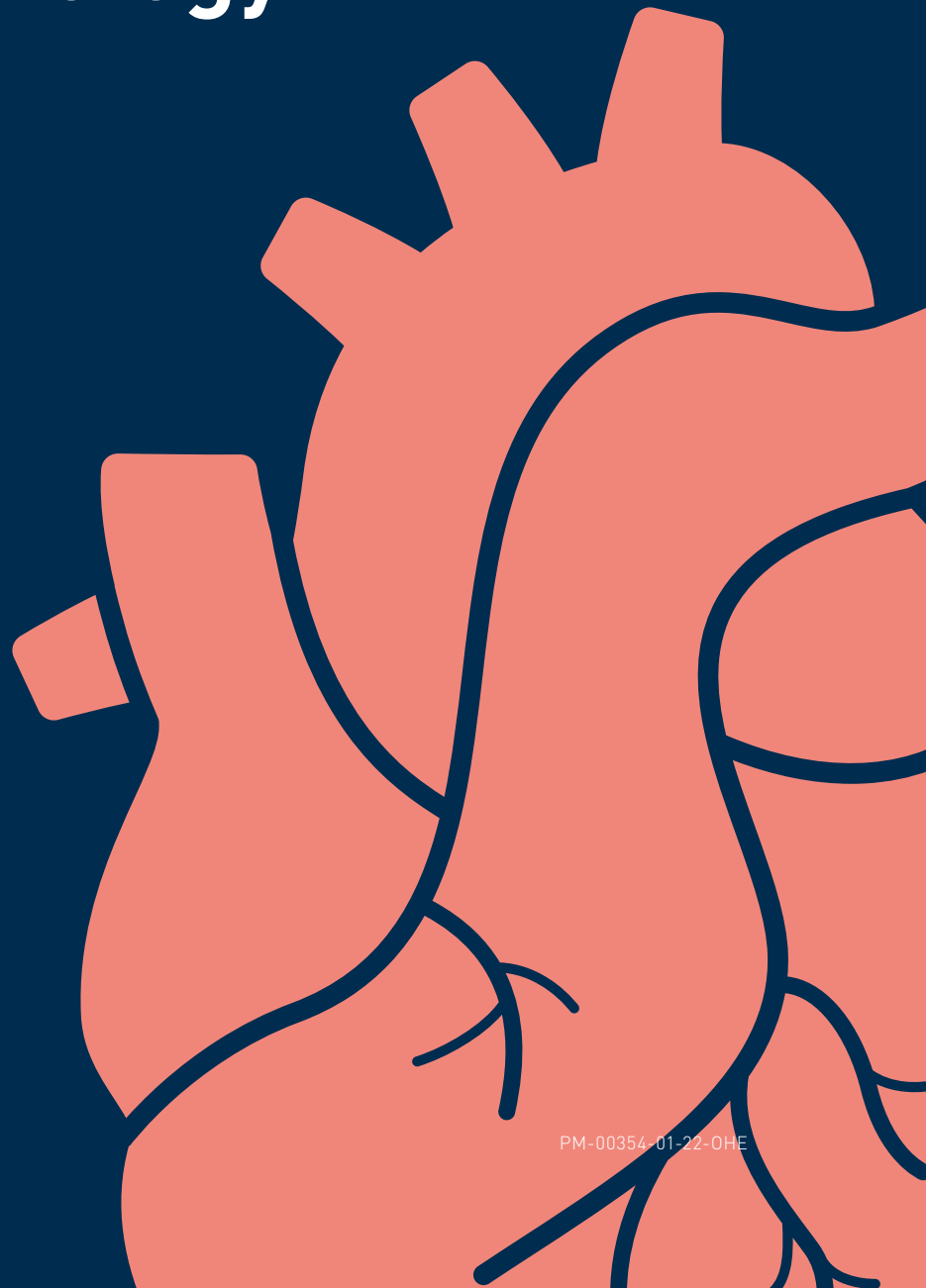


Highlights of clinical research and literature in the field of **Cardiology**

2022





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Committed to helping people live a freer and more fulfilling life with zero compromise, OMRON Healthcare is a global leader in the field of clinically proven, innovative medical equipment for health monitoring and therapy.

We offer products that have clinically validated accuracy based on the validation results by the official medical protocols.

For many decades, OMRON's devices have helped people to prevent, treat and manage their medical conditions both at home and in clinical practice in over 110 countries in the world.

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This booklet will share OMRON's acquired knowledge and expertise by providing an overview of the most relevant topics and existing scientific literature in the field of cardiology. Each chapter ends with a short summary with the main takeaways. This booklet is designed to bundle key information, in a clear and concise manner, and make it available for your daily practices.



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Blood Pressure

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01/1 Hypertension

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. It is a major cause of premature death worldwide, with 1 in 4 men and 1 in 5 women – over a billion people – having the condition. The number of adults aged 30–79 years with hypertension has increased from 650 million to 1.28 billion in the last thirty years of which nearly half did not know they had hypertension. Hypertension significantly increases the risk of heart, brain, and kidney diseases, and is one of the top causes of death and disease throughout the world as addressed in the cardiorenal continuum. It can be easily detected through measuring blood pressure, at home or in a health centre, and can often be treated effectively with medications that are low cost.¹

2018 ESC/ESH Guidelines for the management of arterial hypertension²

Several proven, highly effective, and well-tolerated lifestyle and drug treatment strategies can achieve reduction in Blood Pressure (BP). Despite this, BP control rates remain poor worldwide and are far from satisfactory across Europe. Consequently, hypertension remains the major preventable cause of cardiovascular disease (CVD) and all-cause death globally. These guidelines summarize and evaluate available evidence with the aim of assisting health professionals in selecting the best strategy.

Secondary hypertension³

Secondary hypertension is elevated blood pressure (BP), which is secondary to an identifiable cause. Since its prevalence is relatively low, performing routine evaluations in every case of hypertension is not cost-effective and is also time-consuming. This paper summarizes the various causes of secondary hypertension, various treatments, and management options. Furthermore, available evidence about the best management strategies for an individual patient with a given condition will be covered, to help health care professionals to implement the right management strategy.

Cardiorenal Continuum⁴

Cardiovascular events rarely occur in patients without underlying disease; rather, they typically take place at the final stage of a pathophysiological process that results in progressive vascular damage, including vital organ damage—specifically, the kidney and the heart. Renal and cardiovascular diseases share the same enteropathogenic risk factors. If these factors are controlled, then atherosclerotic process evolution and further target-organ damage or cardiovascular events can be prevented.

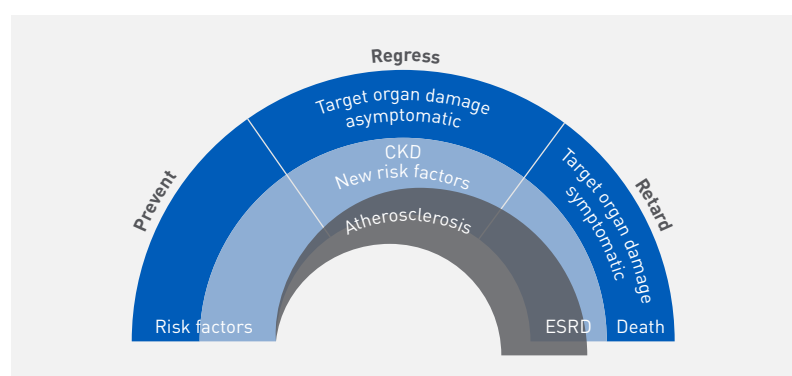


Figure 1: Graphic representation of the cardiorenal continuum.

