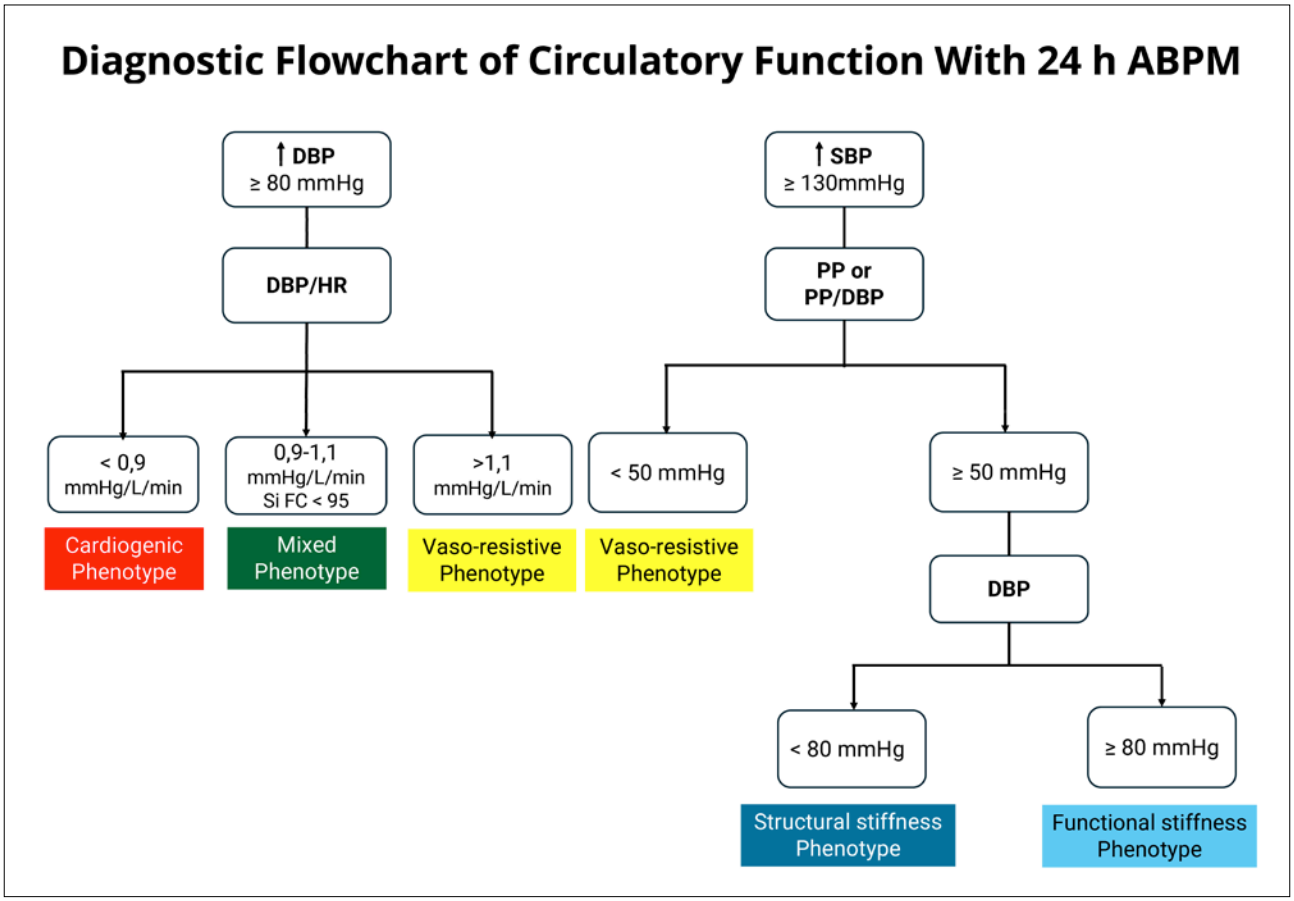
The appeal of a phenotype-informed framework lies in its practicality. ABPM is already recommended in clinical guidelines.[10] Systematic interpretation of HR, DBP, and PP patterns across 24 hours allows inference of dominant hemodynamic drivers without additional testing.[6]

A hyperdynamic phenotype may favor rate-modulating strategies. A stiffness-predominant profile may emphasize interventions targeting arterial compliance. A resistance-predominant pattern may align with renin–angiotensin system modulation or volume-directed therapy. The aim is precision without added complexity, a refinement rather than a paradigm shift.

Conclusion

Hypertension has long been managed through threshold-based staging.[1] Yet BP elevation represents the hemodynamic surface of interacting regulatory mechanisms.[9] ABPM captures both steady-state levels and temporal modulation,[6] enabling derivation of reproducible circulatory phenotypes.

In this framework, hypertension is reframed not as a single static number, but as a dynamic circulatory state – one that reflects how the heart and arterial system respond, adapt, and at times maladapt to physiological demands.



Diagnostic Flowchart of Circulatory Function Using 24-Hour ABPM

In predominantly diastolic hypertension, the relationship between heart rate (HR) and diastolic blood pressure (DBP) helps identify the dominant hemodynamic mechanism. If HR exceeds DBP by ≥10%, a hyperdynamic (cardiac output–mediated) phenotype is predominant. If DBP exceeds HR by ≥10%, a resistance-mediated phenotype driven by elevated systemic vascular resistance is more likely. A high pulse pressure (PP) >50 mmHg indicates a stiffness-predominant phenotype.

The 24-hour day–night BP profile further characterizes the severity of circulatory dysfunction and complements phenotypic classification as illustrated in the clinical ABPM examples (Figure x). Abbreviations: DBP, diastolic blood pressure; HR, heart rate; PP, pulse pressure.

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NEW PAPERS

Renal denervation in Asia: Why I'm focusing on nighttime and morning blood pressure

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I have spent years trying to help patients reach their blood pressure (BP) control targets, only to watch that control unravel outside the clinic – especially overnight and in the early morning. That is why I paid close attention to the 2025 Asia Renal Denervation Consortium (ARDeC) consensus statement (endorsed by the HOPE Asia Network), developed at the second ARDeC conference in 2024.[1] Experts from multiple Asian countries intentionally framed their recommendations around Asian hypertension phenotypes and seven practical topics, ranging from BP-lowering efficacy and technique to indications, anatomy, and shared decision-making.[1]

Toward true 24-hour blood pressure control

What convinces me first is the consistency of BP reduction across measurement methods. The statement emphasizes that transcatheter renal denervation (RDN) safely and effectively reduces office, home, and 24-hour ambulatory BP, regardless of whether antihypertensive medications are being used.[1] This aligns with a broad sham-controlled evidence base across different platforms and trial designs.[4–10] For clinicians, that matters because it suggests that the clinical evidence for blood pressure reduction is not confined to a single setting or monitoring approach.[1]

What I find most clinically meaningful, however, is the focus on the "hard" time windows: nighttime and morning BP. ARDeC highlights that RDN significantly reduces nighttime and morning BP – periods that are often difficult to control with medication strategies guided mainly by office BP readings.[1] The statement explicitly links this to Asian hypertension patterns, noting that nocturnal and morning hypertension are common in Asia and that nighttime or morning BP may reflect cardiovascular risk better than daytime or office BP.[1] From my perspective, this is where RDN may contribute most: helping achieve optimal 24-hour BP control, including nighttime and morning BP, through continuous sympathetic modulation (**Figure 1**).[2]

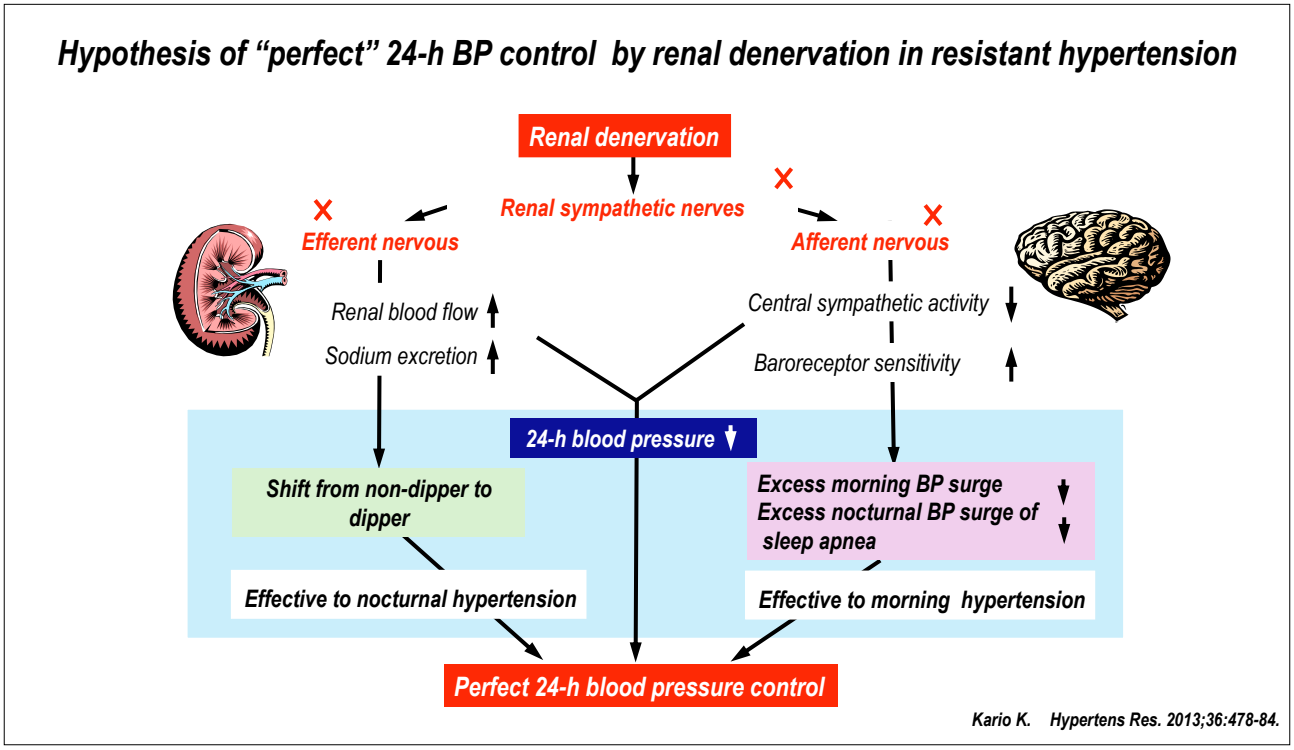
Durability as a core value of device therapy

Durability is the second message I take home. The consensus statement notes that BP lowering after RDN persists for at least 10 years.[1] In my experience, long-term control is exactly where pharmacologic strategies can fail – not because drugs are ineffective, but because adherence issues, side effects, and therapeutic inertia accumulate over time. A durable, adherence-independent BP-lowering effect is precisely what a device-based therapy should add to our treatment toolbox. Longer-term follow-up and real-world data continue to inform safety and effectiveness beyond pivotal trials.[10]

Why renal artery anatomy matters

The third insight is anatomical – and it helps explain why modern RDN procedural approaches have evolved and improved. The ARDeC consensus reviews renal artery branching and nerve distribution patterns and emphasizes that nerves converge closest to the vessel wall distal to

Figure 1



the primary bifurcation.[1] They cite estimates that approximately 75% of nerve fibers lie within 5 mm of the distal main renal artery lumen (suggesting that a 5-mm ablation depth could affect >80% of fibers), and that most nerves are within 3 mm of the lumen in post-bifurcation branches.[1] The statement also notes evidence that treating the main artery plus branches can produce greater reductions in renal norepinephrine and BP than treating the main artery alone.[1] This is how I now explain the technique to colleagues: we are increasingly targeting sites where the nerves are most accessible.[1]

Patient selection: reproducibility is everything

For me, the practical value of a consensus statement is whether it makes patient selection more reproducible. Here, ARDeC is unambiguous: indications require lifestyle modification and antihypertensive therapy plus uncontrolled out-of-office BP documented by ambulatory BP monitoring (ABPM) or home BP monitoring (HBPM).[1] The thresholds are explicit – ABPM 24-hour BP ≥130/80 mmHg (or awake ≥135/85, or asleep ≥120/70), and HBPM morning/evening ≥135/85 (or asleep ≥120/70).[1] I also appreciate the recommendation to perform ABPM (after directly observed medication intake in treated patients), because it provides the most comprehensive evidence regarding BP-lowering efficacy.[1]

Resistant hypertension confirmed by out-of-office BP represents a very high-risk phenotype, often accompanied by nocturnal and/or morning hypertension. In one report, the incidence of cardiovascular events in patients with HBPM-confirmed resistant hypertension was 34.7 per 1000 person-years, significantly higher than in those with well-controlled hypertension on ≥3 drugs including a diuretic (11.9 per 1000 person-years; P<0.001).[3] This kind of risk gradient is one reason I prioritize accurate out-of-office confirmation before discussing device-based therapy.

