

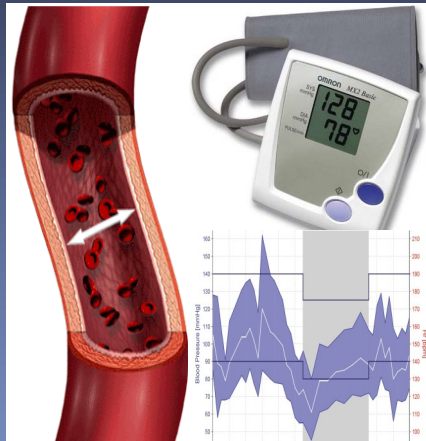
Dr Diana R Holdright

MD, FRCP, FESC, FACC, MBBS, DA, BSc.

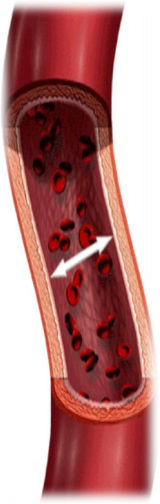
*Consultant Cardiologist*



# HYPERTENSION



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Blood pressure is the pressure exerted on the walls of the arteries when the heart pumps; the term “**systolic**” relates to the **maximum pressure** exerted on the artery when the heart contracts, and the term “**diastolic**” to the **minimum pressure** exerted on the artery when the heart relaxes. Both the systolic (top reading) and diastolic (bottom reading) are important:

for adults aged 40 to 69  
every **20 mmHg** ↑ in **systolic** blood pressure  
or  
**10 mmHg** ↑ in **diastolic** blood pressure  
doubles  
the **risk of death** from **coronary artery disease**

High blood pressure (hypertension) is a very common condition, affecting **1 in 4 adults in the UK** and **70% of people over 70 years of age**. There is a direct relationship between high blood pressure readings and the incidence of coronary artery disease and stroke:

**half of coronary artery disease cases**  
and  
**two thirds of stroke cases**  
are due to  
**raised blood pressure**

The latest (2018) guidelines from the European Society of Cardiology (ESC) define hypertension as “**the level of BP at which the benefits of treatment unequivocally outweigh the risks of treatment, as documented by clinical trials**”.

Blood pressure changes throughout the day, tending to be **highest in the morning** and **lowest in the evening**. It can rise transiently with **stress** and will be higher during physical activity than before.



30-40% of patients who have high blood pressure readings with a doctor are actually suffering from “white coat hypertension” and have normal blood pressures outside of a clinic setting, and equally 15% of people have “masked” hypertension, where blood pressure is normal with a doctor but high elsewhere. Diagnosis of hypertension should therefore not be based on readings obtained during an isolated visit to the doctor, unless the blood pressure readings are exceptionally high (180/110 mmHg or above - known as grade 3 hypertension), or there is evidence that blood pressure has been sustained at a high level for some time, resulting in damage to kidneys or eyes, or in heart muscle thickening.

The recently published ESC guidelines advocate the use of ambulatory blood pressure monitoring, or readings taken at home, to confirm or refute a diagnosis of hypertension, with treatment recommended at the following thresholds:

#### Definitions of hypertension according to office, ABPM and home BP levels

Category	Systolic		Diastolic
Office BP	≥140	and/or	≥90
Ambulatory BP			
Daytime average	≥135	and/or	≥85
Night-time average	≥120	and/or	≥70
Home BP average	≥135	and/or	≥85

## Ambulatory/24 hour blood pressure monitoring (ABPM)

An ambulatory blood pressure monitor is programmed to take a patient’s blood pressure at regular intervals throughout the day and night over a 24 hour period. The blood pressure cuff is fitted to the non-dominant arm and will inflate every 30 minutes during the day, and every hour at night. The patient will also be asked to keep a diary over the 24 hours, to help the doctor make sense of any particularly high or low readings.

As well as being useful for identifying white coat or masked hypertension, ABPM is particularly effective for looking at night-time readings, which would otherwise not easily be obtainable. This is important since both lack of a dip in blood pressure at night and conversely an exaggerated dip in blood pressure at night are associated with a substantial increase in cardiovascular risk.

# Treatment for hypertension

The latest ESC guidelines recommend that blood pressure is treated when the following systolic (top) readings are obtained in clinic:

## Blood pressure thresholds for treatment

Age	Hypertension	+Diabetes	+Chronic kidney disease	+Coronary artery disease	+Stroke/TIA
18-79	≥140/≥90	≥140/≥90	≥140/≥90	≥140/≥90	≥140/≥90
80+	≥160/≥90	≥160/≥90	≥160/≥90	≥160/≥90	≥160/≥90

There are a number of **different drug classes** which can lower blood pressure. Most patients need **more than one drug** to lower blood pressure adequately and **treatment is usually for life**. Patients respond differently and often unpredictably to antihypertensive drugs; one drug class may have no effect on one patient's blood pressure, whereas a different drug class may lower the blood pressure significantly.

