Heart disease in numbers

A report on the leading global killer

Shen.AI

Table of contents

Summary

Cardiovascular disease (CVD) is still the **number one killer** globally, claiming **20.5 million lives** every year, that's **one-third of all deaths** worldwide. Despite all the advances in medicine, prevention and early detection remain significant challenges.

This report highlights the urgent need for new strategies to prevent CVD, addressing key risk factors, the global burden of hypertension and the necessity for systemic change in both policy and personal health behaviours to improve health outcomes.

A major concern is the low detection of cardiovascular risk factors. Studies show that **46% of adults** with hypertension are unaware of their condition due to a lack of routine screenings. This report advocates for greater investment in preventive care, expanded screening programs and digital health solutions to empower individuals to take control of their heart health proactively.

The report identifies several modifiable risk factors for CVD, including hypertension, smoking, diabetes, obesity, and physical inactivity. It underscores the importance of lifestyle changes and early intervention to reduce the risk of heart disease and it's complications.

Prevention is not only beneficial for individuals but also economically crucial. The cost of treating CVD is projected to exceed **$1 trillion in the U.S. alone by 2035**. Investing in prevention today can significantly reduce future healthcare costs and improve long-term health outcomes.

Finally, the report calls for collective action from policymakers, healthcare providers and individuals to raise awareness, expand routine health screenings, and adopt heart-healthy lifestyles. Taking these steps can significantly reduce the burden of CVD and improve long term health outcomes worldwide.

Purpose of the report

Cardiovascular disease is the leading cause of death worldwide, responsible for approximately **20.5 million deaths annually**, one-third of global mortality[1]. Despite significant medical advancements, early detection and prevention continue to pose major challenges, putting millions at risk of severe complications, disability, and premature death.

This report aims to raise awareness of the urgent need for more effective strategies in preventing, diagnosing, and managing cardiovascular diseases. It explores key risk factors, the global impact of hypertension, and the role of prevention strategies, providing a data-driven analysis of how systemic changes – both in policy and individual health behaviors – can lower mortality rates and improve long-term health outcomes.

A critical issue underscored in the report is the low detection rate of cardiovascular risk factors. According to recent studies, **46% of adults with hypertension** are unaware of their condition[2], as they do not undergo routine screenings. This lack of awareness delays treatment and significantly increases the risk of life-threatening events such as heart attacks and strokes.