The paper also reinforces key "do not miss" items in the workup. It states plainly that RDN should not be performed in patients with untreated endocrine hypertension.[1] Procedurally, it describes thin-slice contrast CT as essential for identifying anterior and posterior divisions of the main renal artery and recommends keeping ablation at least 5 mm away from abnormal anatomy (including preexisting stents).[1] These are exactly the details I want embedded in referral pathways and operator checklists.[1]

Table 1. Determinants of RDN effectiveness [1]

Domain	Determinants / examples
Patient characteristics	**Neurogenic hypertension** (• *Obesity hypertension* • *Mild essential hypertension* • *Hypertension with high 24-hour heart rate on ABPM ≥ 73.5 beats/min*) **Young age** **Ethnicity** (*e.g., Asian*) **Risk factors** (• *Obstructive sleep apnea* • *Body mass index*) **Heart rate** (• *Basal office heart rate ≥ 70 beats/min* • *Heart rate variability*) **Systolic blood pressure** (• *Amplitude* • *Variability*) **Ambulatory blood pressure** (• *Blood pressure variability*) **Hypertension phenotype** (• *Nocturnal hypertension* • *Orthostatic hypertension* • *Isolated systolic hypertension in the young* • *Morning hypertension*)
Biomarkers	**Norepinephrine spillover** **Muscle sympathetic nerve activity** **Plasma renin activity**
Invasive / provocative testing	**Arterial stiffness** (• *Pulse wave velocity* • *Aortic distensibility* • *Central arterial pressure* • *Augmentation index*) **Renal artery resistance and wave speed** **Drug challenge** **Baroreceptor sensitivity** **Excitatory/inhibitory nerve stimulation**
Procedural variables	**Number of treatment applications** **Four-quadrants ablations** **Anatomic site** (• *Distal branch vessels* • *Accessory renal arteries*)

Shared decision-making and identifying potential responders

Finally, I am glad ARDeC treats RDN as preference-sensitive care. The task force recommends initiating shared decision-making early in the pre-procedure phase, giving patients time to consider their treatment options and expectations.[1] The statement also reminds us that "response" is multifactorial – patient phenotype, biomarkers, provocative testing, and procedural variables can all matter (**Table 1**).[1] That framing helps me counsel patients honestly: RDN is not "magic", but it is increasingly evidence-based and protocol-driven.[1,4–10]

So where does this leave me today? In Japan, RDN has been introduced in clinical practice for strictly selected patients with resistant hypertension confirmed by ABPM or HBPM, typically despite treatment with three or more antihypertensive drugs including a diuretic. At ARDeC, however, we intentionally did not restrict the discussion only to resistant hypertension. I am increasingly comfortable discussing RDN as an evidence-based adjunct for resistant or otherwise uncontrolled hypertension – especially when the true burden is at night or in the early morning and remains above threshold on ABPM or HBPM despite appropriate therapy.[1,4–10] I also see a clear mandate for disciplined implementation: confirm out-of-office uncontrolled BP, exclude secondary causes, use high-quality imaging, and document shared decision-making.[1]

Most importantly, I am encouraged that the field is now turning toward outcomes that matter: identifying optimal candidates, defining reliable procedural endpoints and response metrics, and testing whether improved 24-hour BP control translates into less organ damage and fewer cardiovascular events.[1]

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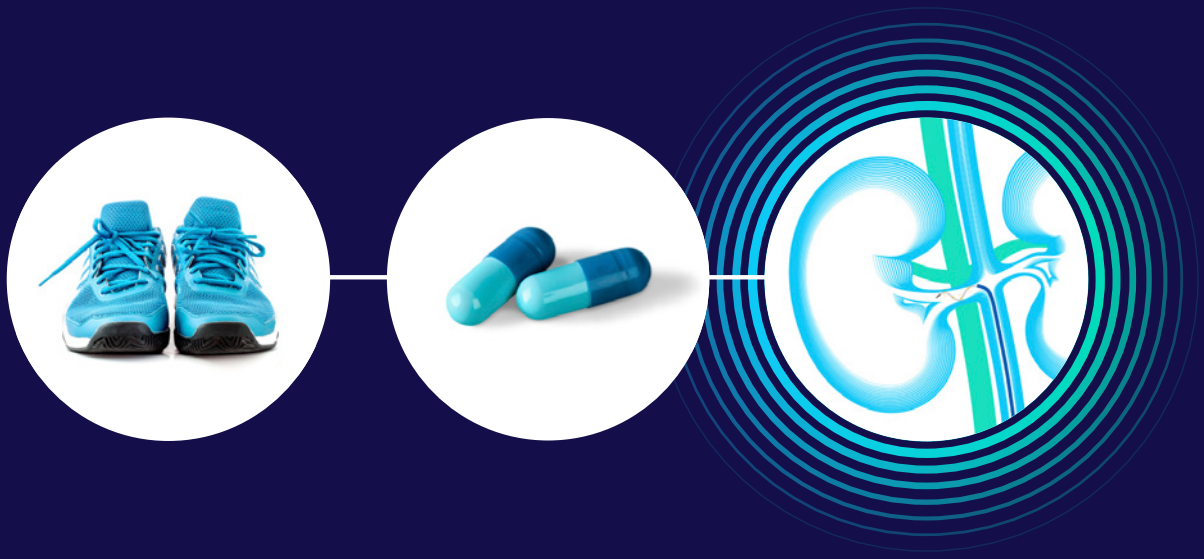
ISH Regional Advisory Groups (RAGs)

Our six ISH Regional Advisory Groups (RAGs) provide a platform for members to connect and collaborate in their region and for ISH to pick up messages and send messages to the world. The ISH RAGs lead initiatives which serve the specific needs of their regions.

Find out more about your RAG: https://ish-world.com/rags

Medtronic

ACC/AHA hypertension guidelines are here!



Renal denervation now recommended.[1]

The American College of Cardiology (ACC) and American Heart Association (AHA) hypertension guidelines now include renal denervation (RDN) as a class IIb recommendation, serving as an adjunctive treatment option alongside lifestyle and medication management to control blood pressure.[†,1]

Review highlights from the published guidelines, including RDN recommendations related to patient selection, shared decision-making, and care pathway.

U.S. healthcare professionals

International healthcare professionals

† See ACC/AHA hypertension guidelines for specific patient selection recommendations.

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FOCUS ON PAEDIATRIC HYPERTENSION

Why paediatric hypertension can no longer be ignored. A practical global roadmap from the ISH Position Paper

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Hypertension is a well-known risk factor for cardiovascular disease and early mortality in adults. Yet one of the central messages of our recently published International Society of Hypertension (ISH) position paper is clear: **hypertension often begins in childhood.** In our paper, *Practical approach to evaluate and manage hypertension in youth*,[1] colleagues from 12 countries worked together to provide practical, globally adaptable guidance for clinicians caring for children and adolescents. We did not aim to replace existing national guidelines. Instead, we sought to harmonise key principles and offer pragmatic advice that can be implemented across diverse health systems, including in low- and middle-income settings where much of the global burden resides.

The scale and consequences of the problem

Global data suggest sustained hypertension affects approximately 4% of children,[2] with higher rates reported in sub-Saharan Africa and South Asia, although not reflected in global analyses. Prevalence continues to rise, driven by obesity, unhealthy dietary patterns, physical inactivity, adverse childhood experiences, poor sleep, and broader socioecological pressures. Childhood blood pressure tracks strongly into adulthood. Longitudinal data from the International Childhood Cardiovascular Cohorts Consortium show that elevated systolic blood pressure in childhood is directly associated with increased risk of cardiovascular events in mid-life.[3] Children with blood pressure above the 90th percentile have roughly double the risk of fatal or nonfatal adult cardiovascular outcomes.[4] In addition, paediatric hypertension is associated with early target organ injury long before clinical events occur, including left ventricular hypertrophy and vascular changes.[5] The life-course implications are illustrated in **Figure 1** of the paper, which maps the progression from childhood hypertension to adult cardiovascular and kidney disease. The trajectory is importantly, modifiable.

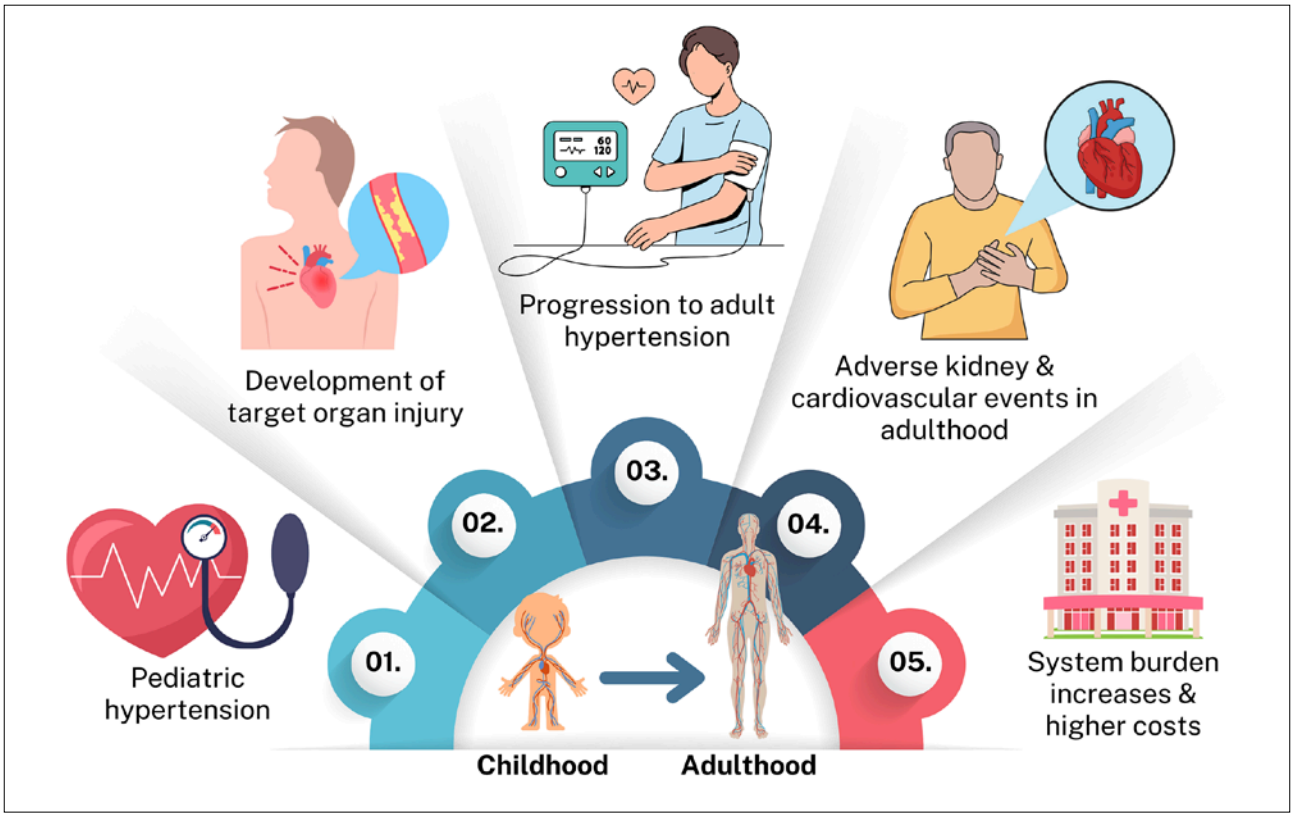
Getting the diagnosis right

Accurate blood pressure measurement is fundamental.[6] In children, diagnostic thresholds are percentile-based and differ slightly across regions. This complexity contributes to under-recognition.

We emphasise several practical points:

- Use devices that have been validated specifically in children
- Select the correct cuff size based on measured mid-upper arm circumference
- Ensure appropriate technique patient positioning, and repeated measurements
- Confirm elevated values across multiple visits

Figure 1. Long-term clinical consequences of paediatric hypertension across the life course.



Out-of-office measurement, i.e., ambulatory blood pressure monitoring (ABPM) is particularly valuable in children, as it detects white-coat hypertension, masked hypertension, and nocturnal hypertension.[7] Masked hypertension especially carries cardiovascular risk comparable to sustained hypertension, and may otherwise be missed without ABPM. Although ABPM availability varies globally, its use should be prioritised where feasible. Home blood pressure measurement is an additional approach to out-of-office measurement, although further research is needed regarding validity and interpretation.

Evaluating the child in front of you

Unlike in adults, secondary hypertension remains relatively common in younger children, with renal causes predominating.[8] A sequential, targeted evaluation is recommended. Not every child requires extensive testing, but further work-up should be considered in:

- Children younger than 6 years
- Stage 2 hypertension without obesity
- Severe or symptomatic hypertension
- Presence of target organ injury
- Suspicion of syndromic or endocrine causes

Assessment of target organ injury is essential for risk stratification and treatment decisions.[9] Echocardiography to evaluate left ventricular mass and basic renal evaluation (urinalysis and estimated GFR) are key components.

Lifestyle is the cornerstone

Lifestyle modification remains the foundation of management and often the most powerful intervention.

Core recommendations include:

- Reducing sodium intake (approximately 2000 mg/day in adolescents)
- Shifting toward minimally processed foods
- Limiting sugar-sweetened beverages
- Encouraging ≥60 minutes of moderate-to-vigorous physical activity daily
- Limiting recreational screen time to <2 hours/day
- Promoting age-appropriate sleep
- Addressing stress and psychosocial wellbeing

These interventions must be culturally sensitive and socioeconomically realistic. Family engagement is critical. Children rarely control their food or activity environments. Motivational interviewing, caregiver modelling, and school-based programmes can significantly enhance adherence.

When medication is needed

Pharmacotherapy should not be delayed when clearly indicated. Current guidelines recommend initiating medication in youth with:

- Persistent hypertension despite 6-12 months of lifestyle intervention
- Stage 2 hypertension
- Symptomatic hypertension
- Hypertension associated with diabetes, chronic kidney disease, or established target organ injury

As in adults, ACE inhibitors, angiotensin receptor blockers, long-acting calcium channel blockers, or thiazide diuretics are all acceptable first-line medication options. Evidence suggests similar blood pressure-lowering efficacy across major drug classes in children.[10] Combination preparations have not been studied systematically in children but may be appropriate in selected patients. Treatment targets vary slightly between guidelines, but generally aim for below the 90th percentile in younger children and <130/80 mmHg in adolescents.

A global call to act earlier

Paediatric hypertension has historically been under-recognised and inconsistently managed. Meanwhile, the global burden of cardiovascular disease continues to grow. If we are serious about prevention, we must begin earlier in the life course. This ISH position paper provides practical, globally relevant guidance to help clinicians identify, evaluate, and manage hypertension in youth. The opportunity before us is substantial: with early detection and timely intervention we can alter the cardiovascular trajectory of an entire generation.