01/2 Nocturnal blood pressure

Nocturnal hypertension is the most prevalent phenotype of masked hypertension and more than one-third of the individuals with nocturnal hypertension had normal ABPM during daytime activities, namely Isolated Nocturnal Hypertension⁵



1 in 4 people
with controlled daytime blood pressure
has nocturnal hypertension



Night View

Measuring Blood pressure
Night and Day

A comprehensive view of home nighttime and daytime blood pressure for improved treatment decisions

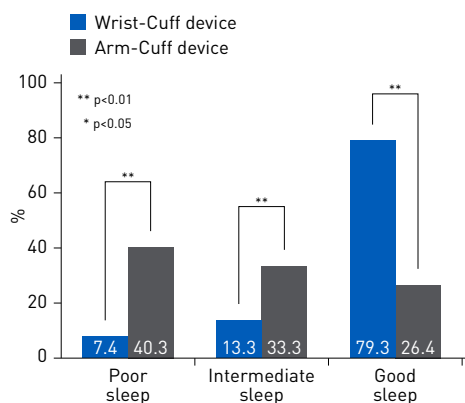


Figure 3: Comparison of the quality of sleep during nocturnal blood pressure monitoring between wrist-cuff and arm-cuff system *p<0.05; **P<0.016⁹

Prevalence of isolated nocturnal hypertension according to 2018 European Society of Cardiology and European Society of Hypertension office blood pressure categories⁶

Isolated nocturnal hypertension is a specific subtype of nocturnal hypertension which is characterized by elevated blood pressure at night with normal daytime blood pressure. Individuals with isolated nocturnal hypertension may experience more arterial stiffness, cardiac damage, and a higher risk of cardiovascular events and death. A recent study also showed that this condition could be an early manifestation of hypertensive disease. This paper studies the prevalence of isolated nocturnal hypertension and its relationship with office blood pressure categories defined by 2018 European Society of Cardiology and European Society of Hypertension (ESC/ESH) guidelines.

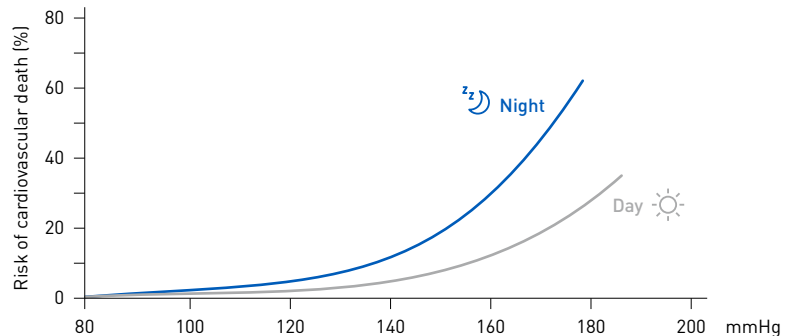


Figure 2: Nighttime blood pressure values and non-dipping patterns are stronger predictors of cardiovascular outcomes than daytime values⁷

Isolated Nocturnal Hypertension: What Do We Know and What Can We Do?⁷

Blood pressure monitoring and studies have increased the awareness of nocturnal hypertension and its influence on target organ damage. Nocturnal hypertension is associated with an inadequate drop or even an increase in blood pressure at night compared to daytime blood pressure. Investigations have concluded that inadequate drop or reverse dipping is a predictor of cardiovascular events independently of circadian blood pressure patterns. This paper discusses the mechanisms, diagnosis, and treatment of nocturnal hypertension and why the timing of drug administration plays a crucial role in reducing nighttime blood pressure.

The Role of Nocturnal Blood Pressure and Sleep Quality in Hypertension Management⁸

Hypertension and the prevention of its associated cardiovascular risks can be managed by an accurate measurement, prediction, and treatment of high blood pressure during the day. However, nocturnal blood pressure can still increase the risk of fatal and non-fatal cardiovascular events. Nighttime blood pressure is usually evaluated with an ambulatory blood pressure monitoring device, however, the availability is low and it can cause sleep disturbances. Home blood pressure monitoring can be an alternative and is more preferred by patients. The NightView is a new validated blood pressure device which offers the possibility to measure daytime and nighttime blood pressure with minimal sleep disturbance.

Development and evaluation of a home nocturnal blood pressure monitoring system using a wrist-cuff device⁹

The conventional nocturnal blood pressure monitoring (NBPM) systems can disturb sleep and lead to false measurements. The present study compared the validity and acceptability of a newly developed wrist-cuff system with that of the conventional upper arm-cuff system for NBPM. Compared with the arm-cuff system, the wrist-cuff system had significantly lower systolic BP. Furthermore, sleep disturbance during NBPM was reported in less than 20% with the wrist-cuff system and in 70% with the arm-cuff system. A significantly higher rate of participants who wore the wrist-cuff system reported that they were not bothered by various stimuli, such as noise, during NBPM.

Main takeaways

Blood pressure

- Hypertension significantly increases the risk of heart, brain, and kidney diseases, and is one of the top causes of death and disease throughout the world.¹
- Nocturnal hypertension is the most prevalent phenotype of masked hypertension.⁵
- Nocturnal hypertension is a better predictor for cardiovascular events.⁶
- The management of hypertension should direct towards controlling blood pressure for 24 hours, including nocturnal and morning periods.⁹
- The golden standard to measure nocturnal blood pressure is ABPM, but the use of connected home blood pressure monitors could prove to be more feasible for the assessment of nocturnal blood pressure.⁸

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Blood Pressure Monitoring

High blood pressure comes with high risks. However, it often goes undetected until it's too late. Blood pressure monitoring can help with diagnosing and treating this condition. Blood pressure is measured in units of millimetres of mercury (mmHg). The readings are always given in pairs, with the upper (systolic) value first, followed by the lower (diastolic) value. Different methods of blood pressure monitoring include clinical blood pressure monitoring, ambulatory blood pressure monitoring, and self-monitoring.¹

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02/1 Office blood pressure monitoring

Auscultatory or oscillometer semiautomatic or automatic sphygmomanometers are the preferred method for measuring BP in the doctor's office. With inadequate attention to the standardized conditions recommended for the valid measurement of office BP, it can be performed improperly. Improper measurement of office BP can lead to inaccurate classification, overestimation of a patient's true BP, and unnecessary treatment.²



HBP-1120 / HBP-1320

Professional upper arm blood pressure monitor

Designed for use in a professional setting, including fully automatic oscillometer and manual auscultation mode.

Clinically proven to produce fast and reliable results, all day every day.

Category	SBP (mmHg)		DBP (mmHg)
Office BP ^a	≥140	and/or	≥90
Ambulatory BP			
Daytime (or awake) mean	≥135	and/or	≥85
Nighttime (or asleep) mean	≥120	and/or	≥70
24h mean	≥130	and/or	≥80
Home BP mean	≥135	and/or	≥85

Figure 4: Definitions of hypertension according to office, ambulatory, and home blood pressure levels Category²

Masked Hypertension³

The addition of ambulatory blood pressure monitoring to conventional clinic measurement for defining blood pressure status in clinical practice has added a new complexity to the process. The separation of normotension and hypertension can be assessed independently by each of the two methods. We thus have four potential groups of patients who are, first, normotensive by both methods (true normotensives); second, hypertensive by both (true, or sustained, hypertensives); third, hypertensive by clinic measurement and normotensive by ambulatory measurement (white-coat hypertensives); and fourth, normotensive by clinic measurement and hypertensive by ambulatory measurement (masked hypertension). In this paper the importance of this fourth group will be addressed.

Masked hypertension: a systematic review⁴

The purpose of this research was to review the literature on masked hypertension. The prevalence of masked hypertension seems to lie between 8 and 20% and can be up to 50% in treated hypertensive patients. Subjects with masked hypertension have a higher risk of cardiovascular events than normotensive subjects. This is due to a possible failure to recognize and appropriately manage this form of hypertension, the frequent association with other risk factors and coexisting target organ damage.

White-Coat Hypertension – New Insights from Recent Studies⁵

White-coat hypertension indicates individuals who are not on treatment for hypertension but who had elevated office blood pressure and normal daytime blood pressure measured with ambulatory blood pressure monitoring (ABPM). Clearly, these individuals would be at low cardiovascular risk. The purpose of this review is to provide new insights into the characteristics, definitions, and cardiovascular risk assessment in persons with white-coat hypertension, and it will be limited primarily to ABPM with a primary focus on prospective studies.

