HIGH AND LOW BLOOD PRESSURE: CAUSES, SYMPTOMS & SOLUTIONS

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Part 1 - How to Measure Blood Pressure Correctly

Are you curious about your blood pressure? Or did your doctor measure your blood pressure and now you'd like to learn how to measure it yourself? The following article will help you measure your blood pressure correctly.

Other things you will learn are:

- The common mistakes when measuring blood pressure
- What tho 2 numbers in your blood pressure measurement represent
- The type of device you can use

Let's begin and start at the end!

What device makes measuring blood pressure easy & accurate?

Some of you who had your blood pressure measured reading this might think: "Hey... this isn't how my blood pressure was measured?". You will find that measuring blood pressure isn't as simple as it seems.

If you have concerns about your blood pressure, it might be wise to buy a blood pressure monitor yourself. Personally, I use the Omron EVOLV blood pressure monitor. Why?

- It measures electronically and is therefore easy to use.
- It is accurate compared with other electronic devices (other devices have a tendency to overestimate!).
- It measures your heart rate at the same time. It even registers if your heartbeat became irregular during the measurement. Don't panic if this happens, it is normal if your heartbeat skips once in a while. But if it happens regularly, you might want to discuss the results with your doctor.

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Make sure when buying a blood pressure monitor that the cuff fits over your arm! Children for example need different cuffs. People with big arms as well.

How to measure your blood pressure correctly

With the right device preparing for a blood pressure measurement becomes your only concern. Manual measurements are great as well because manual measurements are often more precise than most automated cuffs. The downside of manual measurements is that it is hard to measure yourself and you will need some experience to make this method accurate.

To measure blood pressure, you will need to be at rest. This leads to rule number 1:

- Sit up in a chair for 5 minutes with your feet on the ground and not crossed. No phones. No talking.

In my experience, if you have been running to an appointment you might need some more time to get in full rest. If you measure too soon, it could potentially hide a low blood pressure or falsely lead to elevated 'rest' measurements.

So here is rule number 2:

- Don't squeeze in a blood pressure measurement in your schedule. It will be visible in the results.

It sounds obvious, but rushing to your doctor or feeling the stress of being late for your next appointment before measuring your own blood pressure won't give accurate readings.

On a different note: if you finished a workout, don't measure your blood pressure for at least a full hour after your training. Believe it or not, you might measure a lower blood pressure than usual since your blood vessels dilate due to physical activity.

Don't measure your blood pressure only once!

In my experience, the first measurement is often not the actual blood pressure measured at rest. Many people are a little tense waiting for the results, which will be visible in the measurements. The official way to find out the 'real' blood pressure is by measuring the blood pressure 3 times with a few minutes of rest in between. The average of these numbers is the official blood pressure.

Personally, I work with the last number measured. Why? Because people are usually more relaxed after 3 measurements. The influence of the tension is therefore the lowest in the last measurement.

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Here is the 3rd rule to measure blood pressure accurately:

- Measure at least 3 times, especially if this is your first time doing a measurement.

Here is a last rule that I personally use. A blood pressure measurement is representative of that moment. If you like a better understanding of what is going on, measure your blood pressure a few times daily. You can do this for a few days up to 2 weeks if you are really curious. Make sure you choose the same times every day.

Here are some additional rules for performing a good measurement:

- Make sure your back is supported. Support vs no support can easily differ by 5-10 points of mmHg. (mmHg are the units used to measure blood pressure)
- Make sure that your arm is at heart height. This can be done by placing your lower arm on a table. If you want to learn how much points arm position influences the results, you can experiment with your own blood pressure monitor by measuring with your arm above your head or letting your arm hang next to your body.
- Make sure you don't place the cuff over your clothes.