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FOCUS ON PAEDIATRIC HYPERTENSION

Hypertension in children and adolescents: a growing concern we can't ignore

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We are excited to share some key findings from our recent study on hypertension in children and adolescents, published in The Lancet Child & Adolescent Health.[1] Our work sheds light on the growing global prevalence of hypertension in children and adolescents, a topic that's deeply concerning but often overlooked in public health discussions.

Over the past two decades, the world has seen rapid urbanization, economic growth, and shifts in lifestyle and nutrition. While these changes have brought many benefits, they've also contributed to rising obesity rates in children and adolescents, which is closely linked to hypertension. In fact, our study found that the prevalence of hypertension almost doubled between 2000 and 2020.This trend should ring alarm bells for parents, healthcare providers, and policymakers alike.

Why is childhood hypertension a big deal?

Hypertension in children often flies under the radar. Unlike adults, children with high blood pressure rarely show obvious symptoms, which makes it harder to detect. This "silent" condition may not seem pressing at first glance, but it can lead to serious long-term health problems, including heart disease and stroke, if left untreated. What's worse, children who develop hypertension are much more likely to carry it into adulthood, amplifying their risk of future complications.[2]

Our work highlights another important issue: the way blood pressure is measured has a big impact on how many children and adolescents are diagnosed with hypertension. Traditional methods, which rely on multiple in-office blood pressure readings, might underestimate the true burden.[3-4] That's why we also explored the role of out-of-office measurements, such as ambulatory or home blood pressure monitoring, in identifying children with hypertension.

What did we find?

We conducted a meta-analysis of data from 96 articles, involving over 440,000 children and adolescents from 21 countries. Here are some of the key findings:

Using the in-office approach, blood pressure was measured in a clinical setting and confirmed on at least three separate occasions. Through this method, we estimated that approximately 4.28% of children and adolescents worldwide have hypertension. Hypertension becomes more common as children age, peaking around 14 years old. This underscores the importance of screening during adolescence. Alarmingly, we found that hypertension affects about 18.77% of obese children – nearly eight times the rate seen in children with a healthy weight. It's clear that tackling childhood obesity is a key step in preventing high blood pressure. Hypertension in children and adolescents was further classified by both severity (prehypertension, stage 1 hypertension, or stage 2 hypertension) and phenotype (systolic, diastolic, isolated systolic, isolated diastolic, or systolic–diastolic hypertension). In terms of severity, stage 1 hypertension (blood pressure between the 95th and 99th percentile plus 5 mmHg) was

the most common, affecting 4.02% of children, while stage 2 hypertension (blood pressure above the 99th percentile plus 5 mmHg) was less prevalent, at 0.83%. Among phenotypes, isolated systolic hypertension (elevated systolic but normal diastolic blood pressure) was the most frequent, affecting 1.78% of children.

The combination approach, which integrates in-office and out-of-office measurements (e.g., ambulatory or home blood pressure monitoring), provided further insights. When this combined approach was applied, the prevalence of sustained hypertension increased to 6.67%. One of the most concerning findings was the prevalence of masked hypertension – normal blood pressure in the clinic but elevated readings outside. This condition affected 9.22% of children, indicating that routine in-office measurements alone might miss these cases entirely. Conversely, white coat hypertension, where blood pressure is elevated in clinical settings but normal outside, was observed in 5.17% of children. These findings underscore the importance of incorporating both in-office and out-of-office measurements to improve diagnostic accuracy and reduce the risk of misdiagnosis.

What can we do?

The nearly twofold increase in childhood hypertension over just 20 years is a wake-up call. But there's good news: we can take action now to address this growing problem. Early detection is key, and improving access to both in-office and out-of-office blood pressure monitoring can help ensure no child slips through the cracks.

Prevention is equally important. Encouraging healthy eating habits, promoting physical activity, and tackling childhood obesity can go a long way in reducing the risk of high blood pressure. Schools, healthcare providers, and policymakers all have a role to play in creating environments that support healthy lifestyles for children and adolescents.

For healthcare providers, it's time to rethink diagnostic strategies. Relying solely on traditional in-office blood pressure readings might not give us the full picture. Incorporating out-of-office monitoring, such as home or ambulatory blood pressure measurements, can improve accuracy and ensure timely intervention.

Summary

Childhood hypertension is more common than we once thought, and its impact can no longer be ignored. As a global community, we need to prioritize early detection, prevention, and treatment to reduce the long-term burden of high blood pressure. Our study provides a foundation for future research and policy development, and I hope it inspires action to protect the health of the next generation.

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The research team behind the paper.

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FOCUS ON PAEDIATRIC HYPERTENSION

The transition of care between pediatric and adult health services, and how to reduce differences in the standard of care for arterial hypertension

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Healthcare transition is a planned process designed to prepare and integrate adolescents and young adults (AYAs) from pediatric services into adult systems.1 Its primary objective is to ensure continuity of care and developmentally appropriate attention. This manuscript proposes a practical framework to mitigate differences in the standards of care by conceptualizing transition as a complex intervention: governance and longitudinal responsibility, readiness building, pre-transfer risk stratification, strengthening self-management skills, an operational bridge between teams, and measurement for continuous improvement.

Transition is not synonymous with transfer. While transfer is the administrative act of moving a patient, transition involves early planning and standardized processes to guarantee effective integration and positive health outcomes.[1]

Emerging adulthood (ages 18–25) is a period of rapid life changes in education, residence, and social support, often coinciding with shifts in insurance coverage.[2] For chronic conditions like hypertension (HTN), this stage can disrupt health behaviors and exacerbate existing disparities. Accordingly, transition should be conceptualized as a pillar of patient safety and clinical excellence, extending beyond a simple age-related milestone.[2,3]

The Importance of Continuity

In HTN management, treatment discontinuity is hazardous. Missed appointments and suboptimal adherence often lead to persistently uncontrolled blood pressure (BP), delayed therapeutic escalation, and undetected target-organ damage. AYAs often possess limited health literacy regarding "silent" conditions and may underestimate risks in the absence of symptoms.

However, transition also presents a preventive opportunity. Because adult cardiovascular health is established early, a structured pathway can consolidate evidence-based targets and strengthen self-management skills as autonomy increases.

From our clinical perspective, the gap in standards is viewed less as a “lack of guidelines” and more as a systems failure: the absence of a longitudinal care lead, abrupt changes in the treating team, and inconsistent messaging regarding the diagnosis

and goals of care. Therefore, improving transition requires the design and implementation of complex, multidisciplinary interventions (with multiple components across several organizational levels), with planned evaluation and adaptation to the local context.[3-6]

Hypertension-specific considerations

1) BP Tracking and Early-Life Determinants

Blood pressure "tracks" over time; elevated childhood BP is a strong predictor of adult HTN. This trajectory is shaped by family history, adiposity, diet, and social determinants of health.[7] These drivers often intensify during late adolescence as routines change. Transition planning should treat lifestyle interventions as longitudinal therapy, linking patients to sustainable community and workplace resources.[8]

2) Changing diagnostic criteria and clinical messaging:

Pediatric BP classification relies on age, sex, and height-specific percentiles, while adult guidelines use fixed thresholds.[8] This shift can lead to reclassification and inconsistent clinical messaging (e.g., a patient being told they are "hypertensive" by a pediatrician but "normal" by an adult provider). To maintain trust, clinicians must document the standards used, explain why thresholds change, and maintain a risk-based perspective even if the patient falls below adult cutoffs: because a history of elevated adolescent BP justifies continued monitoring and lifestyle interventions.[1,2,8]

3) Masked hypertension and out-of-office BP assessment:

Masked HTN – normal office BP but elevated ambulatory or home BP – is common in high-risk groups (obesity, CKD, diabetes, repaired coarctation of aorta). It is associated with increased left ventricular mass and early myocardial impairment.[9] Transition pathways must define when Ambulatory BP Monitoring (ABPM) is indicated and ensure these reports are included in the transfer package to prevent redundant testing.

4) Risk stratification and target-organ surveillance:

Prior to transfer, clinicians must reassess HTN severity and target-organ involvement. This includes evaluating BP trajectories, screening for secondary causes, and reviewing renal parameters (e.g., GFR and albuminuria). Cardiac assessments for left ventricular hypertrophy should be performed based on guideline criteria. This stratification determines the intensity of the "handoff" and the urgency of adult follow-up.[10]

Key elements to reduce differences in the standard of care

A) Early preparation with readiness assessment:

Planning should begin between ages 12–14. Tools like the Transition Readiness Assessment Questionnaire (TRAQ) help build competencies in medication knowledge and appointment scheduling.[3] Clinicians should progressively increase "patient-only" time during visits.

B) Clear accountability and defined endpoints:

A designated transition lead should oversee milestones, ensuring the transfer package is complete and the first adult appointment is attended. Success is defined by confirmed attendance at the initial adult consultation, not just the issuance of a referral.[8]

C) Standardized transfer documentation:

Standardized Documentation: A concise transfer summary is vital. It should include the initial diagnosis and standards used, longitudinal office and out-of-office BP data, comorbidities and evaluations for secondary causes, comprehensive medication history (dosages, side effects, and adherence). Finally, confirm that the adult appointment has been successfully scheduled.

D) A “warm handoff” and operational bridge:

For high-risk patients, direct communication or joint pediatric-adult visits are ideal. Establishing a low-barrier consultation channel for 6–12 months post-transfer allows adult teams to clarify history and adjust therapy without delay.[10]

E) Measurement and continuous quality improvement:

Systems should track indicators such as the time between visits, loss to follow-up, and BP control at 12 months. Iterative cycles (e.g., PDSA) should be used to adapt pathways to local constraints.[5,6]

The challenge of applying clinical guidelines in local settings

In countries like Chile and Argentina, clinical recommendations emphasize proactive preparation and psychosocial support. However, implementation remains heterogeneous due to geographic barriers and disparate access to subspecialty care.[10] HTN serves as an ideal "index condition" for developing scalable pathways because it offers measurable targets and standardizable processes. Systematizing these into routine workflows is the most critical step toward reducing variability nationwide.

Conclusion

The transition period is a fundamental determinant of long-term health for AYAs with HTN. Vulnerability arises from systemic discontinuities and shifting diagnostic criteria. Mitigating these risks requires intentional, evidence-based programs focused on readiness assessment, rigorous risk stratification, and accountable linkage to adult services. By bridging the gap between pediatric and adult teams, healthcare systems can transform a period of risk into a continuous trajectory for cardiovascular health.

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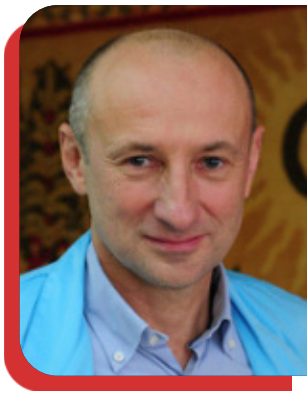
FOCUS ON PAEDIATRIC HYPERTENSION

Adolescents with hypertension – the transition to adult care: how we do it in Poland



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Hypertension in children and adolescents is no longer considered a rare disease. While in young children it is relatively rare and usually presents as secondary hypertension (SH), primary hypertension (PH) is now diagnosed starting already at age 3.[1] PH becomes the dominant cause of hypertension beginning with the pubertal growth spurt. In adolescents, the prevalence of hypertension is similar to that seen in young adults and is estimated at approximately 10% of the population, with a higher incidence in boys.[2,3]

From the point of view of public health, the increase in the prevalence of hypertension in children and adolescents in recent decades by approximately 30% is of significant importance.[3] Analyses of the etiology of hypertension indicate that over the past 40 years, the age at which PH is diagnosed has significantly shifted to younger age groups.[1,4] This has occurred despite the availability of numerous sophisticated diagnostic methods. Adolescents with PH exhibit a fairly typical clinical and laboratory phenotype, with body composition abnormalities and metabolic disturbances typical of metabolic syndrome. This necessitates the diagnosis and treatment of metabolic disorders such as hyperuricemia and insulin resistance.[5]

Another significant and growing problem is the long-term consequences of prematurity and/or low birth weight, which affect approximately 10% of all live births. Long-term consequences include the development of hypertension, cardiovascular disease, body composition abnormalities and metabolic abnormalities typical of metabolic syndrome. These can manifest already during childhood and adolescence.

The predominant causes of SH in children and adolescents are renal disease (CKD) and renovascular hypertension (RVH). Unlike in adults, the causes of RVH are not atherosclerotic renal artery stenosis, but fibromuscular dysplasia (FMD) and various syndromic forms of RVH. Other conditions such as endocrine tumors and monogenic hypertension constitute an important but small percentage of all cases of hypertension in adolescents. In specialist centers, a significant problem is hypertension in patients with coarctation of the aorta and mid-aortic syndrome. It indicates a significant diversity of the group of adolescents with hypertension.

As with other chronic conditions of developmental age, ensuring an appropriate transition to adult care is an organizational challenge. This problem encompasses both psychological aspects, such as adherence, and clinical aspects, related to the distinct pathophysiology of both PH and SH. An additional issue is the treatment method. While adolescents with hypertension are treated with medications from the same drug classes as adults, combination medications are not licensed for pediatric use. Furthermore, they are not reimbursed in many countries.

No single framework for transitioning adolescents with hypertension to adult care has been developed. Published statements represent expert opinions and depend largely on the healthcare system in a given country and applicable recommendations.[6]

In the following part of the position paper, we present a framework and proposal for transitional care for adolescents with hypertension used in our centers and based on the recommendations of Polish Society of Arterial Hypertension (PSAH) and the European Society of Hypertension. (ESH).[7,8]

According to the ESH and PSAH recommendations, the classification of hypertension, including the thresholds for diagnosing hypertension, is common for individuals aged 16 and older. This is justified by an analysis of population-based blood pressure values. Furthermore, the adoption of such classifications facilitates a common approach to diagnosis and treatment for a large population group that will be transferred to adult health care within two years. At the same time, it helps avoid underdiagnosis of hypertension in boys aged 18 if blood pressure percentiles were used. It should be noted that in the USA, common thresholds for diagnosing hypertension (lower than in the EU, i.e. >130/80) and classification for adults already apply to teenagers from 13 years of age.