	Office BP HIGH	Office BP NORMAL
Out Of Office BP HIGH	Sustained Hypertension	Masked Hypertension
Out Of Office BP NORMAL	White-coat Hypertension	Normal Blood Pressure

Figure 5: What is missed at the doctor’s office?²

02/2 Ambulatory blood pressure monitoring

The ambulatory blood pressure is ideally measured every 15-30 minutes. Ambulatory monitoring is usually carried out over a 24-hour period. Day and night, awake and asleep, are either defined as clock times or by the time individuals say they sleep. Ambulatory blood pressure monitoring is still the golden standard for diagnosing hypertension and predicting hypertension-mediated organ damage. However, it is becoming less popular with patients to carry a device around for 24 hours. ABPM leads to decreased sleep quality during the night which can cause misleading readings. 24-hour measurement has been consistently shown to have a closer relationship with morbid or fatal events.^{2,13}

European Society of Hypertension practice guidelines for ambulatory blood pressure monitoring (ABPM)⁶

The article represents an updated schematic summary of the most important aspects related to the use of ABPM in daily practice, and is aimed at providing recommendations for proper use of this technique in a clinical setting by both specialists and practicing physicians. The clinical indications for ABPM suggested by the available studies, among with white-coat phenomena, masked hypertension, and nocturnal hypertension are outlined in detail. Furthermore, the place of home measurement of blood pressure in relation to ABPM is discussed.

Ambulatory blood pressure monitoring⁷

Any clinical measurement of blood pressure may be regarded as a surrogate measure for the “true” blood pressure of the patient, which may be defined as the mean level over prolonged periods. Two techniques have been developed to improve the estimate of true blood pressure — ambulatory monitoring and home monitoring (or self-monitoring). This article will focus on the implications of ambulatory monitoring.

02/3 Self-monitoring and Remote management

Self-monitoring or home blood pressure monitoring can provide a larger number of blood pressure measurements than conventional office measurements in conditions that are more representative of daily life. Available studies have further indicated that home measurements better predict cardiovascular morbidity and mortality than office blood pressure measurements.²

Call to Action on Use and Reimbursement for Home Blood Pressure Monitoring⁸

Home blood pressure monitoring (HBPM) overcomes many of the limitations of traditional office blood pressure (BP) measurement and is both cheaper and easier to perform than ambulatory BP monitoring. This call-to-action article makes several recommendations, including: HBPM should become a routine component of BP measurement in the majority of patients with known or suspected hypertension; Two to three readings should be taken while the subject is resting in the seated position, both in the morning and at night, over a period of one week. Read more about these interesting insights.



M7 Intelli IT

Fast and easy accurate measurements

A clinically validated blood pressure monitor that simplifies monitoring your hypertension at home and automatically transfers your results to your smartphone by Bluetooth.

Home and Online Management and Evaluation of Blood Pressure (HOME BP) using a digital intervention in poorly controlled hypertension: randomised controlled trial⁹

This trial aimed to test a digital intervention for hypertension management in primary care by combining self-monitoring of blood pressure with guided self-management. The primary outcome was the difference in systolic blood pressure after one year. The study concludes that using self-monitored blood pressure led to better control of systolic blood pressure after one year than usual care, with low incremental costs.

Impact of Changes to National Hypertension Guidelines on Hypertension Management and Outcomes in the United Kingdom¹⁰

In recent years, national and international guidelines have recommended the use of out-of-office blood pressure monitoring for diagnosing hypertension. Despite evidence of cost-effectiveness, critics expressed concerns this would increase cardiovascular morbidity. This article is assessing the impact of these changes on the incidence of hypertension, out-of-office monitoring and cardiovascular morbidity. They used routine clinical data from UK general practices, linked to inpatient hospital, mortality and socio-economic status data. The changes to hypertension guidelines in 2011 were associated with a stabilisation in incidence and no increase in cardiovascular events. Guidelines should continue to recommend out-of-office monitoring for diagnosis of hypertension.

Effect of Self-monitoring and Medication Self-titration on Systolic Blood Pressure in Hypertensive Patients at High Risk of Cardiovascular Disease: The TASMIN-SR Randomized Clinical Trial¹¹

This study establishes the effect of self-monitoring with self-titration of antihypertensive medication compared with usual care on systolic blood pressure among patients with cardiovascular disease, diabetes, or chronic kidney disease. The study concluded that indeed among patients with hypertension at high risk of cardiovascular disease, self-monitoring with self-titration of antihypertensive medication compared with usual care resulted in lower systolic blood pressure at 12 months.

Performance and persistence of a blood pressure self-management intervention: telemonitoring and self-management in hypertension (TASMINH2) trial¹²

This study aimed to evaluate, in detail, the implementation of the self-management intervention used in the TASMINH2 trial. The intervention, comprising self-monitoring for the first week of each month and an individualised treatment self-titration schedule, was developed from a previous trial of self-management. Although adherence to the intervention reduced over time, implementation of treatment recommendations appeared better than equivalent trials using physician titration. Future self-management interventions should aim to better support patients' decision making, perhaps through enhanced use of technology.

Cost-Effectiveness of Telemonitoring and Self-Monitoring of Blood Pressure for Antihypertensive Titration in Primary Care (TASMINH4)¹³

The use of self-monitoring of blood pressure (with or without telemonitoring) has been recently demonstrated to reduce blood pressure compared to using clinic monitoring (current practice). This study assessed the cost-effectiveness of physician titration of antihypertensive medication using self-monitored blood pressure, with or without telemonitoring, to make hypertension treatment decisions in primary care compared with usual care. A Markov patient-level simulation model was developed taking a UK Health Service/Personal Social Services perspective. Concluding that self-monitoring in clinical practice is cost-effective and likely to lead to reduced cardiovascular mortality and morbidity.

OMRON's Hypertension Plus

Supports clinicians to manage hypertensive populations more effectively.

Hypertension Plus includes unique clinical decision support tools based on NICE Guidelines and know-how from the TASMINH clinical trials. Guiding clinicians on when to act, and to provide a remote patient monitoring solution.

<https://www.omron-healthcare.co.uk/rpm.html>



02/4 Blood pressure monitoring during pregnancy

Physiological changes during pregnancy lead to difficulties in obtaining accurate blood pressure readings. An understanding of these changes helps to diagnose and treat hypertensive disorders such as gestational, white-coat and masked hypertension, or pre-eclampsia.¹⁴



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No tubes. No wires.
Simply accurate.

All in One Upper Arm Blood Pressure Monitor. Easy to track progress. Take accurate readings and any position around the upper arm. Clinically validated for pregnancy and pre-eclampsia.

* Upper Arm circumference ≥ 32 cm.

** With wrist circumference 13.5-21 cm
(for all wrist models)

Hypertensive Disorders of Pregnancy – ISSHP Classification, Diagnosis, and Management Recommendations for International Practice¹⁵

Worldwide there is disagreement about many aspects of the classification, diagnosis, and management of the hypertensive disorders of pregnancy. This set of recommendations provides practical advice on classification, diagnostic criteria, and management for all clinicians, who are involved in the management of women with hypertension during pregnancy.

The classification, diagnosis, and management of the hypertensive disorders of pregnancy: A revised statement from the ISSHP¹⁶

In the years since the ISSHP report mentioned above, there have been several developments relevant to diagnosis, classification, and management of the hypertensive disorders in pregnancy. One problem is the emerging concept that pre-eclampsia may indeed have several subtypes, the final clinical manifestation being the result of a maternal constitutive response to either abnormal placental function or abnormal placentation. This purpose of this article is to update the ISSHP on these new developments.

The natural history of white-coat hypertension during pregnancy¹⁷

White-coat hypertension (WCH) is a common phenomenon with a long-term prognosis intermediate between those with true hypertension and true normotension. The natural history of this phenomenon throughout pregnancy remains unknown. This article assessed the likelihood of women with an initial diagnosis of WCH developing pre-eclampsia (PE) as their pregnancy progressed.