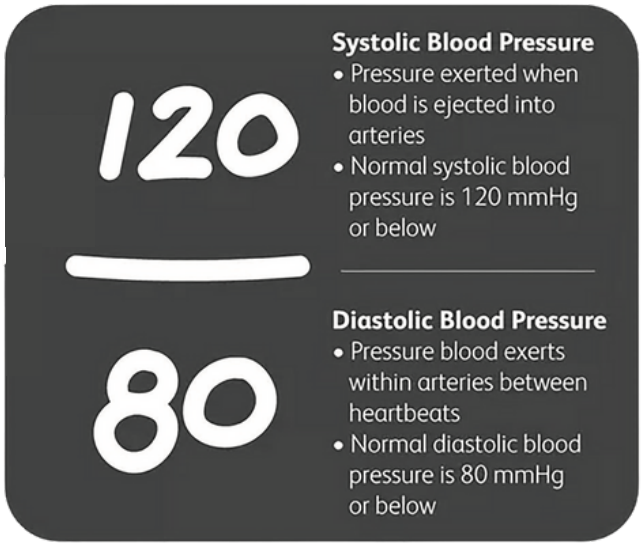
Other things that can influence the results that you might not have thought of:

- A full bladder can increase blood pressure. Make sure you empty your bladder first.
- Being in pain will also influence the measurement
- A bad night's sleep

What do the 2 numbers in your blood pressure measurement mean?

Now you have measured your blood pressure, but what do the 2 numbers mean?

When the heart beats, blood flows out of the left ventricle into the aorta. This causes the blood to press against the blood vessels and is called systolic blood pressure. The systolic blood pressure is the highest number of your blood pressure measurement. When the heart relaxes, blood flows back from the atrium into the left ventricle causing a lowering of the blood pressure. When the pressure is at its minimum, this is called diastolic blood pressure and is the lowest number of your blood pressure measurement.



Next in part 2, we'll discuss the causes, solutions and different stages of high blood pressure.

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Part 2 - Hypertension: Causes, Solutions and Understanding the Different Stages

In part 1 we discussed how to measure your blood pressure correctly. The following section will help you interpret high blood pressure. After reading through this part, you will understand why measuring blood pressure the correct way is so essential.

In this part, I will dive deeper in:

- The different stages of hypertension
- The signs & symptoms of hypertension
- Why having normal values is important for health & longevity
- The difference between primary & secondary hypertension
- What are the most important causes of hypertension and what you can do about it

Since hypertension is such a big topic, we'll discuss low blood pressure in Part 3.

The Different Stages of Hypertension

The difficulty with hypertension or high blood pressure is that experts might disagree on what they consider as high values. Currently, scientific literature considers a healthy value when the systolic pressure is under 120 and the diastolic pressure is less than 80.

- Just to help you remember, systolic pressure is measured when the left ventricle in the heart contracts and pushes blood into the aorta. This causes pressure to rise in the blood vessels. A blood pressure monitor will measure this number.

When the left ventricle relaxes, the valves in the heart close preventing blood from the aorta to go back into the heart and the blood flows from the atrium into the left ventricle. The pressure in the blood vessels will drop. The pressure measured then is called diastolic pressure.

You just need one value to be elevated to talk about elevated blood pressure. Below you can quickly see where your number falls when you get your blood pressure results back:

	Systolic	***Diastolic***
Healthy range	less than 120	less than 80
Elevated	between 120-129	less than 80
Stage 1 Hypertension	between 130-139	between 80-90
Stage 2 Hypertension	140 or higher	90 or higher
Hypertension Crisis	over 180	over 120

If you measured your blood pressure correctly and at least one of the numbers falls into the Hypertension Crisis category, it is important to make an appointment with your doctor.

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What are the signs & symptoms of elevated blood pressure?

Often nothing!

Most of the signs often look innocent as well. You might experience:

- Headaches
- Nose bleeds
- Shortness of breath
- Dizziness
- Blood spot in the eyes
- Chest pain
- Vision changes like blurred vision
- Buzzing in the ears
- Heart palpitations.