The main problem in transferring adolescents with hypertension to adult care is patients with SH. As mentioned, SH hypertension in adolescents, accounting for up to 20% of all cases of hypertension at the age of 18, include conditions rarely observed in the practice of family practitioners. These include cases of unifocal, univessel FMD, CKD, as well as complex congenital and acquired vascular pathologies involving multiple vascular beds [9].

Similarly, rare forms of hypertension, including monogenic hypertension, are a special case. Therefore, from a practical perspective, a significant problem is preparing patients with SH for further care in a specialist center. Prior consultations and planning for further corrective procedures for vascular pathologies, as well as establishing treatment for patients with monogenic hypertension, should occur before patients reach adulthood.

In our two centers, over the past two decades we have developed a collaborative consultation protocol for patients with SH. Joint consultations, both virtual and on-site, take place as needed, generally every 3-6 months. This allows for joint planning of the scope and method of vascular interventions for RVH and/or aortic pathology and is in line with 2023 Guidelines of ESH, that *"nevertheless, despite their limited prevalence, detection and management of secondary forms of hypertension is of utmost importance, because these forms often carry a high or very-high risk of morbidity and mortality and can possibly be cured by timely treatment of their cause."* [8]

Patients thus prepared for vascular interventions are transferred for further care to a specialized adult center in the Department of Hypertension of the National Institute of Cardiology, where physicians have already assessed the patient's problems and participated in developing the treatment plan. Regardless, a significant problem is the meeting of patients who are still under the care of their parents but will soon become adults with the team of doctors who will take over their care.

The main group of adolescents with hypertension are patients with PH. They constitute a significant percentage of the population. These patients should be referred to family physicians for care. For practical reasons, due to the relatively large number of patients, organizing specific procedures and protocols for transferring patients with uncomplicated PH to adult care is difficult. In our practice, we maintain a practice of thoroughly informing family physicians about the course of the disease, the treatment being administered, and its tolerance. Furthermore, we utilize a system of coordinated care, which allows family physicians to directly contact specialists and clarify difficult clinical issues. The exception to this are cases of hypertension in adolescents associated with prematurity and/or low birth weight. These patients present with a complex set of metabolic complications that require specialized, sometimes interdisciplinary, treatment. In our opinion, they should also be provided with care in adult referral centers.

ESH 2023 Guidelines clearly summarize, that *"the asymptomatic nature of the BP elevation and the remoteness of its possible adverse consequences may favor underappreciation of the risks and poor adherence to the prescribed treatment. During transition, close collaboration and sharing of clinical information between pediatricians and adulthood physicians is of crucial importance. Parents" involvement plays an important role."* [8]

Therefore, in the light of the current 2023 ESH recommendations, we created a model collaboration between pediatric and adult

hypertension centers and highlight, that after transition is completed, patients should be closely followed to detect the BP trajectories in the subsequent years.

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PERSPECTIVES IN HYPERTENSION

Pros and cons of lower systolic blood pressure targets in chronic kidney disease

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Knowing what systolic blood pressure (SBP) to target for patients with chronic kidney disease (CKD) can be confusing. The 2021 KDIGO guideline tells us to aim for SBP <120 mm Hg[1], the 2025 ESC guideline says 120–129 mm Hg[2], and the 2025 AHA/ACC guidelines splits the difference with a recommendation to target SBP <130 mm Hg "with encouragement to achieve SBP <120 mm".[3] Part of the confusion stems from the fact that the evidence for lower SBP targets is strong for cardiovascular (CV) outcomes, mixed for kidney outcomes, and highly dependent on how we measure blood pressure (BP).

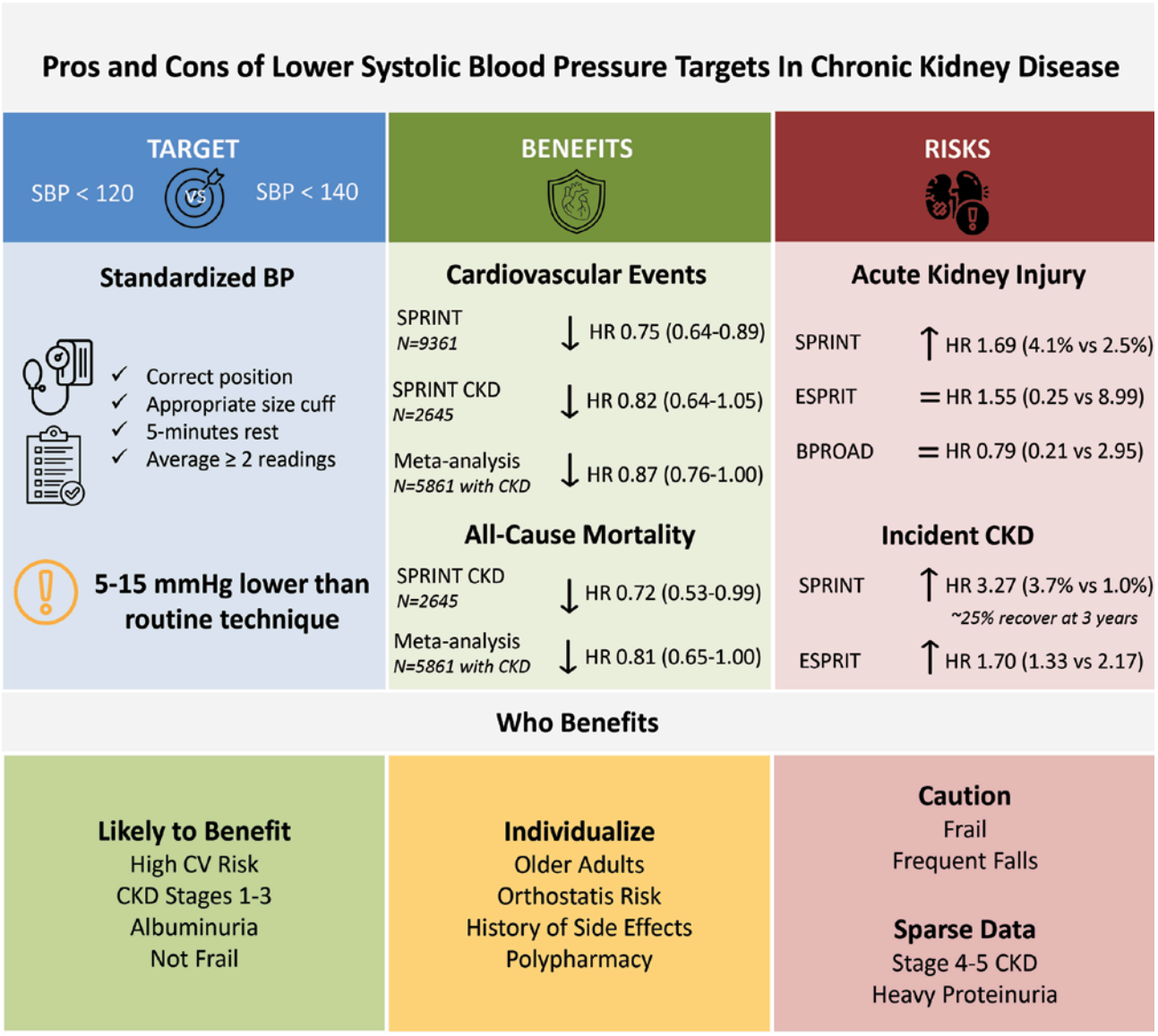
All BP-target trials used standardized office BP, where the patient rests quietly for 5 minutes with attention paid to proper positioning and correct cuff size before ≥2 BP readings are taken and averaged. Standardized BP readings can be 5–15 mm Hg lower than the typical rushed clinic BP. Because intra-individual variability is so large, we cannot just subtract a fixed number from non-standardized measurements and call it standardized. If we try to treat to SBP <120 using non-standardized readings, we are at high risk of overtreatment that could lead to adverse clinical events.

Now back to the different SBP targets among the different guidelines. The differences are not just academic; it changes medication burden, monitoring, and adverse event risk in clinical practice. Notably, the findings from recent trials are actually fairly consistent: lower (<120 mm Hg) SBP targets reduce CV events and likely reduce mortality overall, and the benefits in CKD are relatively similar to the general population.

The first trial to show a benefit of targeting SBP<120 was SPRINT, which randomized high-CV risk adults to SBP <120 vs <140 mm Hg and intentionally enriched for CKD.[4] In the full cohort, intensive control reduced the primary composite CV outcome (hazard ratio [HR] 0.75, 95% confidence interval [CI] 0.64–0.89). In the CKD subgroup (n=2,645; mean estimated glomerular filtration rate [eGFR] ~48 mL/min/1.73m2), the effect size was similar (HR 0.82, CI 0.64–1.05; no significant interaction), and all-cause mortality was lower in the SBP<120 group (HR 0.72, CI 0.53–0.99).[4] The catch: SPRINT excluded diabetes, eGFR <20, and heavy proteinuria (>1 g/day).

Since SPRINT, there have been several additional randomized trials that extended the benefits of targeting SBP<120 mm Hg versus < 140 mm Hg on CV events to older adults[5] and to patients with diabetes.[6,7] However, in all these trials the proportion of patients with CKD was very low (2-8%). A meta-analysis pooling ~5,861 CKD patients across six randomized trials found lower BP targets reduced CV events (RR 0.87, p=0.05) and suggested lower all-cause mortality (RR 0.81, p≈0.051).[8]

Figure 1



But what about kidney outcomes? For patients with baseline CKD, the results are mostly neutral. In SPRINT's CKD subgroup, the prespecified kidney outcome (≥50% eGFR decline or kidney failure) did not differ between treatment groups, and while there was earlier eGFR decline, the differences were attenuated after the first months, consistent with a hemodynamic effect.[4,5] ESPRIT reported more kidney outcomes in the intensive group, driven mainly by sustained ≥40% eGFR decline; almost nobody reached kidney failure, and a meaningful fraction later recovered to eGFR ≥60 mL/min/m2.6 BPROAD similarly showed no difference in CKD progression between treatment arms.[7]

There is some evidence to suggest that more intensive SBP lowering confers a higher risk of incident CKD. In SPRINT, the <120 mm Hg group experienced more incident CKD, defined as a ≥30% decline in eGFR to <60 mL/min/1.73 m² (HR 3.27, 95% CI 2.43-4.40), though absolute rates were still low (3.7% vs 1.0% at 3 years).[4] An important nuance: in SPRINT, about one quarter of "incident CKD" cases later recovered and no longer met criteria at final visit, and biomarker sub-studies suggest these drops often reflect hemodynamics rather than intrinsic injury.[9,10]

Regarding the risk for acute kidney injury (AKI), this adverse kidney event occurred more often in the SBP <120 mm Hg group in SPRINT, but

there were no between-group differences in ESPRIT and BPROAD Falls/syncope/hypotension are relatively uncommon in trials, but real-world frailty, polypharmacy, and volume depletion are more common than trial eligibility allows.

So, what is the practicing clinician to do? Here's how we would translate current evidence into practice. (See **Figure 1**)

- If we're going to target SBP <120 mm Hg, we must measure BP in a standardized way.
- Consider targeting SBP < 120 mm Hg for the CV and mortality benefits
- Explain to the patients that kidney benefits are less certain and prepare them for the early dip in kidney function that can occur with lower SBP targeting
- Patients with advanced CKD, frailty, and heavy albuminuria were not well represented in the trials, so guidance on SBP targets is less clear for these and other subgroups.

As for most things in medicine, BP management in CKD should be personalized to each patient's clinical circumstances.

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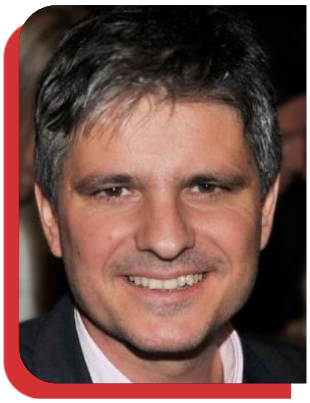
PERSPECTIVES IN HYPERTENSION

Thresholds for ambulatory blood pressure in high-risk pregnancies: Time for a change?



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Preeclampsia (PE) remains one of the most serious hypertensive disorders of pregnancy and a leading cause of maternal and perinatal morbidity and mortality worldwide. The development of elevated blood pressure (BP) after mid-gestation constitutes the cornerstone of PE diagnosis, as emphasized by both the International Society for the Study of Hypertension in Pregnancy (ISSHP) and the American Heart Association (AHA).[1,2] Despite advances in obstetric care, early identification of women at increased risk remains a clinical priority.