Main takeaways

Blood pressure monitoring

- Self-monitoring and remote management are well accepted by patients and have clear and proven benefits for both professionals and patients.^{9,10}
- Frequent self-monitoring by patients at home gives a better measure of underlying blood pressure and hypertension than clinical office blood pressure measurement.⁹
- Remote titration of antihypertensives according to a predefined plan decreases professional workload and is both effective and cost-effective.¹³
- Changes during pregnancy require careful monitoring of the blood pressure to ensure the safety of both the mother and child.¹⁵
- ABPM is the golden standard for diagnosing hypertension. However, it has become less popular as it leads to decreased sleep quality during the night which can cause misleading readings.²

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Heart Arrhythmias

Arrhythmias or heart rhythm problems are experienced by more than two million people a year in the UK. Most people with an abnormal heart rhythm can lead a normal life if it is properly diagnosed. Certain types of arrhythmias occur in people with severe heart conditions and can cause sudden cardiac death. This kills 100,000 people in the UK every year. Some of these deaths could be avoided if the arrhythmias were diagnosed earlier.¹

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03/1 ECG Measurement

An electrocardiogram (ECG) is used to determine how the heart is functioning. Knowing how to read an ECG is of importance for most medical professionals since an early detection of a cardiac disorder can save lives.²

Prospective, multicentre validation of a simple, patient-operated electrocardiographic system for the detection of arrhythmias and electrocardiographic changes³

Electrocardiographic changes, such as arrhythmias causing syncope or palpitations, are often brief and therefore difficult to diagnose. Systematic and symptom-activated ECG recordings can increase diagnostic advantage in such patients. This study evaluated the diagnostic accuracy of a simple, leadless, patient-operated ECG device compared with a standard 12-lead ECG. Recordings made by this patient-operated ECG device allow to detect arrhythmias and other ECG changes with high accuracy compared with a standard ECG. It may help to improve accurate diagnosis of transient ECG changes such as paroxysmal Atrial fibrillation (AFib) in palpitations or other unexplained cardiac symptoms.

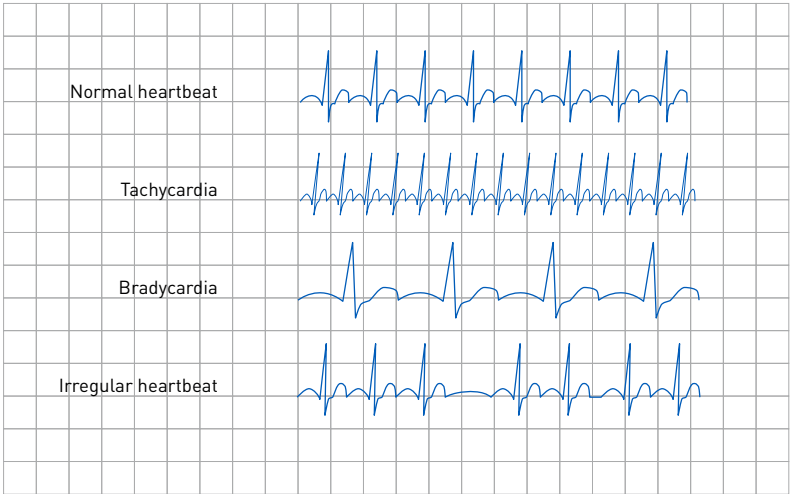


Figure 6: An overview of heart arrhythmias⁴

03/2 Atrial fibrillation

Atrial fibrillation (AFib) is the most common type of arrhythmias which is detected via an electrocardiogram (ECG). AFib can occur with hypertension and is associated with a 5x greater risk of stroke. With effective treatment, the risk of stroke can be reduced.⁵

Atrial fibrillation: diagnosis and management NICE guideline⁶

This guideline covers diagnosing and managing atrial fibrillation in adults. It includes guidance on providing the best care and treatment for people with atrial fibrillation, including assessing and managing risks of stroke and bleeding. The recommendations in this guideline represent the view of NICE, which is arrived at after careful consideration of the evidence available.

2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS)⁵

Guidelines summarize and evaluate available evidence with the aim of assisting health professionals in proposing the best management strategies for an individual patient with a given condition. This publication will assist healthcare professionals in streamlining the care of patients with AFib in daily clinical practice. The complexity of AFib requires a multifaceted, holistic, and multidisciplinary approach to the management of AFib patients. This is a challenging but essential requirement for effective management of AFib.

Diagnostic Value of Atrial Fibrillation by Built-in Electrocardiogram Technology in a Blood Pressure Monitor⁷

The Complete blood pressure (BP) monitor (Omron Healthcare, Kyoto, Japan) was developed as the first BP monitor with electrocardiogram (ECG) capability in a single device to simultaneously monitor ECG and BP readings. This study investigated whether the Complete can accurately differentiate sinus rhythm (SR) from AFib during BP measurement. The study concluded that the Complete can indeed accurately differentiate SR from AFib during BP measurement.

03/3 Bradycardia

A bradycardia is a type of arrhythmia in which the heart rate is too low (under 60 beats/minute). Pathology that produces it may occur within the sinus node, atrioventricular (AV) nodal tissue, and the specialized His-Purkinje conduction system.⁸

First Degree Heart Block⁹

The definition of first-degree atrioventricular (AV) block is a PR interval of greater than 0.20 seconds on electrocardiography (ECG) without disruption of atrial to ventricular conduction. The normal measurement of the PR interval is 0.12 seconds to 0.20 seconds. When the PR interval prolongs more than 0.30 seconds, the first-degree atrioventricular block is called "marked." Regular evaluation is essential, as affected patients have demonstrated an increased risk of developing atrial fibrillation or higher degree AV block.

Atrioventricular Block Second-Degree¹⁰

A delay in conduction between the atria and ventricles results in an atrioventricular conduction block. This is indicated by a prolongation of the PR interval on electrocardiogram. Conduction blocks are classified as either first-degree, second-degree, or third-degree blocks. There are two types of second-degree atrioventricular blocks: Mobitz type I, also known as Wenckebach and Mobitz type II. This article examines when this condition should be considered on differential diagnosis and how to properly evaluate for it. It highlights the role of the interprofessional team in caring for patients with this condition.

Third-Degree Atrioventricular Block¹¹

An atrioventricular block is a loss of the regular function of the cardiac electroconductive pathways linking the sinoatrial node (SA node) and the ventricles via conduction through the atrioventricular node (AV node). Third-degree AV block indicates a complete loss of communication between the atria and the ventricles. Without appropriate conduction through the AV node, the SA node cannot act to control the heart rate, and cardiac output can diminish secondary to loss of coordination of the atria and the ventricles. The condition can be fatal if not promptly treated. The objective of this paper is to describe when third-degree atrioventricular block should be in the differential diagnosis, explain the treatment considerations and review the importance of the interprofessional team in the monitoring and evaluation of patients in a third-degree atrioventricular block.

Athlete's Heart and Cardiovascular Care of the Athlete¹²

The heart of the athlete has intrigued clinicians and scientists for more than a century. Scientific understanding of the association between sport participation and specific cardiac abnormalities has paralleled advances in cardiovascular diagnostic techniques. This review provides an up-to-date summary of the science of cardiac remodelling in athletes and an overview of common clinical issues that are encountered in the cardiovascular care of the athlete.

Athletic heart syndrome¹³

Athletic heart syndrome (AHS) is a benign condition consisting of physiologic adaptations to the increased cardiac workload of exercise. Its primary features are biventricular hypertrophy and bradycardia associated with normal systolic and diastolic function. In addition, the alterations in cardiac structure are related to the type of training, with dynamic training causing proportionally greater dilation and static training primarily increased wall thickness. AHS is associated with abnormalities in ECG, radiograph, and echocardiographic findings. It is important to be aware of these changes so that they are not misinterpreted to represent pathologic states.