Hypertension & Longevity

The smallest blood vessels suffer the most from elevations in blood pressure. Kidneys, eyes, and brains contain a good amount of small blood vessels and this is where hypertension can cause damage. Stage 1 & Stage 2 hypertension can be invisible for years and won't cause immediate problems. But walking around day in & day out with these values can slowly cause these organs to struggle. Hypertension can all play a role in dementia, heart disease, kidney disease, & vision loss. Interestingly enough, studies show that the risk of death is significantly increased with relatively small elevations in blood pressure. This meta-study concluded that:

If you consider people ages about 40 to 70, every 20 millimeters of mercury increase in systolic blood pressure and every 10 millimeters of mercury increase in diastolic blood pressure are associated with a doubling in the risk of death from stroke, heart disease, or other vascular diseases.

If your blood pressure is 140 over 90 as opposed to 120 over 80, you've doubled your risk of death.

Unfortunately, a lot of doctors don't consider blood pressure readings of 139/89 as a problem without symptoms. When optimal health is your goal, lowering these numbers will reduce vascular stress on your body and is an investment in your future.

Primary Hypertension vs Secondary Hypertension

Sometimes you will hear people talk about primary hypertension and secondary hypertension. Officially primary hypertension is hypertension that isn't caused by underlying health conditions. Secondary hypertension is when underlying health conditions cause your blood pressure to rise.

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However, keep in mind you can have both primary and secondary hypertension!
Since functional medicine interprets lab values differently, the lines between primary hypertension and secondary hypertension can get a bit blurry. The distinction is also less important. There are however clues as to when secondary hypertension might be at play.

- Clue 1: If a person's already being treated for high blood pressure but is not responding to medications.
- Clue 2: Also, if someone is no longer responding to medications that they previously responded to.
- Clue 3: If blood pressure is extremely high (above 180 mm Hg systolic)
- Clue 4: If it's high and you're really young. For example, a 30-year old person that otherwise has no risk factors such as a family history of high blood pressure, they're not obese, and yet they show up with high blood pressure.
- Clue 5: If the blood pressure rises suddenly.

What can you do to lower your blood pressure?
Find the root causes!
Here is a list that can help you on your way:

- Address Insulin resistance: insulin has been shown to inhibit sodium excretion by increasing sodium reabsorption in the kidney. Sodium accumulation causes water retention and often, high blood pressure.

- Salt/Sodium intake: You might have learned that reducing salt reduces blood pressure. There is more nuance to that. The influence on blood pressure by consuming less salt for a lot of people isn't that big. Some people do however respond well to reducing salt intake. The best way is to find out empirically! Just measure the change in your blood pressure.
  People that do respond better to lower sodium intake are for example people with insulin resistance. Other people that might respond better to lower sodium intake are older people, people with kidney disease, and African Americans.

- Address Thyroid problems: A slow or a fast thyroid can cause high blood pressure. Would you like to know what symptoms are of thyroid dysfunction? Just watch this video. If you like to learn more about what lab values you should measure to provide the correct insight into your thyroid health, watch this video!

- Obesity: being overweight can increase blood pressure.