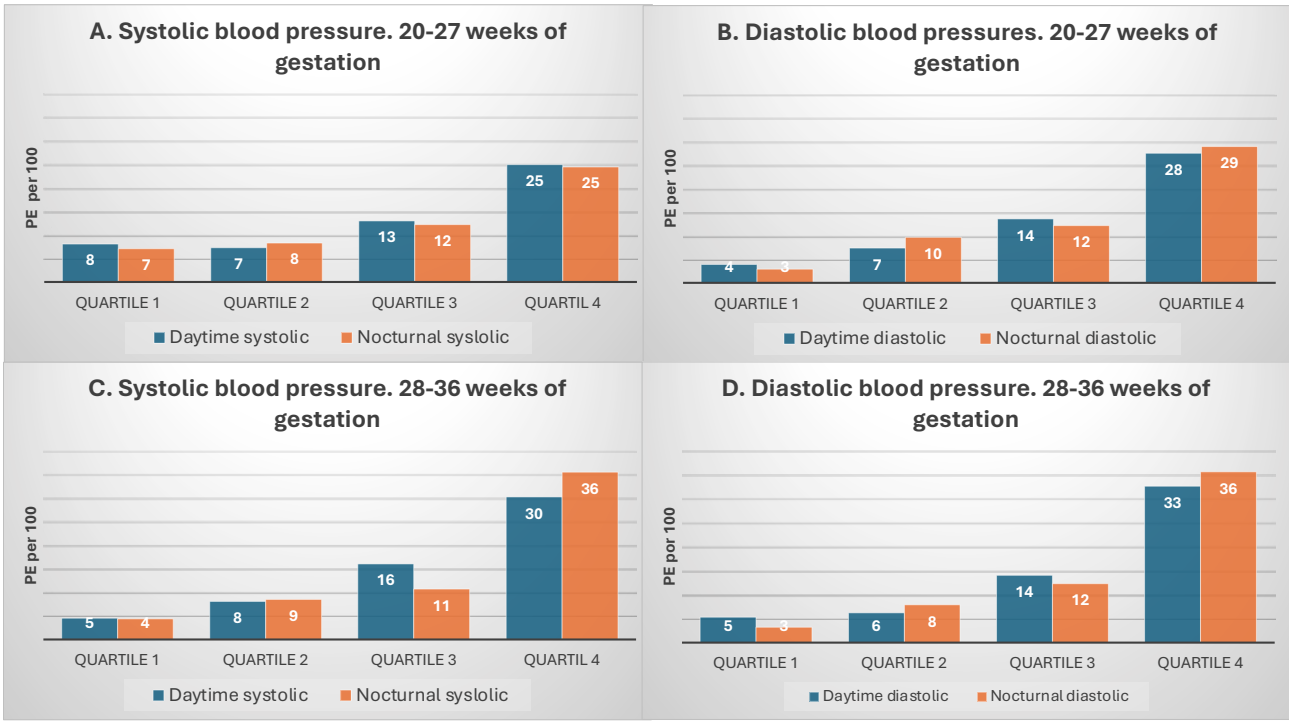
In routine practice, hypertension in pregnancy is primarily diagnosed using office BP measurements. However, 24-hour ambulatory blood pressure monitoring (ABPM) has demonstrated clear advantages in selected populations. In pregnant women, ABPM enables the identification of white coat hypertension – thus preventing unnecessary pharmacological treatment – as well as masked and nocturnal hypertension, both of which are associated with increased maternal–fetal risk. In high-risk pregnancies in particular, nocturnal BP abnormalities appear to carry significant prognostic information.

A central unresolved issue concerns the BP thresholds used to define hypertension by ABPM during pregnancy. Current daytime and nocturnal cut-off values (135/85 mmHg and 120/70 mmHg, respectively) were originally defined based on long-term cardiovascular outcomes in non-pregnant populations. While appropriate for long-term cardiovascular risk prediction in the general adult population, these criteria may not reflect the specific hemodynamic physiology or risk patterns of pregnancy.

Earlier efforts to define pregnancy-specific ABPM reference values, such as those proposed by Brown et al., were based on normotensive pregnant women and relied on statistical definitions (mean + 2 SD) rather than outcome-based thresholds. Consequently, they were not designed to predict PE or other adverse pregnancy outcomes. This distinction is critical: physiologic reference values do not necessarily correspond to clinically meaningful risk thresholds.

Another complexity arises from the dynamic changes in BP throughout gestation. During normal pregnancy, BP typically declines by approximately 10–20 mmHg in the first half of gestation, reaching a nadir around mid-pregnancy, and then progressively increases in the third trimester, returning toward pre-pregnancy levels. This biphasic pattern strongly suggests that fixed ABPM thresholds applied uniformly across gestation may be suboptimal. A gestational-age–specific approach may provide more accurate risk stratification.

Figure 1. Rates of preeclampsia across quartiles of systolic and diastolic ambulatory blood pressure monitoring in two gestational periods: 20–27 weeks (A, B) and 28–36 weeks (C, D)



In this context, our recent cohort study evaluated outcome-based ABPM thresholds for predicting PE in 1,374 high-risk pregnant women who were not receiving antihypertensive treatment at the time of monitoring.[5] Analyses were conducted separately at 20–27 weeks and 28–36 weeks of gestation to account for physiological BP variation (n = 588 and n = 854, respectively).

In the absence of a standardized methodology for defining ABPM cut-offs in pregnancy, we applied two independent approaches. First, receiver operating characteristic (ROC) curves were constructed, and optimal thresholds were determined using Youden's index (maximizing sensitivity and specificity). Second, we examined the relationship between ambulatory systolic and diastolic BP values and the frequency of PE across quartiles of distribution within each gestational window. Women in the highest quartile exhibited a markedly increased risk of PE, and the boundary between the third and fourth quartiles was defined as the cut-off **(Figure 1**). Importantly, both methods yielded highly concordant results, strengthening the robustness of the findings.

Three observations emerge with potential clinical implications. First, around 30 weeks of gestation, the currently recommended nocturnal hypertension threshold of 120/70 mmHg appears appropriate for identifying PE risk. Estimated cut-offs derived from both analytical approaches were highly consistent with this value (**Table 1**). These findings provide outcome-based support for maintaining the current nocturnal threshold at this stage of pregnancy.

Second, the conventional daytime ABPM threshold of 135/85 mmHg appears excessively high in pregnant women (**Table 1**). These findings suggest that a substantial proportion of women at increased risk of PE may remain unidentified if traditional daytime thresholds are applied.

Third, gestational timing matters. Before 30 weeks, both daytime and nocturnal thresholds that best predicted PE were lower than those observed later in pregnancy (**Table 1**) and may warrant downward adjustment during earlier gestational stages.

Table 1. Outcome-Based Cut-Off Points for Ambulatory Blood Pressure According to Gestational Period, Estimated Using Youden's Index and the Upper Quartile of the ABPM Distribution

Gestational age	ABPM period	Populational	Youden index	Top quartile
20-27 weeks	Daytime	135/85 mmHg	121/74 mmHg	126/77 mmHg
	Nocturnal	120/70 mmHg	112/64 mmHg	114/66 mmHg
28-36 weeks	Daytime	135/85 mmHg	124/77 mmHg	128/80 mmHg
	Nocturnal	120/70 mmHg	118/69 mmHg	118/70 mmhg

Our findings are consistent with recent data from Asian cohorts in which ABPM thresholds were defined according to maternal and neonatal outcomes. These studies similarly reported lower optimal daytime thresholds than those currently recommended.[6,7] Although population differences must be considered, the convergence of evidence across independent cohorts strengthens the argument for reassessing current thresholds.

An additional noteworthy observation is the particularly strong predictive performance of nocturnal BP, especially diastolic BP, which demonstrated the highest area under the curve (AUC) values. This aligns with our previous studies showing that nocturnal hypertension is the most powerful predictor of subsequent PE, particularly early-onset PE.[8,9] From a pathophysiological perspective, impaired nocturnal BP decline may reflect endothelial dysfunction or altered autonomic regulation – mechanisms closely linked to PE development. Therefore, accurate identification of nocturnal hypertension thresholds is not merely a methodological refinement but a clinically relevant objective.

Several limitations deserve mention. The study was observational and included only high-risk pregnant women; therefore, extrapolation to low-risk populations should be cautious. Cut-offs were derived specifically for PE prediction and did not incorporate other fetal outcomes, such as intrauterine growth restriction. Optimal BP thresholds for maternal risk stratification may not fully align with those required to optimize fetal health. Furthermore, the study population represented a single ethnic group, underscoring the need for external validation in diverse populations.

Nonetheless, the question is no longer merely theoretical: should ABPM thresholds in pregnancy continue to be extrapolated from non-pregnant cardiovascular research, or should they be grounded in pregnancy-specific outcomes? Outcome-based data indicate that the nocturnal ABPM threshold of 120/70 mmHg remains appropriate after 30 weeks of gestation. In contrast, daytime thresholds appear to warrant downward revision, with values in the range of 125–130/80 mmHg offering more accurate risk stratification in high-risk pregnancies.

A gestational-age–specific, outcome-driven approach to ABPM interpretation may represent a necessary evolution in the management of hypertensive disorders of pregnancy. Reconsideration of current diagnostic standards is therefore justified.

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PERSPECTIVES IN HYPERTENSION

Clinical diagnosis and treatment of paroxysmal hypertension

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Paroxysmal hypertension (PH) represents a common clinical phenomenon encountered by practitioners. However, as hypertension specialists, we were astonished to find that when confronted with a sudden and significant elevation in blood pressure (BP), clinicians demonstrate inadequate consideration, confining their differential diagnosis to pheochromocytoma or psychiatric disorders.

In reality, in clinical practice, PH is closely associated with a variety of underlying diseases, physiological stressors, and environmental factors. It may present as either a physiological stress response or a clinical manifestation of critical illness. The interaction between psychological factors and elevated BP often forms a vicious cycle, complicating clinical identification. Moreover, acute hemodynamic changes resulting from abrupt rises in BP can exacerbate target organ damage and may even induce severe cardiovascular and cerebrovascular events.

Therefore, to improve understanding of this condition, and avoid both underdiagnosis and overtreatment, we have briefly summarized the diagnosis and management of PH to guide clinical practice. The cases of PH should be categorized into the following three scenarios, based on the underlying causes:

1.Emergencies and PH

Emergencies causing PH include acute coronary syndrome, acute left heart failure, acute aortic dissection, acute stroke, hypertensive encephalopathy, acute severe bronchial asthma, status epilepticus, etc.[1-6] For patients presentingwith acute hypertensive surges, prompt identification of any underlying conditions carrying a risk of severe adverse outcomes is paramount. Clinicians must rapidly assess the patient's clinical status through targeted history taking, physical examination, and essential auxiliary investigations to recognize critical cases. The key to treatment lies in the stabilization of vital signs and aggressive treatment of theprimary disease. The targets for antihypertensive treatment, the rate of BP lowering, and the principles of pharmacotherapy vary across different critical conditions. Consequently, we believe that effective BP management is contingent upon a timely and accurate diagnosis and comprehensive assessment.

2.Diseases and PH

The key diagnostic and therapeutic approach involves actively evaluating, screening and identifying the clinical context and precipitating factors of PH. Targeted control of the primary disease and elimination of triggers represent effective strategies to prevent recurrence.

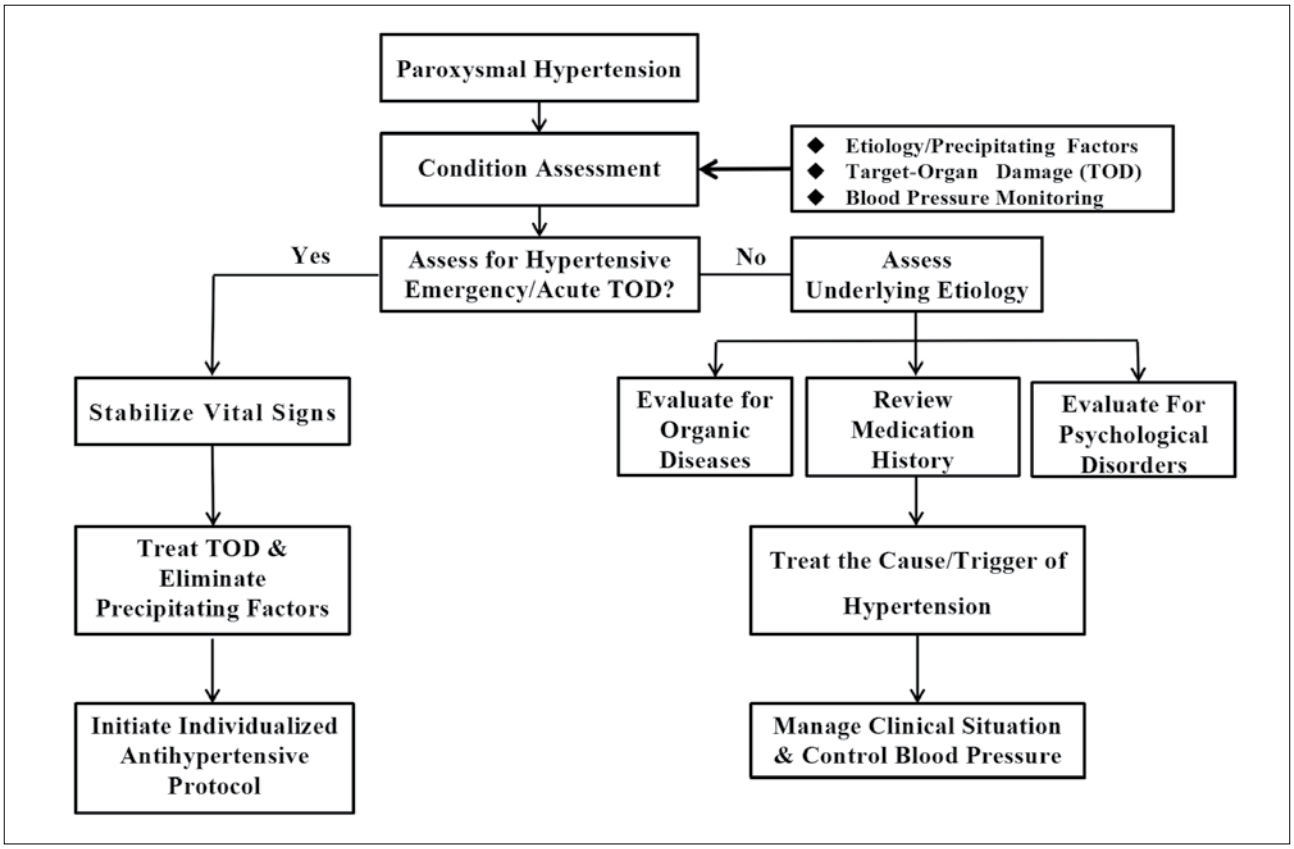

Figure 1. Clinical Diagnostic and Management Flowchart for Paroxysmal Hypertension

2.1 Organic diseases and PH:

i. Endocrine disorders:[7]
It mainly elaborates on pheochromocytoma, adrenal medullary hyperplasia, primary aldosteronism, hypercortisolism (Cushing's syndrome), and thyrotoxic crisis.

ii. Obstructive sleep apnea (OSA).

iii. Renal diseases and hemodialysis:
renal artery stenosis, chronic kidney disease (CKD), and hemodialysis.[8]

iv. Other organic diseases affecting multiple systems and organs can also lead to paroxysmal hypertension, e.g., chronic coronary syndrome, intracranial space-occupying lesions, autonomic dysfunction, sympathetic cervical spondylosis, insulinoma, hyperparathyroidism, and acute high-altitude hypertension.