03/4 Tachycardia

The heart is usually faster during exercise or stress. However, it can be concerning if this occurs during rest. Tachycardia is a faster heartbeat than normal which could be an early sign of a serious pathology.¹⁴



Postural tachycardia syndrome (POTS)¹⁵

This chapter describes postural tachycardia syndrome (POTS) as a syndrome of orthostatic tachycardia associated with symptoms of cerebral hypoperfusion and autonomic activation. POTS is best considered a condition rather than a disease so that the same patient may or may not fulfil criteria at different times. A variety of approaches have been used to alleviate symptoms in POTS. This study will review these approaches and provide some recommendations in treating the symptoms of POTS.

Supraventricular Tachycardia: Mechanisms and Management¹⁶

The phrase paroxysmal supraventricular tachycardia describes a group of arrhythmias with similar electrocardiographic features but different mechanisms that have been clarified in recent years with specialized intracardiac recording and pacing techniques. This study will address these mechanisms and gives recommendation on the management of supraventricular tachycardia.

Complete

2-in-1 home blood pressure and single-lead ECG monitoring

The OMRON Complete is an accurate and easy blood pressure monitor with ECG recording. This monitor records measurements and tracks data.

Main takeaways

Heart Arrhythmias

- Arrhythmias can lead to severe cardiac conditions or even sudden cardiac death if left untreated.¹
- Early detection of heart arrhythmias through ECG can save lives.¹
- A simple, leadless, patient-operated ECG device allows to detect arrhythmias and other ECG changes with high accuracy.³
- AFib is the most common type of arrhythmia and can often occur with hypertension.⁵
- It is important to be aware of changes in ECG readings to recognize the correct type of arrhythmia and provide appropriate treatment.^{9,10,11}

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Comorbidities of cardiovascular conditions

The presence of one or more co-occurring chronic diseases next to an index disease is defined as comorbidity. Comorbidity could potentially lead to poorer functional status, lower quality of life, and even increased mortality. Today comorbidity tend to be considered the rule rather than the exception, so increasing awareness and improving guidance for patients with comorbid conditions is crucial to prevent adverse health outcomes, increase efficiency, and reduce costs.¹

Comorbidities of cardiovascular conditions 16

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Comorbidity in patients with cardiovascular disease in primary care: a cohort study with routine healthcare data¹

Comorbidity is a major public health issue, which challenges healthcare configured around single diseases. This study aims to provide an overview of frequent disease combinations of one and two additional chronic diseases and groups among patients with cardiovascular disease (CVD) in general practice. It concludes that comorbid conditions are very common in patients with CVD, even in younger age groups. To ensure efficient and effective treatment, organisational adaptations may be required in the healthcare system to accommodate comorbid conditions in patients with CVD.

04/1 Resistant Hypertension

Resistant hypertension is defined as failure to achieve target blood pressure (BP) when a patient adheres to the maximum tolerated doses of three antihypertensive drugs including a diuretic.²

Resistant Hypertension an Overview of Evaluation and Treatment²

The prevalence of resistant hypertension is projected to increase, owing to the aging population, and increasing trends in obesity, sleep apnoea, and chronic kidney disease. Management of resistant hypertension must begin with a careful evaluation of the patient to confirm the diagnosis and exclude factors associated with “pseudo-resistance,” such as improper BP measurement technique, the white-coat effect, and poor patient adherence to lifestyle and/or antihypertensive medications. This paper provides an overview of evaluation and treatment of resistant hypertension.

04/2 Obstructive sleep apnoea

Obstructive sleep apnoea is a condition causing breathing to stop involuntarily for a brief period during sleep. It is a global issue with several implications on global health and quality of life.³

Epidemiological aspects of obstructive sleep apnoea³

At an individual level, obstructive sleep apnoea (OSA) leads to a significant decrease in quality of life (QOL) and functional capacity, alongside a markedly increased risk of cardiovascular disease and death. At a societal level, OSA not only leads to reduced economic productivity, but also constitutes a major treatable risk factor for hypertension, coronary artery disease (CAD) and stroke. This article addresses OSA from an epidemiological perspective, from prevalence studies to economic aspects to co-morbidity.

Treatment options for obstructive sleep apnoea⁴

Obstructive sleep apnoea (OSA) is a global problem with implications for general health and of life, and is often encountered in patients with neurologic disease. This review outlines treatment modalities to consider for management of OSA in patients with neurologic disease. New advances in positive airway pressure (PAP) devices, oral appliances, and surgical interventions offer a wide range of treatment options for patients with OSA.

Obstructive sleep apnoea and Obesity: Implications for Public Health⁵

Obstructive sleep apnoea (OSA) is a global disease with a rising incidence along with its comorbidities, especially with metabolic syndrome. One of the main components contributing to sleep apnoea is obesity, as well as diabetes mellitus type 2 (T2DM), hypercholesterolemia, and hypertension. This paper addresses important public health implications to prevent and to treat the condition.

Association Between Treated and Untreated Obstructive Sleep Apnoea and Risk of Hypertension⁶

Systemic hypertension is prevalent among patients with obstructive sleep apnoea (OSA). Short-term studies indicate that continuous positive airway pressure (CPAP) therapy reduces blood pressure in patients with hypertension and OSA. The objective of the study is to determine whether CPAP therapy is associated with lower risk of incident hypertension. It concludes that compared to people without OSA the presence of OSA was associated with increased adjusted risk of incident hypertension; however, treatment with CPAP therapy was associated with a lower risk of hypertension.

Obstructive sleep apnoea and its cardiovascular consequences⁷

Obstructive sleep apnoea (OSA) is a common disorder in which repetitive apnoea's expose the cardiovascular system to cycles of hypoxia, exaggerated negative intrathoracic pressure, and arousals. Epidemiological studies have shown significant independent associations between OSA and hypertension, coronary artery disease, arrhythmias, heart failure, and stroke. This article will review our current understanding of mechanisms by which OSA might contribute to the pathogenesis of cardiovascular disease, it will assess epidemiological evidence concerning a potential link between these two conditions and it reviews cardiovascular effects of treating OSA.

	Cross-sectional (prevalence)		Prospective (incidence)	
	Unadjusted*	Adjusted†	Unadjusted*	Adjusted†
Hypertension	Yes	Yes	Yes	Yes
Dysglycemia	Yes	Yes	Yes	No
Coronary artery disease	Yes	Yes	NA	NA
Heart failure	Yes	Yes	NA	NA
Cardiac arrhythmias				
Bradyarrhythmias	No	No	NA	NA
Atrial fibrillation	Yes	Yes	NA	NA
Ventricular ectopy	Yes	Yes	NA	NA
Cerebrovascular disease	Yes	Yes	Yes	No

Yes = available data support a significant association. **No** = available data do not support a significant association. **NA** = no data available. *Finding of univariable analyses or multivariate analyses with partial adjustment. †Findings of multivariable analyses in which adjustments have been made for all known confounding factors.

Figure 7: Summary of community-based epidemiological studies investigating the potential links between obstructive sleep apnoea and cardiovascular diseases⁷

Main takeaways

Obstructive sleep apnoea

- Obstructive sleep apnoea (OSA) is characterized by recurrent episodes of upper airway obstruction occurring during sleep.³
- Obstructive sleep apnoea leads to significant decrease in quality of life and functional capacity, alongside a markedly increased risk of cardiovascular disease and death.⁵
- Due to the increasing prevalence of obesity globally, the number of people with OSA will also increase. There is a linear correlation between OSA and obesity.⁵
- Patients with OSA are more likely to develop hypertension and the risk is associated with the severity of OSA.⁶
- Data from animal models, epidemiological studies, and randomised clinical trials provide strong evidence that OSA can cause hypertension, and that its treatment can lower blood pressure.³

04/3 Chronic kidney disease

Chronic kidney disease (CKD) is an important and common noncommunicable condition globally. It refers to a long-term loss of renal function and is categorised in stages.

Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis⁸

Chronic kidney disease (CKD) is a global health burden with a high economic cost to health systems and is an independent risk factor for cardiovascular disease (CVD). All stages of CKD are associated with increased risks of cardiovascular morbidity, premature mortality, and/or decreased quality of life. CKD is usually asymptomatic until later stages, and accurate prevalence data are lacking. This systematic review and meta-analysis of observational studies estimating CKD prevalence in general populations was conducted through literature searches in 8 databases.

Blood pressure lowering and major cardiovascular events in people with and without chronic kidney disease: meta-analysis of randomised controlled trials⁹

Chronic kidney disease, most defined by a reduced glomerular filtration rate (GFR) or abnormal concentrations of proteinuria, or both, is an important public health problem, affecting 10-15% of the adult general population. The objective of this article is to define the cardiovascular effects of lowering blood pressure in people with chronic kidney disease. It concluded that blood pressure lowering is an effective strategy for preventing cardiovascular events among people with moderately reduced eGFR.

Chronic kidney disease: identification and management in primary care¹⁰

We distinguish between five stages of chronic kidney disease. With treatment and lifestyle changes, the progression through the stages can be slowed down and the patient can also prevent their condition from worsening. It is often asymptomatic in its early stages, and early detection is important to reduce future risk. The risk of cardiovascular outcomes is greater than the risk of progression to end-stage kidney disease for most people with CKD. This review aims to summarize the vital role that primary care plays in pre-dialysis CKD care and to outline the main considerations in its identification, monitoring, and clinical management in this context.

Nocturnal Systolic Hypertension and Adverse Prognosis in Patients with CKD¹¹

Nocturnal hypertension is associated with adverse outcomes in patients with CKD. However, the individual association of entities of nocturnal hypertension according to achievement of systolic and/or diastolic BP goals with kidney failure and cardiovascular outcomes of CKD is not clear. The purpose of this study was to evaluate the individual prognostic value of nocturnal hypertension entity in a large, prospective cohort of Chinese patients with CKD not on dialysis. It concludes that nocturnal systolic hypertension, either alone or in combination with diastolic hypertension, is associated with higher risks for adverse outcomes in patients with CKD.

Diabetes status	BP category	ACR categories (mg/mmol)		
		A1 (<3)	A2 (3-30)	A3 (>30)
Diabetes	Systolic	≤140	≤130	≤130
	Diastolic	≤90	≤80	≤80
No diabetes	Systolic	≤140	≤130	≤130
	Diastolic	≤90	≤80	≤80

Abbreviations: KDIGO, Kidney Disease Improving Global Outcomes; BP, blood pressure; CKD, chronic kidney disease; ACR, albumin-to-creatinine ratio.

Figure 8: KDIGO recommended BP targets for people with CKD¹⁰

Main takeaways

Chronic kidney disease

- All stages of CKD are associated with increased risks of cardiovascular morbidity, premature mortality, and/or decreased quality of life.⁸
- Blood pressure lowering is an effective strategy for preventing cardiovascular events among people with moderately reduced eGFR.⁹
- CKD patients mostly have a comorbidity such as hypertension, diabetes, and heart failure.⁸
- Primary care plays a crucial role in pre-dialysis CKD care and in outlining the main considerations in its identification, monitoring, and clinical management.¹⁰
- Nocturnal systolic hypertension, either alone or in combination with diastolic hypertension, is associated with higher risks for adverse outcomes in patients with CKD.¹¹

04/4 Metabolic syndrome

Metabolic Syndrome is a constellation of anthropometric, haemodynamic, and metabolic abnormalities.

The Metabolic Syndrome and Cardiovascular Risk: A Systematic Review and Meta-Analysis¹²

The objective of this study is to conduct a systematic review and meta-analysis of the cardiovascular risk associated with the metabolic syndrome as defined by the 2001 National Cholesterol Education Program (NCEP) and 2004 revised National Cholesterol Education Program (rNCEP). It concludes that metabolic syndrome is associated with a 2-fold increase in cardiovascular outcomes and a 1.5-fold increase in all-cause mortality.

The metabolic syndrome, its component risk factors, and progression of coronary atherosclerosis¹³

Although there is accelerated disease progression observed in patients with metabolic syndrome, according to this study, it appears to be largely driven by individual component risk factors rather than by the presence of metabolic syndrome itself. This provides further support for the concept that conferring a diagnosis of metabolic syndrome highlights a patient with multiple atherogenic risk factors.

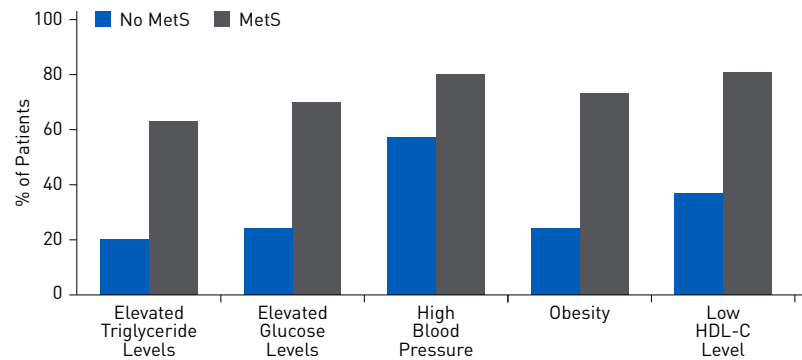


Figure 9: Percentage of patients with or without metabolic syndrome (MetS) with each defining component risk factor.¹ HDL-C, high-density lipoprotein cholesterol

Treatment of metabolic syndrome¹⁴

This review focuses on the treatment of the metabolic syndrome. Diagnosing patients with metabolic syndrome allows them to make the necessary lifestyle changes, such as losing weight and reducing abdominal obesity. This is the main therapeutic goal in metabolic syndrome. Even though intensive lifestyle changes will help in normalizing a patient's lipid profile, some patients might need drug therapy if this is not sufficient. It is recommended to prescribe anti-hypertensive drugs in [mild] hypertensive patients with metabolic disturbances when systolic blood pressure is ≥ 140 and/or diastolic blood pressure is ≥ 90 mmHg after a suitable period of lifestyle change.

Main takeaways

Metabolic syndrome

- Metabolic syndrome is associated with a 2-fold increase in cardiovascular outcomes and a 1.5-fold increase in all-cause mortality.¹²
- Metabolic syndrome appears to be largely driven by individual component risk factors rather than by the presence of metabolic syndrome itself.¹³
- The main therapeutic goal for metabolic syndrome is lifestyle changes such as losing weight and reducing abdominal obesity. However, some patients still might need drug therapy.¹⁴

04/5 Diabetes

Diabetes mellitus is defined as a group of metabolic diseases characterized by chronic hyperglycaemia because of defects in insulin secretion, insulin action, or both. Hypertension and diabetes often coexist and the risk of developing cardiovascular diseases is four-fold higher with both conditions. The prevalence of diabetes is increasing worldwide.

Diabetes mellitus: The epidemic of the century¹⁵

In this article, the epidemic nature of diabetes mellitus in different regions is reviewed. Diabetes mellitus is rising to an alarming epidemic level. Early diagnosis of diabetes and prediabetes is essential using recommended haemoglobin A1c criteria for different types except for gestational diabetes. Screening for diabetes especially in underdeveloped countries is essential to reduce late diagnosis.

Diabetes and Hypertension: Is There a Common Metabolic Pathway?¹⁶

Diabetes and hypertension frequently occur together. There is substantial overlap between diabetes and hypertension in etiology and disease mechanisms. Obesity, inflammation, oxidative stress, and insulin resistance are thought to be the common pathways. Recent advances in the understanding of these pathways have provided new insights and perspectives. Physical activity plays an important protective role in the two diseases. Knowing the common causes and disease mechanisms allows a more effective and proactive approach in their prevention and treatment.

Type 2 diabetes mellitus and hypertension: An update¹⁷

Diabetes is common in hypertensive patients and an increased prevalence of hypertension was noted in diabetic patients. Both conditions exacerbate one another, due to which it is important to understand their co-occurrence and the best treatments recommended to control it. The risk for cardiovascular disease (CVD) is four-fold higher in patients with both diabetes and hypertension as compared to the normotensive non-diabetic controls.