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- Stress: Another big reason why blood pressure elevates is because of imbalances in stress hormones. With elevated stress, the body tries to prepare for a possible physical attack. It tries to increase blood sugar, heart rate, and blood pressure to make a quick escape possible. Unfortunately, the body doesn't differentiate between different types of stress. Up until a few hundred years ago hunting or being in physical danger caused stress hormones and blood pressure to rise. These days deadlines, trying to pay bills, and emotional stress cause the same stress response and can cause elevations in blood pressure.
  To make it more complex: stress hormones can also rise with infections, inflammation, and pain. This video dives deeper into what can cause elevations in cortisol and is worth watching!
- Insufficient potassium: insufficient potassium intake can also cause elevations in blood pressure. In fact, more people will respond to increasing potassium intake as reducing potassium. Good sources of potassium are tomatoes, bananas, avocados, and beans.
- Insufficient magnesium: Magnesium is needed to absorb potassium into the cells, but it is also needed to relax muscles around the blood vessels. If you like to measure your magnesium levels, I prefer RBC (Red Blood Cell) magnesium over serum magnesium levels.
- Poor sleep: Insufficient sleep can impact blood pressure as well. In fact, a really bad night's sleep can increase blood pressure the next day. Especially people who sleep fewer the 5 hours per night can see significant elevations in blood pressure.
- Lack of exercise: exercise can be a great way of reducing blood pressure. Cardiovascular activities (and this can include walking if you are physically inactive!) seem to have the biggest impact. Strength training can be great as well. A tip when your blood pressure is really elevated, don't start with exercises like squats, leg presses, and deadlifts since these exercises do increase blood pressure a lot!
- Coffee: Drinking a lot of coffee can increase blood pressure as well. Reducing your intake might be part of your healing journey.
- Smoking & Alcohol: perhaps worth mentioning, although it might not need much explanation. It is my experience with my clients that a few cigarettes from yesterday can still impact blood pressure measurements measured today.

If you'd like a short summary on what elevates blood pressure I recommend you to read the handout in the B Better library called High Blood Pressure (just click here). It summarizes the different root causes. Next, let's dive into low blood pressure!

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Part 3: Low Blood Pressure: Causes, Symptoms and Solutions

In the following section you will learn:

- Signs & symptoms of low blood pressure
- Some common mistakes in low blood pressure measurements
- The impacts of low blood pressure
- What you can do about it!

Before we dive into answering these questions, make sure you measure your blood pressure the correct way as discussed in Part 1. If you measure low blood pressure, keep in mind that you shouldn't trust your first blood pressure measurement.

Here is a nice summary table on what can influence your blood pressure measurements (credits go to https://www.adctoday.com!)

Factors Affecting Blood Pressure Readings

Variance ↓ (mmHg)	Cause of Variance	Variance ↑ (mmHg)
	Cuff is too small [2, 4, 6, 7, 8, 10, 12, 14, 16, 18, 19]	10-40
10-40	Cuff over clothing [10, 16, 18]	10-40
	Back/feet unsupported [3, 18]	5-15
	Legs crossed [1, 5, 9, 16, 17, 18]	5-8
	Not resting 3-5 minutes [2, 10, 16, 18, 19, 20]	10-20
	Patient talking [2, 10, 11, 16, 17, 18]	10-15
	Labored breathing [16, 18]	5-8
	Full bladder [13, 16, 18]	10-15
	Pain [16]	10-30
	Arm below heart level [2, 10, 13, 16, 17, 18]	1.8/inch
1.8/inch	Arm above heart level [10, 13, 16, 17, 18]	

The most important factor to mention here, which is not mentioned in the table, is the size of the cuff. Some people (like children and people with small arm sizes) need different cuff sizes; even when you are using an adjustable cuff! When arms are smaller, not only should the width of the cuff be smaller, but the length as well to get accurate readings! This is why kids usually need different cuff sizes.

From this table, you can see that putting cuffs over clothes can easily add or lower blood pressure measurements as well by 10-40 points.

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Blood pressure and kids

Some people, when they measure blood pressure with their kids, can get worried as well since they will often measure lower blood pressures as well.

Kids usually have a lower blood pressure than adults!

The smaller kids are, the lower their blood pressure values should be. Talk to a doctor if you are worried.

Signs & Symptoms of low blood pressure

Low blood pressure is typically determined when your low blood pressure reading is below 90/60 mm Hg. However, some people don't display symptoms with these values. A single hypotensive measurement isn't usually problematic as long as none of the following symptoms are present:

- Dizziness or light-headedness
- Nausea
- Fainting
- Cold, clammy, pale skin
- Blurred vision
- Dehydration and unusual thirst
- Rapid, shallow breathing
- Lack of concentration
- Fatigue

What causes low blood pressure?