2.2 Psychological factors:

i. Psychiatric disorders:[9]
panic disorder, post-traumatic stress disorder (PTSD), catatonia, bipolar disorder - manic episode, generalized anxiety disorder (GAD), etc.

ii. White-coat effect and menopausal syndrome.

PH related to mental and psychological disorders is more common, emphasizing the importance of early diagnosis and treatment to stabilize BP by improving psychological status.

3.Drug-induced PH

This pertains to improper medication use and/or adverse reactions of some agents. Medications affecting BP include:[10] ephedrine-containing compounds, thyroid hormones, beta-agonists, novel targeted anticancer agents, anesthetics (e.g., Ketamine), central nervous system stimulants, antidepressants, and some traditional chinese medicines, etc. The emphasis lies in recognizing the relationship between the medication or method of administration and BP elevation, understanding its mechanism, and selecting appropriate antihypertensive measures.

To present the diagnostic and therapeutic process of PH more explicitly, we designed a flow chart (**Figure 1**).

Management of patients with PH

i. Acute phase management:
Quickly assess the condition through multi-dimensional monitoring indicators, identify high-risk patients, give priority to dealing with life-threatening conditions, reasonably select antihypertensive drugs, and reduce BP to a safe range. For patients with non-acute PH, control BP fluctuations, pay attention to etiological investigation, prevent target organ damage, and avoid excessive medical intervention.

ii. Long-term management:
Actively intervene in the etiology, avoid inducing factors, establish a scientific follow-up protocol, and prevent recurrence.

Summary

PH represents a distinct phenomenon within the hypertension spectrum. the distinctive nature necessitates systematic differential assessment across multiple dimensions – trigger tracing, pathological mechanism, and clinical phenotype – to achieve precise management.

- PH caused by critical illness: prioritise early recognition and stabilisation of vital signs; blood pressure management should proceed only after thorough assessment of the critical condition.
- PH secondary to organic disease: focus on identifying the underlying cause, delivering cause-specific treatment, and preventing recurrence.
- Drug-induced PH: emphasise clarification of the relationship and mechanism between the medication (or dosing regimen) and blood-pressure elevation, followed by selection of appropriate antihypertensive interventions.
- Paroxysmal hypertension associated with mental health disorders: highlight early diagnosis and treatment, aiming to stabilise BP through improvement of psychological status.

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PERSPECTIVES IN HYPERTENSION

Rehumanising hypertension: The wounded storyteller meets the digital clinician

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Chair ISH South and Central Asia Regional Advisory Group (SACA RAG)

I have measured blood pressure thousands of times. In clinic, on wards, in research studies, and in community screenings. What I have measured far less often is the story that accompanies those numbers.

Hypertension is one of the most common conditions in medicine, yet one of the least humanly understood. We diagnose it by numbers, manage it through algorithms, and judge its success by whether systolic and diastolic values fall within predefined targets. In doing so, we have quietly transformed a deeply embodied, lived condition into a technical problem of measurement and control.

For patients, however, hypertension is rarely just a number.

I think of a woman in her forties who sat across from me clutching her blood pressure diary like a school report card. Her readings were high. She apologized before I could speak. "I tried," she said. "I really did." Her life was crowded with caregiving, financial strain, interrupted sleep, and quiet grief. Hypertension, for her, was not a defect of willpower. It was a mirror held up to an exhausted life.

Another patient, a retired schoolteacher, arrived with meticulously recorded home readings taken five times a day. He had memorized guideline thresholds. Each elevated value sent him into panic. "Doctor," he whispered, "what if today is the day I have a stroke?" He did not need another antihypertensive. He needed reassurance, containment, and permission to stop surveilling his own body.

And then there was the man who refused medication altogether. He had been dismissed by doctors before. His side effects were minimized. His questions were brushed aside. He turned to herbal remedies not because he was ignorant, but because he no longer trusted a system that did not listen.

These patients were not "non-adherent." They were human. To rehumanise hypertension, we must begin not with better numbers, but with better listening.

Illness as Narrative

Arthur Frank's concept of the wounded storyteller offers a useful lens through which to understand hypertension.[1] He describes three narrative responses to illness: restitution, chaos, and quest.

The restitution story is the one medicine prefers: "I was sick, I took treatment, I am better." In hypertension, this becomes a pill, a normal number, and the hope of returning to who one was before the diagnosis.

The chaos story belongs to those overwhelmed by fluctuating readings, unexplained medication changes, side effects, and an unspoken fear of stroke or sudden death. Nothing makes sense. Control feels elusive.

The quest story is rarer but transformative. Here, hypertension becomes a turning point – a signal that reshapes priorities, identity, and meaning.

Modern hypertension care recognizes only the restitution story. We reward those whose numbers behave and quietly marginalize those whose stories do not fit the algorithm.

The anxious schoolteacher lived inside a chaos narrative.

The exhausted caregiver was being forced into restitution.

The resistant man had begun a quest for dignity outside medicine.

Beyond stories: how hypertension creates identities

Yet illness narratives alone do not fully capture how people learn to live inside medical systems. Over time, patients with hypertension also acquire identities – not as personality traits, but as adaptations to a form of care that moralizes compliance, rewards control, and quietly punishes deviation.2

These identities shape what patients disclose, what they hide, how they interpret their numbers, and how they relate to clinicians. To rehumanize hypertension, we must learn to recognize not only the stories patients tell, but the roles they have been taught to perform.

The moralization of blood pressure

Hypertension has quietly become a moral condition. Controlled blood pressure signals virtue. Uncontrolled blood pressure implies failure.[3]

Patients learn quickly what is rewarded. They perform adherence. They conceal missed doses. They apologize for their numbers.

The woman with the diary was not apologizing for physiology.

She was apologizing for her life.

The Human Faces of Hypertension

The Dependable Patient

‡Ī do what Ī"m told. Ī don"t want to be diŁcult.•

Follows prescriptions even when struggling.

Hides side effects and fear to appear "good."

Feels moral shame when BP remains uncontrolled.

The Stoic Patient

‡Others have it worse. Ī shouldn"t complain.•

Minimizes symptoms and delays follow-up.

Normalizes fatigue and dizziness.

Endures silently at personal cost.

The Anxious Monitor

‡Every number matters. Ī must keep checking.•

Compulsively measures BP.

Panics over single readings.

Loses trust in embodied experience.

The Resistant Patient

‡Ī don"t trust this system. Īt doesn"t see me.•

Rejects medication for herbs or alternatives.

Feels unheard or culturally misaligned.

Protests through non-adherence.

The woman with the diary was a dependable patient.

The schoolteacher was an anxious monitor.

The man who rejected medication was resistant because he had been unheard.

These are not flawed personalities.

They are survival strategies.

I have come to recognize that chaos narratives are not merely psychological dispositions; they are often produced by care itself. A single rushed consultation, an unexplained medication switch, or a dismissive remark can undo months of careful self-management. Poor hypertension care does not simply fail to restore order – it actively generates chaos.

Adherence, in this context, is not a technical problem but a narrative one. The so-called "non-adherent" patient is often a dependable, stoic, anxious, or resistant human being whose life no longer fits the story medicine is asking them to live.

Digital medicine and the tyranny of numbers

Digital health technologies have intensified this dynamic. Home blood pressure monitors, smartphone apps, and wearable devices promise empowerment, yet often deliver anxiety.[4,5]

The schoolteacher did not need five readings a day. He needed permission to live.

Numbers now follow patients into bedrooms, workplaces, and family meals. A quiet evening can be ruined by a transient systolic spike. Life itself becomes a risk factor.

Surveillance medicine does not merely observe hypertension. It reshapes identity around it.

In this emerging world, the clinician is no longer only a witness to suffering, but a curator of data – a digital clinician negotiating between algorithms and human stories.

A striking example of this digital turn is the recent FDA-cleared hypertension notification feature on the Apple Watch.[6] Rather than directly measuring blood pressure in millimetres of mercury, the watch analyses vascular patterns over time and alerts users when readings are consistent with possible hypertension, prompting confirmation with a validated cuff and clinician review. This innovation has real public-health promise: it could identify millions of people with undiagnosed hypertension who might otherwise remain unaware of their risk.

Yet it is not a diagnostic tool, does not provide standard blood pressure values, and must not replace clinical assessment. Its value lies in awareness and screening, not in management decisions. For some patients it may empower; for others it may amplify anxiety or create false reassurance. The Apple Watch thus embodies both the promise and the peril of digital medicine: data without context can deepen surveillance while hollowing out meaning.

Gender, culture, and the silent burden

In low- and middle-income countries, and among women globally, these dynamics are amplified.[7]

The exhausted caregiver I met did not skip medication out of ignorance. She skipped it because her children needed school fees more than she needed tablets. She delayed follow-up because transport cost money. She minimized symptoms because no one had time to hear them. Stoicism becomes survival.

The resistant patient, too, must be understood culturally. In postcolonial contexts, distrust of Western medicine is not ignorance; it is historical memory.[8] Herbal remedies are not superstition – they are parallel languages of care.

To rehumanize hypertension globally means recognizing that non-adherence is often a rational response to systems that do not listen.

What rehumanizing hypertension really means

Rehumanizing hypertension is not about being nicer. It is about changing what we count as success.

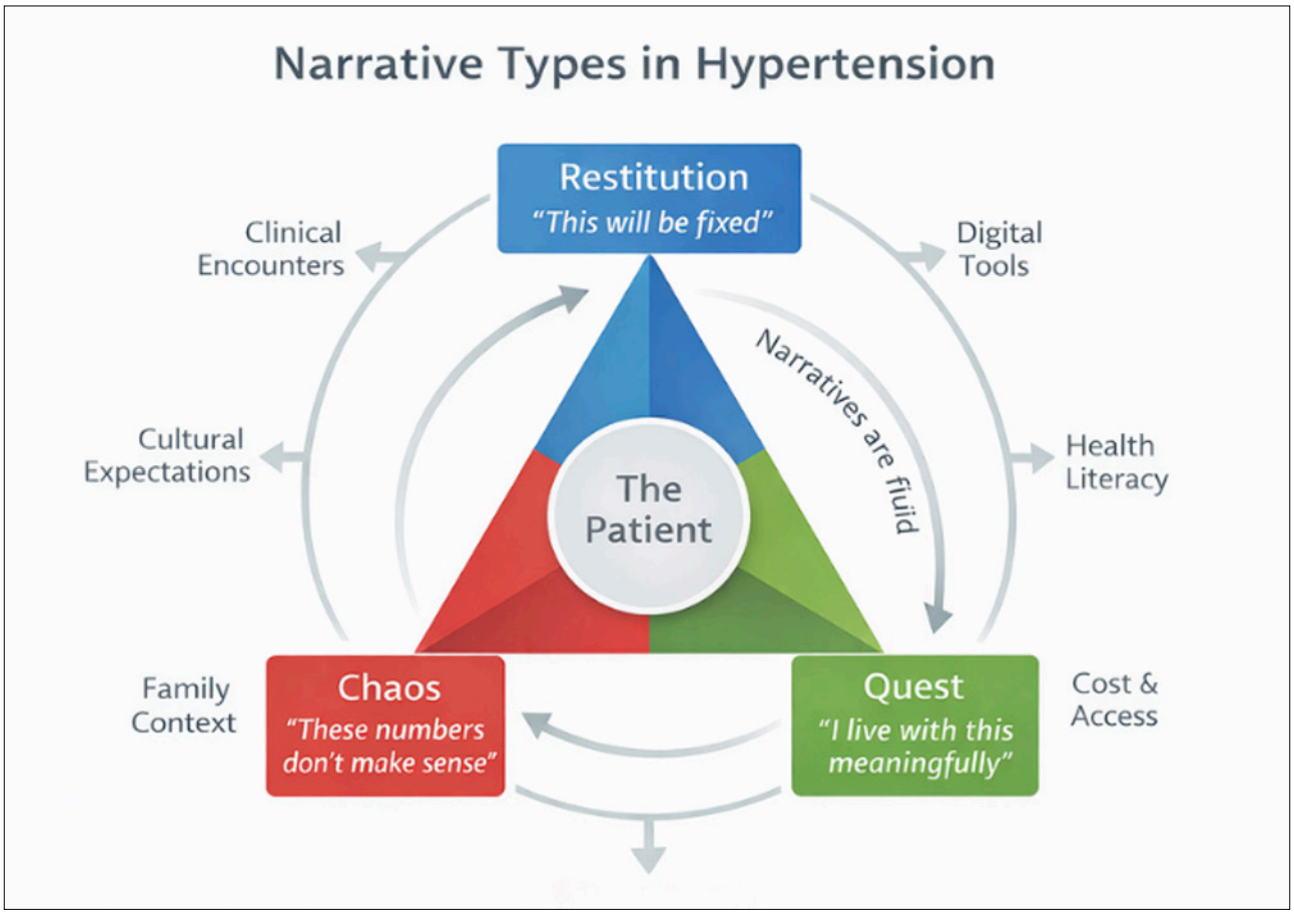
It means:

- Asking patients what hypertension means to them.
- Listening for restitution, chaos, or quest.
- Recognizing patient identities as adaptive roles.
- Valuing trust as much as pharmacology.
- Designing digital tools that reduce anxiety.
- Creating space for fear, resistance, and meaning.