Blood Pressure Lowering in Type 2 Diabetes – A Systematic Review and Meta-analysis¹⁸

Lowering blood pressure (BP) is widely used to reduce vascular risk in individuals with diabetes. The objective of this study is to determine the associations between BP-lowering treatment and vascular disease in type 2 diabetes. Supporting the use of BP lowering medication, this review concludes that among patients with type 2 diabetes, BP lowering was associated with improved mortality rates and other clinical outcomes.

Main takeaways

Diabetes

- Hypertension is common and dangerous in patients with diabetes.¹
- The risk for cardiovascular disease (CVD) is four-fold higher in patients with both diabetes and hypertension as compared to the normotensive non-diabetic controls.¹⁷
- Drug choices are marginally different from those used in essential hypertension.¹⁸
- Treatment targets are a little uncertain but BP<140/90 mmHg would be a good starting point.¹⁸

04/6 Obesity

Worldwide least 400 million adults are obese and more than 20 million children under the age of 5 are overweight and the numbers are increasing. Obesity can lead to life-threatening issues, including hypertension, and treatment can be quite challenging.¹⁹



VIVA

Smart body composition monitor

OMRON VIVA is a medical device with key parameters that indicates the visceral fat, fat and skeletal muscle, using Bio-electric Impedance Analysis (BIA) Technology to assess your body's composition.



RS7 Intelli IT

Connected, portable and accurate for all body sizes

Wrist Blood Pressure Monitor validated in obese population*.² The wrist BPM range of OMRON is convenient for all body shapes** to get accurate measurements.

* Upper Arm circumference \geq 32 cm.

** With wrist circumference 13.5-21 cm (for all wrist models)

Obesity and hypertension (Review)¹⁹

The imbalance between energy intake and expenditure is the main cause of excessive overweight and obesity. Technically, obesity is defined as the abnormal accumulation of $\geq 20\%$ of body fat, over the individual's ideal body weight. Excessive overweight remains among the most neglected public health issues worldwide, while obesity is associated with increasing risks of disability, illness and death. Cardiovascular diseases, the leading cause of mortality worldwide, particularly hypertension and diabetes, are the main illnesses associated with obesity. In this review, the researchers address the association between obesity and cardiovascular disease, particularly the biological mechanisms linking obesity and hypertension.

Influence of Weight Reduction on Blood Pressure – A Meta-Analysis of Randomized Controlled Trials²⁰

Increased body weight is a strong risk factor for hypertension. In this review a meta-analysis of randomized controlled trials was performed to estimate the effect of weight reduction on blood pressure overall and in population subgroups. This meta-analysis shows that weight loss is important for the prevention and treatment of hypertension.

The Kidney, Hypertension, and Obesity²¹

This paper brings forth a perspective of the role of abnormal renal pressure natriuresis in the pathogenesis of hypertension. Obesity increases renal sodium reabsorption and impairs pressure natriuresis by activation of the renin-angiotensin and sympathetic nervous systems and by altered intrarenal physical forces. Chronic obesity also causes marked structural changes in the kidneys that eventually lead to a loss of nephron function. It further increases arterial pressure and severe renal injury in some cases.

Which cuff should I use? Indirect blood pressure measurement for the diagnosis of hypertension in patients with obesity: a diagnostic accuracy review²²

This paper determines the diagnostic accuracy of different methods of blood pressure (BP) measurement compared with reference standards for the diagnosis of hypertension in patients with obesity with a large arm circumference. It concludes that BP measurement with a correctly fitting upper arm cuff is sufficiently sensitive and specific to diagnose hypertension in patients with obesity with a large upper arm circumference. If a correctly fitting upper arm cuff cannot be applied, an incorrectly fitting standard size cuff should not be used and BP measurement at the wrist should be considered.

Obesity Paradox in Patients with Hypertension and Coronary Artery Disease²³

An obesity paradox, a "paradoxical" decrease in morbidity and mortality with increasing body mass index (BMI), has been shown in patients with heart failure and those undergoing percutaneous coronary intervention. This paper shows that in a population with hypertension and coronary artery disease, overweight and obese patients had a decreased risk of primary outcome compared with patients of normal weight, which was driven primarily by a decreased risk of all-cause mortality. The results further suggest a protective effect of obesity in patients with known cardiovascular disease in concordance with data in patients with heart failure and those undergoing percutaneous coronary intervention.

Main takeaways

Obesity

- The relationship between BMI and systolic and diastolic blood pressure is nearly linear.¹⁹
- Weight loss is important for the prevention and treatment of hypertension.²⁰
- The increase of renal tubular sodium reabsorption impairs pressure natriuresis and has an important role in initiating obesity hypertension.²¹
- Obesity is associated with obstructive sleep apnoea and masked and white-coat hypertension.¹⁹
- BP monitoring in obese patients requires a correctly fitting upper arm cuff, if this cannot be applied a BP measurement at the wrist should be considered.²²
- The obesity paradox indicates that patients with hypertension, coronary artery disease and obesity showed fewer fatalities, non-fatal myocardial infarction and non-fatal stroke.²³

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Clinical validation of medical devices

At OMRON Healthcare it's our promise to minimize the impact of people's health conditions and enable them to live a more fulfilling life with the products we offer. OMRON Healthcare devices extend their accuracy on specific patient groups in diabetic population, obese population, and pregnant women.

05/1 Importance of clinically validated medical devices

Some patients have specific health conditions that affect the accuracy of blood pressure measurement, such as arterial stiffness for diabetes patients, cuff size for obese patients and hemodynamic changes during pregnancy. Clinical validation certifies the accuracy of blood pressure measurements by thorough testing across these patient groups. At OMRON, we ensure all blood pressure monitors are clinically validated for accuracy. This helps healthcare professionals, and their patients take (home) measurements with confidence.²

Stride BP: an international initiative for accurate blood pressure measurement¹

The diagnosis and management of hypertension is dependent upon accurate blood pressure (BP) measurement. Despite intense efforts over several decades by the international medical community worldwide, the use of inaccurate devices has resulted in the misdiagnosis and poor management of hypertension, which remains a largely unresolved public health problem. STRIDE BP (www.stridebp.org) is an international, non profit organization. Their mission is to improve the accuracy of BP measurement and diagnosis of hypertension.

A validation model for the medical devices industry²

Manufacturers must take an integrated approach to design, development and validation. Good design practice encourages this integrated approach while ensuring fitness for purpose within commercial reality. This paper proposes a practical approach aimed at making devices easier and more economic to validate.

Clinical accuracy of the Omron M3 Comfort® and the Omron Evolv® for self-blood pressure measurements in pregnancy and preeclampsia – validation according to the Universal Standard Protocol³

Medical devices for blood pressure (BP) measurements need to go through independent clinical validation as recommended by different authorities, both in general and in special populations such as pregnancy. After careful evaluation this paper found that both devices, Evolv and M3 Comfort fulfil the validation protocol criteria in pregnancy and pre-eclampsia. Consequently, these two devices can be recommended for home BP measurements in this specific population.

Validation of the Omron RS7 in Obese Population⁴

In obese patients with large arm circumference, wrist BP measurement has been suggested as one of the possible solutions. The purpose of this study is to assess the accuracy of the OMRON RS7® (HEM-6232T-E) device, which allows automatic oscillometer BP determination at the wrist level according to the criteria of the modified ESH-IP validation protocol in patients with large arm circumference ≥ 32 cm or obesity.