Classes of drug used to lower blood pressure include **calcium channel blockers** (e.g. amlodipine or diltiazem), **ACE inhibitors** (e.g. lisinopril or perindopril) and **angiotensin receptor blockers (ARBs)** (such as candesartan, losartan and valsartan) as well as **diuretics** (e.g. bendroflumethiazide); **beta blockers** (e.g. bisoprolol and atenolol) are less frequently used these days. For more resistant blood pressure **spironolactone**, **alpha receptor blockers** (e.g. doxazosin), and **centrally acting drugs** may be prescribed.

Each drug class has a specific **mechanism of action**; many drugs have **additional beneficial effects** beyond blood pressure lowering, such that the choice of drug will, in part, be influenced by any other co-existing conditions. For example, a patient who has suffered a previous heart attack would benefit from an ACE inhibitor, ARB and beta blocker, while a patient with angina would benefit from a beta blocker or calcium channel blocker.

Acknowledging that the majority of patients will require more than one drug to achieve adequate blood pressure lowering, the 2018 ESC guidelines advocate **combination drugs as first-line treatment** for most patients with hypertension. Furthermore studies have shown that patients generally have a better response to a combination of two drugs at lower doses, compared with one drug at higher doses, and with fewer side-effects.

An important point of note is that once an effective regime has been established to lower blood pressure it should be continued; **if the drugs are stopped the blood pressure will swiftly rise to pre-treatment levels or higher**, since these drugs work by suppressing high blood pressure, not curing it.

## Lifestyle modification

Anyone with raised blood pressure should also be offered advice about **lifestyle changes** that can help to lower readings, such as:



The single most important dietary change one can make in the presence of hypertension is to **reduce salt intake**, since this has a significant effect on blood pressure. A diet high in salt alters the **balance of fluid** either side of the blood vessel walls, leading to an **increased volume of fluid** in the blood, **increasing the pressure** exerted against the walls of the blood vessels.

**a reduction in daily salt intake**

from

**10g to 6g**

would result in

**2.6 million fewer deaths**

**per year worldwide**

from

**stroke and coronary heart disease**

6g of salt is about one teaspoonful to look at. On nutritional labelling there is often only a figure for sodium rather than salt *per se*, but the true salt content of a dish is 2.5 times its sodium content, so working from labels alone the goal is a sodium intake of 2.4g or less per day. Thankfully these days many foods have a “traffic light” coding system on the packaging to make it easier to determine which foods to restrict:

High = 1.5g salt or 0.6g sodium per 100g

Medium = 0.3-1.5g salt or 0.1-0.6g sodium per 100g

Low = 0.3g salt or 0.1g sodium per 100g

Some foods have actually been identified as having blood pressure lowering properties, and indeed in the USA there is a diet known as the DASH diet - Dietary Approaches to Stop Hypertension.

Beetroot and garlic in particular have consistently been demonstrated to produce a drop in blood pressure. A 2010 study in the medical journal *Hypertension* found that drinking beetroot juice reduced systolic blood pressure by up to 5.4 mmHg compared to drinking water, and a meta-analysis published in *BMC Cardiovascular Disorders* reviewed 11 studies looking in to the blood pressure lowering effects of garlic and found that there was an average reduction in systolic blood pressure of 4.6 mmHg compared with placebo.



## Home blood pressure monitors

It is important to keep an eye on home blood pressure readings to ensure that blood pressure is consistently being treated to target.

Home blood pressure monitors range in price and functionality, and there is a large selection available, both online and in stores such as pharmacies. Generally speaking arm monitors tend to be more accurate than wrist monitors, but make sure that the cuff fits the arm comfortably otherwise this will affect the readings.





The British and Irish Hypertension Society has a list of monitors which have been validated for home use, which you can find by visiting their website - [www.bihsoc.org](http://www.bihsoc.org)

# Home blood pressure monitoring

## Blood pressure is best taken:

- ✓ After 5 minutes rest and 30 minutes without smoking or caffeine
- ✓ When seated with the arm supported at heart level
- ✓ When immobile and relaxing, not talking and with legs uncrossed

## To record your blood pressure:

-  Write down the results in the table below/overleaf
-  Record 3 consecutive measurements, 1-2 minutes apart
-  Record your blood pressure twice a day, ideally in the morning and evening
-  Record your blood pressure for at least 3 days, and ideally for a week

You can keep a note of your readings in the table overleaf and detach this page to take along to your next appointment.

## Treatment target ranges

Your target treatment range will depend on your age and whether or not you have any of the comorbidities listed in the table below. To date there have been no randomised controlled trials using purely ABPM or home readings to guide treatment of hypertension, and so these figures are based on [clinic readings](#), and only [if tolerated](#) by the patient:

### Blood pressure targets (clinic readings)

Age	Hypertension	+Diabetes	+Chronic kidney disease	+Coronary artery disease	+Stroke/TIA
18-65	120-130/70s	120-130/70s	130-139/70s	120-130/70s	120-130/70s
65+	130-139/70s	130-139/70s	130-139/70s	130-139/70s	130-139/70s