Principles for Rehumanizing Hypertension Care

- Treat BP readings as signals, not verdicts.
- Ask narrative questions: "What has this changed for you?"
- Normalize fear and uncertainty.
- Recognize cultural and gendered dimensions.
- Resist moral language around compliance.
- Design care for people, not just populations.

Figure 1



A Closing Reflection

Hypertension will always be biological.

It will always require pharmacology, guidelines, and targets.[9]

But it is also human.

The woman with the diary, the anxious schoolteacher, the resistant man – none of them needed more algorithms. They needed to be seen. We do not need to choose between science and story. We need to hold them together.

To rehumanize hypertension is to remember that behind every systolic value is a life trying to make sense of itself. And that listening – truly listening – may be as therapeutic as any drug we prescribe.[10]

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ISH COMMITTEE, PARTNER AND AFFILIATED SOCIETY REPORTS

From evidence to impact: developing the next generation of global hypertension leaders

A REPORT FROM THE FOUNDATION FOR CIRCULATORY HEALTH AND THE BRITISH & IRISH HYPERTENSION SOCIETY

PETER SEVER

National Heart and Lung Institute, Imperial College London, UK

Having spent my professional life involved in hypertension research and clinical care, it is increasingly clear to me that while our scientific understanding of hypertension has advanced enormously, our ability to translate this knowledge into effective, scalable models of care has lagged behind. Despite an ever-growing library of clinical guidelines issued by every local clinic, national society and international organisation, including the International Society of Hypertension, blood pressure control remains inadequate in most communities across the world. Inadequate education of those responsible for delivering patient care together with patients who are largely ignorant of their condition contribute to this ongoing problem.

The persistent gap between evidence and impact is not primarily a failure of science. Rather, it reflects shortcomings in how health systems globally have often struggled to prioritise the prevention and management of hypertension. I believe it is this systemic challenge, spanning limitations in hypertension education, variability in the implementation of public health strategies, and therapeutic inertia in clinical practice, that has contributed to the current global burden of high blood pressure.

Over many years of delivering lectures at hypertension meetings and clinical update events, I have increasingly questioned whether traditional educational models truly lead to sustained changes in clinical practice. It's time for a new approach. Physicians and healthcare workers need more than just knowledge - they must develop the skills to translate that knowledge into practice and be the agents of change. These are skills honed by those in marketing and communication. Those responsible for blood pressure control need to learn these skills to sell their product (blood pressure control) to health care providers, physicians, allied healthcare workers and patients. To have a sustainable global impact, our message must reach people living with high blood pressure in a way that is understandable, relevant and motivates them to take action.

With these challenges in mind, we developed the Emerging Hypertension Leaders Summer School, an initiative funded by the Foundation for Circulatory Health and designed to complement existing scientific and medical education by explicitly combining clinical knowledge with communication and leadership skills. The inaugural Summer School was held in Cambridge, UK in September 2025 under the direction of the Foundation for Circulatory Health and the British and Irish Hypertension Society (co-directors Peter Sever and Ian Wilkinson) and brought together 33 mid-career physicians from the UK and Asia. The three-day residential programme combined expert-led teaching on hypertension management with interactive sessions on communication skills

and engagement. What struck me most was not simply the enthusiasm of the participants, but their willingness to challenge their own assumptions about how hypertension care is delivered and to propose new, locally relevant practical solutions.

Early outcomes from our Summer School delegates have been encouraging. Several delegates have since initiated local education programmes, delivered award-winning presentations at national meetings, and engaged in an ongoing mentorship programme fostered through an online international community of practice. These experiences reinforce our belief that focused, immersive education, coupled with sustained peer and faculty support, can act as a catalyst for meaningful change. Our ambition is that these clinicians will continue to work together and support each other to become the next generation of hypertension leaders.

Building on this inaugural event, the 2026 Emerging Hypertension Leaders Summer School will take place from 3–5 August 2026 at Trinity Hall, Cambridge, UK. We have expanded the programme to 40 fully funded places and warmly welcome applications from international delegates. The teaching faculty has expanded to include colleagues with direct experience of delivering hypertension care in low- and middle-income settings, reflecting our commitment to foster international collaboration and shared learning.

Looking ahead our vision is to co-host future Summer Schools with national and regional hypertension societies, and we welcome expressions of interest from potential partners.

Hypertension remains the leading modifiable risk factor for premature morbidity and mortality globally. Closing the gap between what we know and what we do will require not only scientific innovation, but also sustained investment in people, valuing and supporting clinicians and nurturing the hypertension leaders of the future. We hope that initiatives such as the Emerging Hypertension Leaders Summer School can contribute, in a small but meaningful way, to our collective global effort to create sustainable improvements in hypertension care worldwide.

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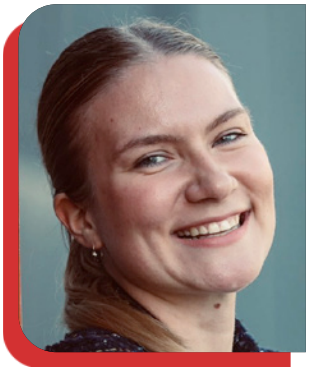
ISH COMMITTEE, PARTNER AND AFFILIATED SOCIETY REPORTS

Health on the islands - hunting the silent killer – summer public health action of the Croatian Hypertension League




MARTA BOLJEŠIĆ DUMANČIĆ,[1,2] KATARINA GRGURIĆ,[1,3] BRUNA MANDARIĆ,[1,4] HELENA POLANŠČAK,[1,4]

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The "Hunting the Silent Killer" initiative, organized by the Croatian League for Hypertension, is a public health campaign aimed at the early detection of elevated blood pressure (BP), i.e. hypertension and the identification of risk factors for cardio-kidney-neuro-metabolic diseases under the patronage of the Croatian Academy of Scientists and Art. The main objectives of the campaign are to raise public awareness of the importance of prevention, provide free and voluntary health screenings and examinations, and educate the population on healthy lifestyle habits that can reduce the risk of chronic non-communicable diseases. Through direct contact with citizens, the campaign seeks to promote individual responsibility for personal health, encourage regular BP monitoring, and foster the timely management of arterial hypertension and related risk factors. In the long term, the campaign aims to reduce the prevalence of hypertension in the population, improve the management of treated hypertensive patients, and strengthen a culture of preventive care within the community.

Hypertension in Croatia

Arterial hypertension represents a major public health issue in the Republic of Croatia. According to the EH-UH-1 study conducted in 2005, the prevalence of hypertension in the adult population was 37%, while preliminary data from the EH-UH-2 study in 2020 indicate an increase to over 50%.[1,2] Alarmingly, nearly 50% of affected individuals are unaware of their condition, and a significant proportion of diagnosed patients neither receive appropriate pharmacological treatment nor modify their lifestyle.[3] According to data from the Croatian Bureau of Statistics and the Croatian Institute of Public Health, hypertensive diseases were the second leading cause of death in the overall population in 2023 and the leading cause of death among women.[4] These data underscore the appropriateness of the campaign's name, as arterial hypertension, often asymptomatic, represents the true "silent killer No. 1," ultimately leading to severe complications and mortality.

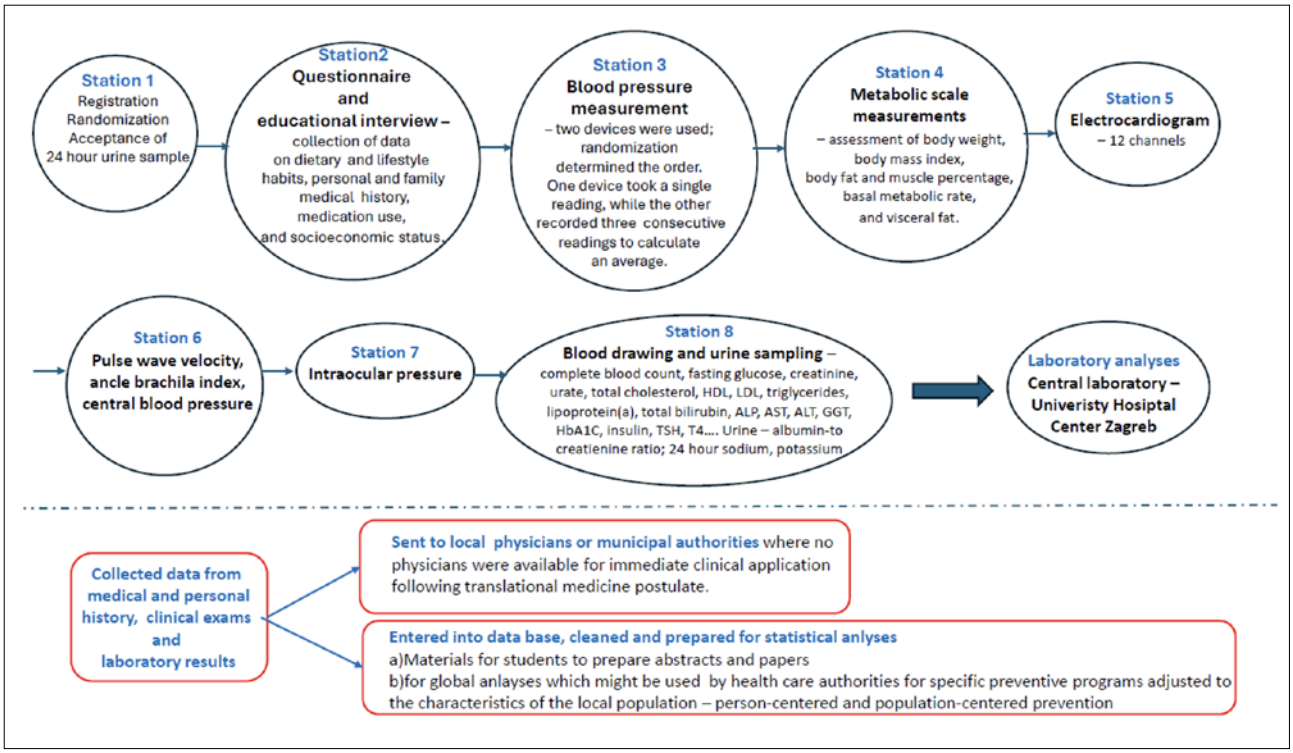

Figure 1. Flow-chart of the action Health on island – Hunting the Silent Killer

About the Campaign

The "Hunting the Silent Killer" campaign has been conducted in Croatia since 2019, with the special sub-initiative "Health on the Islands" implemented this year on Dugi Otok from August 25th to 29th. This part of the "Hunting the Silent Killer" campaign targets islands due to limited or insufficient access to healthcare.

Volunteers from the Croatian League for Hypertension symbolically "fought against demons" – risk factors contributing to the development of hypertension and other cardio-kidney-neuro-metabolic diseases. The most important seven demons included: the salt demon (excessive salt intake), the obesity demon, the physical inactivity demon, the smoking demon, the insufficient fruit and vegetable intake demon, the improper BP measurement demon, and the non-adherence and poor compliance demon.

Participants and Organization

The Dugi Otok campaign included 25 volunteers: 20 medical students from Croatian universities, one young doctor, one nurse, and three members from organizing team. The campaign provided significant educational value for students, who developed practical skills in patient communication, BP measurement, ECG recording, metabolic analysis, pulse wave velocity (PWV) assessment, intraocular pressure measurement, and teamwork. For many, this was their first direct contact with individuals, outside healthcare institutions, an experience crucial for their professional development.

Students also participated in the research part of the campaign, which functioned as an opportunistic screening. Simultaneously, the campaign had a strong educational component for citizens, who received advice on healthy lifestyle habits, informational leaflets, and opportunities for individual counseling on the prevention of cardio-kidney-neuro-metabolic diseases.

Methodology

During the five-day campaign, nearly 300 voluntary citizens were examined. This represented nearly half of the initially intended amount, as the island experienced a significant number of COVID-19 cases during that period. Each participant passed through eight working stations that enabled a comprehensive assessment of cardio-kidney-metabolic health. (**Figure 1**)

Blood and urine samples were properly centrifuged, stored and transported to the central laboratory at the University Hospital Centre Zagreb to ensure comparability with data from other actions of the "Hunting the Silent Killer" campaign. Results were subsequently delivered to local physicians (or municipal authorities where no physicians were available) for immediate clinical application following translational medicine postulate.

Feedback

Residents expressed great satisfaction and gratitude for the free screenings, emphasizing the desire for the campaign to be repeated annually. They especially appreciated the presence of volunteers on their island, which provided access to preventive health services and the opportunity to discuss personal health. The high level of professionalism and organization of the entire team was also praised.

Students reported significant satisfaction as well, noting that the campaign enabled them to develop practical skills and confidence in patient interactions, while fostering a sense of social responsibility and teamwork.

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Conclusion

The positive feedback received confirms the success and educational value of the project for both citizens and students. The "Hunting the Silent Killer" campaign with this mobile examination team represents a model for a successful public health program led by the Croatian League for Hypertension, combining prevention, education, and multidisciplinary collaboration. Its long-term goal is to boost health literacy, lower hypertension and related disease risks, and make healthcare more efficient and cost-effective.