Blood pressure is regulated by the brain, the nervous system and the adrenal glands - yes the same glands that produce cortisol! In fact, the most well-known hormone for regulating blood pressure is called Aldosterone, which regulates the electrolytes potassium and sodium.
What are the factors that cause low blood pressure?

Stress

Stress can cause high blood pressure as well as low blood pressure. You might find it interesting to know that the hormone regulating the electrolytes in the blood called Aldosterone is in fact grouped under the same class of hormones as cortisol: corticosteroids (hormones made in the cortex of the adrenal gland).

- Cortisol is a glucocorticoid because its main function is to regulate blood sugar
- Aldosterone is a mineralocorticoid because its main function is regulating the mineral balance between potassium and sodium.

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Cortisol and aldosterone both can influence blood pressure. With prolonged exposure to stress, we often see low cortisol levels contributing to lower blood pressure. Would you like to measure cortisol levels? The DUTCH Adrenal panel and the DUTCH Complete are both good options. The Adrenal Balance course goes in depth on signs, symptoms and solutions to help you bring balance to your stress hormones.

Low Blood Volume

The body contains about 5 litres of blood. If this volume reduces, blood pressure can drop as well. Several reasons why blood volume could be low:

- Dehydration/excessive sweating
- Blood loss (for example after donation, after injuries and heavy periods)
- Persisting vomiting or diarrhea
- Diuretics
- Heat, since it can cause the blood vessels to dilate. This causes low blood pressure as well

With low blood volume hydration becomes more important!

Lack of nutrients

We need nutrients to produce red blood cells. Iron, vitamin B12, folate, vitamin A and vitamin D are all nutrients we need to create red blood cells. Sodium is also an important mineral to keep blood pressure within range. When people lack sodium or lose a lot of sodium (this could be related to Aldosterone production) the body loses water and cravings for salty foods can be the result.

Pregnancy

Being pregnant causes the body to grow fast. This increase in volume can cause blood pressure to lower as well. In the first part of pregnancy (usually the first 24 weeks) blood pressure can become lower. If symptoms appear, here are some tips during that phase:

- Don't stand for long periods of time
- Avoid getting up quickly when you're seated or lying down
- Eat small meals throughout the day
- Don't take very hot baths or showers
- Drink more water
- Wear loose clothing

After giving birth blood pressure can drop as well.

Medications

Medications to manage high blood pressure lower blood pressure. Keep this in mind if you use medications and are healing from high blood pressure! Be aware if you are using:

- ACE inhibitors
- Beta Blockers
- Diuretics (I know, I mentioned before!)
- Angiotensin II receptor blockers
- Calcium channel blockers (they relax and open up narrowed blood vessels)
- Blood vessel dilators (vasodilators)
- Alpha blockers (which block norepinephrine/noradrenaline from tightening the muscles in the walls of smaller arteries and veins)

Some antidepressants can cause low blood pressure as well. If you're taking antidepressants in the medication group of tricyclic antidepressants and monoamine oxidase inhibitors (MAOIs), this can cause low blood pressure as well! Adjusting medications while working on root causes in this case, might be necessary.

Low blood sugar (Hypoglycemia)

With insulin resistance, we see insulin overproduction as long as the pancreas still does its job. Although with insulin resistance most people think of high blood sugar, in the first stages of insulin resistance a drop in blood sugar can happen. In the early stages, we do see insulin overproduction, but the cells are still sensitive enough to absorb blood sugar. This can cause a drop in blood pressure.

Blood sugars can also be low with long-term starvation. This can also cause low blood pressure.

Although low-carb diets can decrease high blood pressure and are helpful to lower blood sugar, they aren't usually a cause of low blood pressure symptoms.

Hopefully, this guide has been helpful and has given you some better insights into the different forms of blood pressure.