Products names	Codes	Clinically validated in general population	Clinically validated in diabetic population	Clinically validated in pregnant women	Clinically validated in obese population
HBP-1120	HBP-1120-E	●			
HBP-1320	HBP-1320	●			
HEM-907	HEM-907	●			
EVOLV	HEM-7600T-E	●		●	
M7 Intelli IT	HEM-7361T-EBK HEM-7361T-ESL	●	●	●	
M6 Comfort	HEM-7360-E	●	●	●	
M4 Intelli IT	HEM-7155T-EBK	●	●	●	
M3 Comfort	HEM-7155-E	●	●	●	
M2 Intelli IT	HEM-7143T1-EBK HEM-7143T2-ESL	●			
NightView	HEM-9601T-E3	●			
RS7 Intelli IT	HEM-6232T-E	●			●
RS4	HEM-6181-E	●			
RS3 Intelli IT	HEM-6161T-E	●			

Main takeaways

Clinically validation

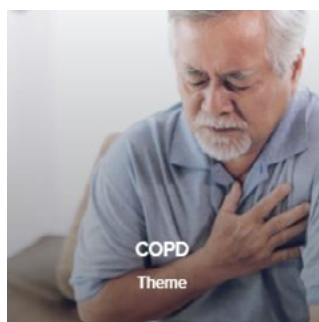
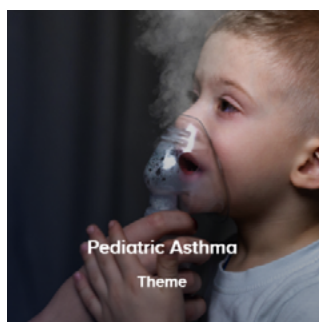
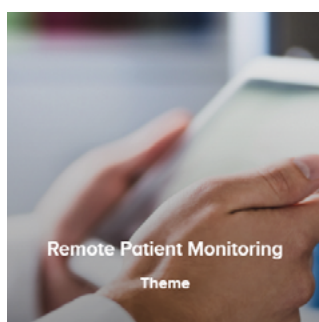
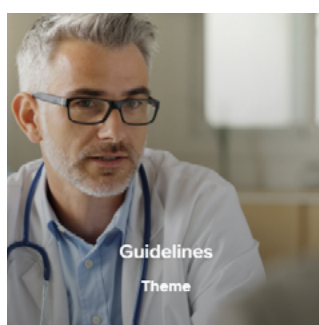
- The diagnosis and management of hypertension is dependent upon accurate blood pressure (BP) measurement.¹
- Clinical validation certifies the accuracy of blood pressure measurements by thorough testing across these patient groups.¹
- At OMRON, we ensure all blood pressure monitors are clinically validated for accuracy.^{3,4}

References:

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NightView



- **Clinically validated accuracy** – proven to provide measurements with accuracy in different positions.
- **Comfortable and completely silent** – completely silent pumping action measures gentle inflation and less compression time limits impact on sleep quality. Less Sleep disturbance than ABPM (< 20% with NightView and >70% with the arm-cuff ABPM)27.
- **Irregular heartbeat detection** – can detect irregular heartbeat during usual blood pressure monitoring.
- **LED Positioning Sensor** – for accurate results during the day.
- **Memory Capacity** – 1 user x 350 memories.
- **OMRON connect app** – automatic data transfer. Get connected. Access anytime. See progress.
- **Intelligent wrist-cuff design** – designed for comfort and ease of use, day or night, with automatic measurements 3x per night (13,5-21,5 cm).
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.

HBP-1120



- **Dual mode** – depending on the patient's condition such as atrial fibrillation, fully automatic oscillometer or manual auscultation mode (using a stethoscope) can be chosen.
- **Easy operation** – the user interface is kept simple for frequent use in clinical setting.
- **Easy to clean** – the monitor and cuffs can be disinfected with alcohol-based cleaning agents.
- **Zero indicator function** – the Zero Indicator shows that the device is reset and is ready for the next measurement, ensuring accurate results.
- **Highly durable** – equipped with a highly durable pump, robust sensor and uniquely shaped sturdy plastic cuff connector, the device is durable enough to survive daily intensive use in hospitals and medical facilities.
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.
- **5 cuff sizes** – for wide range of patients (12-50 cm).

HBP-1320



- **Dual mode** – depending on the patient's condition such as atrial fibrillation, fully automatic oscillometer or manual auscultation mode (using stethoscope) can be chosen.
- **Easy operation** – the user interface is kept simple for frequent use in clinical setting.
- **Easy to clean** – the monitor and cuffs can be disinfected with alcohol-based cleaning agents.
- **Robust design** – this monitor is shock-proof bumper to protect against falls.
- **Portable** – designed for regular blood pressure measurements, the monitor is compact, lightweight, and has an integrated handle for easy carry from patient to patient.
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.
- **5 cuff sizes** – for wide range of patients (12-50cm).

RS7 Intelli IT



- **Irregular heartbeat detection** – can detect irregular heartbeat during usual blood pressure monitoring.
- **Blood pressure level indicator** – indicates if result is above recommended level.
- **Body Movement Detection** – signals if too much movement is detected during measurement, to avoid inaccurate readings.
- **LED Positioning Sensor** – for accurate results.
- **Soundless** – Convenient for measurement anytime, anywhere.
- **OMRON connect app** – automatic data transfer. Get connected. Access anytime. See progress.
- **Memory Capacity** – 2 users x 100 memories
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.
- **Cuff Wrap Guide** – includes an indicator to let users know that the cuff is wrapped correctly.

M7 Intelli IT



- **Irregular heartbeat detection** – can detect irregular heartbeat during blood pressure monitoring.
- **AFib mode** – measures blood pressure 3 times with 30 seconds interval, when in 2 of the 3 measurements irregular heartbeat is detected, then AFib is indicated. 4, 22, 32
- **Blood pressure level indicator** – indicates if result is above recommended level.
- **Body Movement Detection** – signals if too much movement is detected during measurement, to avoid inaccurate readings.
- **Displays the average blood pressure** – displays the average of the morning and evening readings over time.
- **Comparison functions** – not only compares morning and evening results, but also allows users to compare readings with previous measurements.
- **OMRON connect app** – automatic data transfer. Get connected. Access anytime. See progress.
- **Memory Capacity** – 2 users x 100 memories + guest mode. This monitor can store data for two separate users, enabling users to track individual readings and trends.
- **Intelli Wrap Cuff Technology** – accurate results in any position around the upper arm (cuff size: 22-42 cm).
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.
- **Cuff Wrap Guide** – includes an indicator to let users know that the cuff is wrapped correctly.

Complete



- **Single-lead ECG** – taken with a regular blood pressure check, measures 2 critical parameters at once with one easy-to-use device for hassle-free monitoring.
- **Screens for a range of heart conditions** – heart rhythm irregularities (AFib, tachycardia, bradycardia), hypertension & hypotension, normal sinus rhythm.
- **Body Movement Detection** – signals if too much movement is detected during measurement, to avoid inaccurate readings.
- **Easy, accurate, instant** – easily make regular monitoring part of the daily routine with clear and instant results to track progress.
- **OMRON connect app** – automatic data transfer. Get connected. Access anytime. See progress.
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.
- **Cuff Wrap Guide** – includes an indicator to let users know that the cuff is wrapped correctly.

EVOLV



- **All in One** – No tubes. No wires. Simply accurate.
- **Irregular heartbeat detection** – can detect irregular heartbeat during usual blood pressure monitoring.
- **Body Movement Detection** – signals if too much movement is detected during measurement, to avoid inaccurate readings.
- **OMRON connect app** – automatic data transfer. Get connected. Access anytime. See progress.
- **Memory Capacity** – 1 users x 100 memories.
- **Intelli Wrap Cuff Technology** – accurate results in any position around the upper arm (cuff size: 22-42 cm).
- **Intellisense Technology** – measurement without unnecessary over-inflation of the cuff.
- **Cuff Wrap Guide** – includes an indicator to let users know that the cuff is wrapped correctly.

VIVA



- **Tracking** – smart tracking of 6 body metrics.
- **Heart health parameters** – visceral fat, body fat and skeletal muscle.
- **Measurements** – resting metabolism, BMI and weights.
- **Results** – 4 seconds fast reading, classification of results.
- **User recognition** – automatic.
- **Number of users** – 4 users + guest.
- **OMRON connect app** – automatic data transfer. Get connected. Access anytime. See progress.



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