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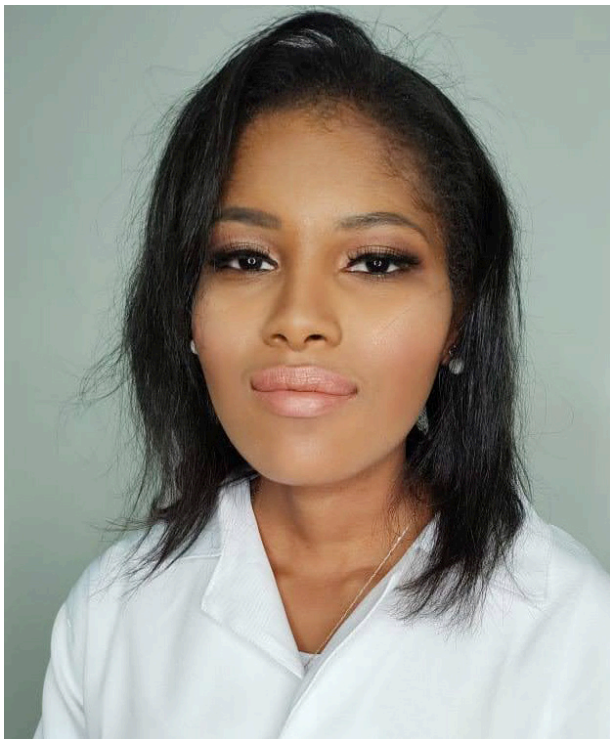
ISH COMMITTEE, PARTNER AND AFFILIATED SOCIETY REPORTS

COLLABORATION EXCHANGE SCHOLARSHIP REPORT

"The exchange profoundly influenced how I envision my future career"

ISH member Caroline Cristina Pinto Souza (Brazil) was one of two early career investigators to be awarded an ISH Collaboration Exchange Scholarship in 2025. The scholarships, each worth USD 5,000, were awarded to support the development of international partnerships which began at the 2024 ISH Scientific Meeting. For the scholarship, Caroline, based at the Institute of Biosciences, Botucatu, at Sao Paulo State University, was hosted by Ana Palei, based at the University of Mississippi Medical Center (UMMC) in Mississippi, USA. Here, Caroline and Ana share their reflections on the experience.



Caroline Cristina Pinto Souza

Throughout the final stages of my doctoral studies in the Post-Graduation Program in Biotechnology at the Institute of Biosciences, State University of Sao Paulo (UNESP), supported by the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) under grant 2022-07605-4, I undertook a research exchange through the ISH scholarship at the University of Mississippi Medical Center (UMMC) in Jackson, Mississippi, United States.

From 1st August 2025 to 29th January 2026, I joined a multidisciplinary team led by Dr. Ana Palei, Associate Professor in the Department of Surgery, School of Medicine. Under her supervision, I focused on mechanisms of cardiovascular adaptations during pregnancy, particularly in relation to the RUPP (Reduced Uterine-Placental Perfusion Pressure) rat model, widely used to investigate preeclampsia.

Living and working in a new country for an extended period was both challenging and rewarding, becoming a transformative personal and professional experience. I had the opportunity to speak English in diverse settings, interacting with various accents and expressions, which enabled me to improve my fluency. Attending scientific meetings and being in multicultural environments also allowed me to practice my Spanish and French.

During this collaboration, I completed both online and in-person training and received certification from the UMMC's Institutional Animal Care and Use Committee (IACUC). I participated in a tour through the facilities of the Center for Comparative

Research (CCR), gaining deeper insight into how institutional protocols and ethical standards are applied. Observing the infrastructure behind intellectual work—the review of procedures and monitoring of animal welfare—enabled me to appreciate the precision, coordination, and responsibility required in translational research.

A major part of my work involved hands-on experimentation with animals. I assisted with tissue dissection, specimen weighing, blood centrifugation, sample sorting and labeling, and sterilization of surgical instruments. Involvement in these activities strengthened my technical skills. Likewise, I presented internal results, analysing morphological and hemodynamic variables, and contributed to discussions on the next steps in the project.

A key turning point was learning to analyze echocardiograms acquired with the VevoLab system, which elevated my comprehension of cardiac functional and structural assessments and broadened my competencies.

Additionally, we collaborated with Dr. David Stec's research team on kinomics analyses using Protein Tyrosine Kinase platforms and high-throughput gene chips to assess kinase activity and phosphorylation patterns in the heart and placental tissue from Sham pregnant and RUPP rat. This experience expanded my knowledge of molecular signaling pathways and introduced me to new evaluation of proteomics strategies.

Over the 6-month period, I participated in several scientific events, including the International Society for the Study of Hypertension in Pregnancy (ISSHP) Congress in Chicago (September 21-24) and the American Physiological Society Conference on "New Trends in Sex Differences and Women's Health Research" in New Orleans (October 23-25). At these events, I engaged with international investigators and presented data from my PhD study. Besides, I participated in seminars, including an online Preeclampsia series and Physiology sessions, as well as weekly laboratory discussions on experimental results and project management.

This exchange profoundly influenced how I envision my future career. It solidified my passion for public speaking and translating complex concepts into more accessible language. It also sparked new ideas and boosted my enthusiasm for organizing events. I love discovering others' journeys and fostering growth in those around me. Science is a double-edged sword—constantly learning and teaching.

Looking ahead, we are working toward joint publications based on the data collected during my stay, with plans to continue our collaboration on kinomics analyses and preclinical studies. This experience has provided me with an international network of mentors and colleagues, which will undoubtedly shape my scientific path for years to come.

Ana Palei

Caroline is a PhD student under the mentorship of Dr. Valeria Sandrim. Dr. Sandrim and I used to work in the same laboratory in Brazil while pursuing our doctorate degrees in Pharmacology at the Ribeirao Preto Medical School (FMRP), University of Sao Paulo (USP). Since then, we have been collaborating in translational studies investigating pathophysiological mechanisms of preeclampsia. In 2024, I had the chance to meet and discuss Caroline's doctorate project on proteomics in preeclampsia during the ISH Congress in Cartagena, Colombia. Soon after

that, we developed a collaborative research project focused on proteomics in rat models of preeclampsia, which was selected for funding by the ISH Collaboration Exchange Scholarship.

Caroline spent 6 months in my laboratory collecting tissues and data from sham pregnant (control) and RUPP rats to then determine protein tyrosine kinase activity and phosphorylation patterns of peptides in the heart and placenta using the PamGene platform. We have selected these tissues because placental ischemia is an initiating event in the pathophysiology of preeclampsia. Moreover, preeclampsia is a significant risk factor for the development of cardiomyopathy during pregnancy as well heart failure and cardiovascular disease-related death postpartum. Thus, knowing which proteins are activated or inactivated in targeted organs may help us to elucidate the mechanisms underlying cardiac and placental dysfunction associated with preeclampsia. Proteins identified by our study could serve as biomarkers for diagnosis, treatment, and prevention in preeclampsia.

Overall, I believe Caroline has benefited from this exchange program by engaging in innovative research and undergoing a well-rounded training in animal modelling of diseases and integrative cardiovascular physiology. She has improved her technical and communication skills, in addition to expanding her professional network. We plan to submit results stemming from this collaborative project for presentation at a scientific meeting and publication in an international peer-reviewed journal.

We are deeply thankful to the ISH for this opportunity!

ISH COMMITTEE, PARTNER AND AFFILIATED SOCIETY REPORTS

ISH webinar report: Paths to scientific independence: how successful researchers found their niche

A REPORT FROM THE ISH CAPACITY BUILDING NETWORK

Article first published on the ISH website

A recent ISH webinar brought together three leading researchers in hypertension - Muscha Steckelings (Denmark/Germany), Dinesh Neupane (USA/Nepal), and Nguelefack-Mbuyo Pami Elvine (Cameroon) - to explore how each of them found their scientific niche.

The transition to an independent scientific career – securing funding, defining a novel research identity, and moving beyond one's mentor's work – represents a critical challenge for early- and mid-career researchers. While developing a sustainable and fundable niche is essential, the path to achieving this often seems unclear.

In excerpts from the webinar, Muscha, Dinesh, and Elvine share practical advice for early- and mid-career researchers on how to identify and shape a research niche.

The webinar, organised by the ISH Capacity Building Network (CBN), was moderated by Debora Colombari (Brazil) and Chloe Landry (Canada) - both pictured below. ISH members can watch the full webinar on demand in the ISH Members' Area.

Débora Colombari

Chloé Landry

Muscha Steckelings

"Watch for what is missing or unexplored in your field. There is often novelty in those gaps. Sometimes you can find a niche by merging together two areas that don't usually sit together – that's often where something truly new emerges.

In my case, this meant for example bringing together skin biology and hypertension –two areas that did not initially seem connected, but which we now understand influence each other.

You also need to find something you enjoy deeply, because building a niche takes time and persistence."

Muscha Steckelings is Professor of Pharmacology in the Department of Molecular Medicine, Cardiovascular & Renal Research Unit at the University of Southern Denmark in Odense, Denmark. She is a member of the ĪSH Council and Coordinator of the ĪSH Regional Advisory Groups.

Dinesh Neupane

"Never give up – your niche is not something you discover overnight. It's something you build step by step. And love what you do, because if you don't, it becomes very hard to grow a meaningful scientific identity. Your niche should come from what excites you, not just what looks fashionable at any given moment.

"Your niche is not only your topic. It's also your people. I see my own niche partly as bringing people together and making interdisciplinary collaboration happen. So build your network and soft skills, because they shape your opportunities as much as your science."

Dinesh Neupane is an Associate Scientist at the Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, USA. His research focuses on the prevention and control of noncommunicable diseases in low- and middle-income countries, with particular emphasis on implementation research and community- based interventions. He is a Fellow of the Ĩnternational Society of Hypertension.

Nguelefack-Mbuyo Pami Elvine

"Listen to advice, and don't be too bold too early – take time to understand where you can realistically position yourself. A strong niche sits at the intersection of what you like, what you are good at, and what the field needs.

"This means working on projects that are fundable and on topics that can attract support.

Join a society like ISH to network, bounce ideas around, and learn from others – that's how you refine and sharpen your niche."

Nguelefack-Mbuyo Pami Elvine is Associate Professor of Physiology and Pharmacology at the University of Dschang, Cameroon, where she leads a research team on cardiovascular and metabolic diseases. She is a member of the ĪSH Africa Regional Advisory Group.

ISH members can watch replays of ISH webinars via the Members Area of the ISH website.

ISH COMMITTEE, PARTNER AND AFFILIATED SOCIETY REPORTS

ISH webinar report: Getting the most out of mentorship

A REPORT FROM THE ISH CAPACITY BUILDING NETWORK

A webinar organised by the ISH Capacity Building Network (CBN) provided early and mid-career researchers with practical strategies for getting the most out of mentorship.

The webinar covered:

- effective techniques for identifying suitable mentors
- making contact with mentors
- some of the complexities around power dynamics
- and ensuring productive mentor-mentee relationships over time.

The speakers were Rahul Chanchlani (Canada), Ana Jelaković (Croatia), and Kehinde Samuel Olaniyi (Nigeria).

Lebo Gafane-Matemane

Kaylee Slater

The session was chaired by Lebo Gafane-Matemane (South Africa), Associate Professor of Physiology at North-West University and Chair of the ISH Mentorship and Training Committee (MTC), and Kaylee Slater (Australia), an early-career researcher focused on sex-specific cardiovascular disease prevention, primary care and health services research. Kaylee is a member of the ISH CBN and MTC.

Ana Jelaković

"When we talk about mentorship, we should move beyond the idea of a single senior person giving occasional advice. Mentorship works best when it is intentional, structured, and built on mutual understanding. It starts with listening carefully to the mentee. Only then can we offer guidance that is meaningful.

"Good mentorship is not about telling someone exactly what to do. It is about helping them learn how to think, how to prioritise, and how to make informed decisions for themselves. It is also about being honest: about the challenges of an academic career, about setbacks, and about the reality that progress is often slow and non-linear.

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"Capacity building is a long-term commitment. We are not just training people to complete a project or obtain a degree - we are helping to develop independent researchers and clinicians who will in turn become mentors to other

"When mentorship is done well, it becomes a partnership. Both the mentor and the mentee learn from each other, and grow."

Ana Jelaković (Croatia) is a nephrologist and hypertensiologist at University Hospital Centre, Zagreb, Croatia, assistant professor in University of Rijeka, Croatia, at Dept. of epidemiology and public health. She is an active member of the Croatian Hypertension League, seeking ways to combine clinical work and public health advocacy.

Rahul Chanchlani

"One of the most important messages I want to share is not to underestimate the power of relationships. Many of the opportunities I have had - whether collaborations, training positions, or research projects - started with a simple conversation or a chance meeting.

"Networking means being curious, asking thoughtful questions, and showing genuine interest in the work of other people. Over time, those small interactions can turn into meaningful professional relationships.

"When choosing mentors, look for people who will challenge you. You do not only need mentors who agree with you or who make you feel comfortable all the time. You need mentors who will push you to think critically, and to step outside your comfort zone.

"A research career is full of uncertainty and rejection, and having mentors and peers who can provide perspective and encouragement makes a huge difference. You do not have to navigate this journey alone, and organisations like ISH offer a platform where these connections can happen."

Rahul Chanchlani (Canada) is a pediatric nephrologist, clinician-researcher, and epidemiologist at McMaster University, where he is an Associate Professor of Pediatrics and staff nephrologist at McMaster Children"s Hospital.

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Kehinde Samuel Olaniyi

"In many parts of the world, young researchers face enormous barriers - not only limited funding, but also limited access to experienced mentors who can guide them through the complexities of research and career development. That is why mentorship and capacity building are so critical.

"Access to guidance can be just as important as access to financial resources. A supportive mentor can help a young scientist avoid common pitfalls, refine their ideas, and build confidence in their abilities.

"We also need to be intentional about creating environments where early-career scientists feel safe: safe to ask questions, safe to admit what they do not know, and safe to make mistakes. This psychological safety is essential for learning and growth.

When we invest in people in this way, we are not only strengthening individual careers - we are strengthening institutions and health systems. Ultimately, this is how we build a stronger, more equitable global research community."

Kehinde Samuel Olaniyi (Nigeria) is an Assistant Professor from Afe Babalola University (Nigeria), specialising in cardiovascular physiology. His research focuses on the pathophysiology of metabolic diseases, including diabetes, obesity, and polycystic ovarian syndrome.

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