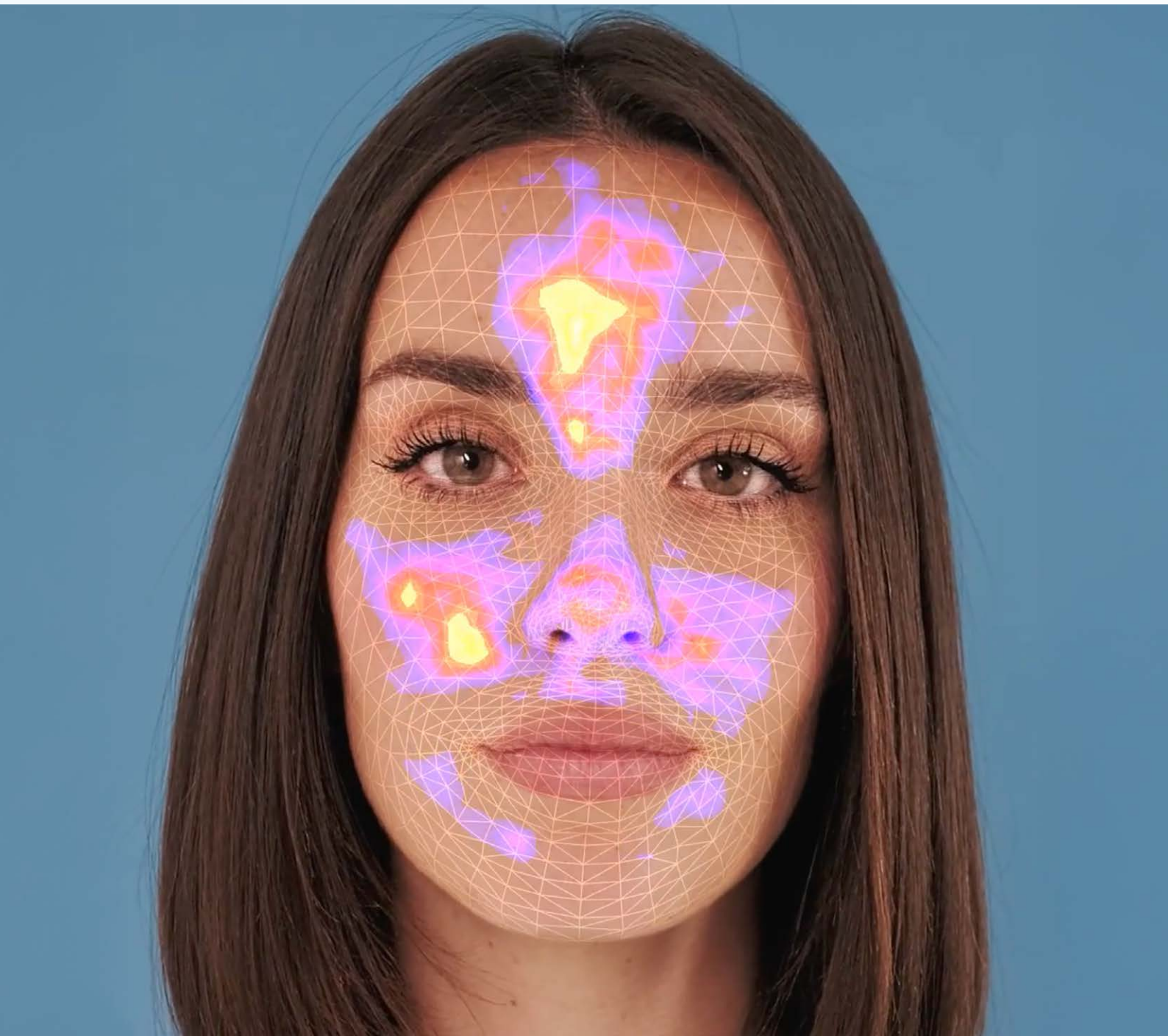
This report calls on policymakers, healthcare leaders, employers, and individuals to take action. Investing in preventive healthcare, expanding screening programs, and embracing digital health solutions can transform cardiovascular care – improving individual health outcomes while easing the economic burden on healthcare systems. At the individual level, increasing awareness, routine monitoring, and proactive lifestyle changes remain critical. Many people are unaware of their cardiovascular risk factors

[1] "Global Burden of Cardiovascular Diseases and Risks Collaboration", Megan Lindstrom PhD, Nicole DeCleene BS, Henry Dorsey MS, Valentin Fuster MD, PhD, Catherine O. Johnson PhD, MPH, Kate E. LeGrand MPH, George A. Mensah MD, Christian Razo PhD, Benjamin Stark MA, Justine Varieur Turco MA, Gregory A. Roth MD, MPH

[2] "Global report on hypertension: the race against a silent killer", WHO

or delay seeking care until serious symptoms arise. Encouraging regular check-ups, promoting heart-healthy habits, and leveraging accessible digital health tools can empower individuals to take control of their heart health – before it reaches a crisis point.

In addition to analyzing the epidemiological landscape of cardiovascular disease, the report also emphasizes practical steps for prevention, including lifestyle modifications, digital health innovations, and the potential of AI-powered monitoring solutions for a proactive approach to cardiovascular health – one that prioritizes prevention, early intervention, and equitable access to life-saving healthcare.



Introduction

(CVDs) continue to pose a major global health challenge. Currently, **1.28 billion people** worldwide live with hypertension[3] and more than **500 million** are affected by some form of cardiovascular disease[4].

Hypertension is the leading risk factor for premature death[5], playing a major role in the growing mortality rate from cardiovascular diseases.

Since 1990, deaths from CVDs have surged by **60% – from 12.1 million to 20.5 million in 2019**[6]. The primary culprits behind these fatalities are ischemic heart disease and stroke.

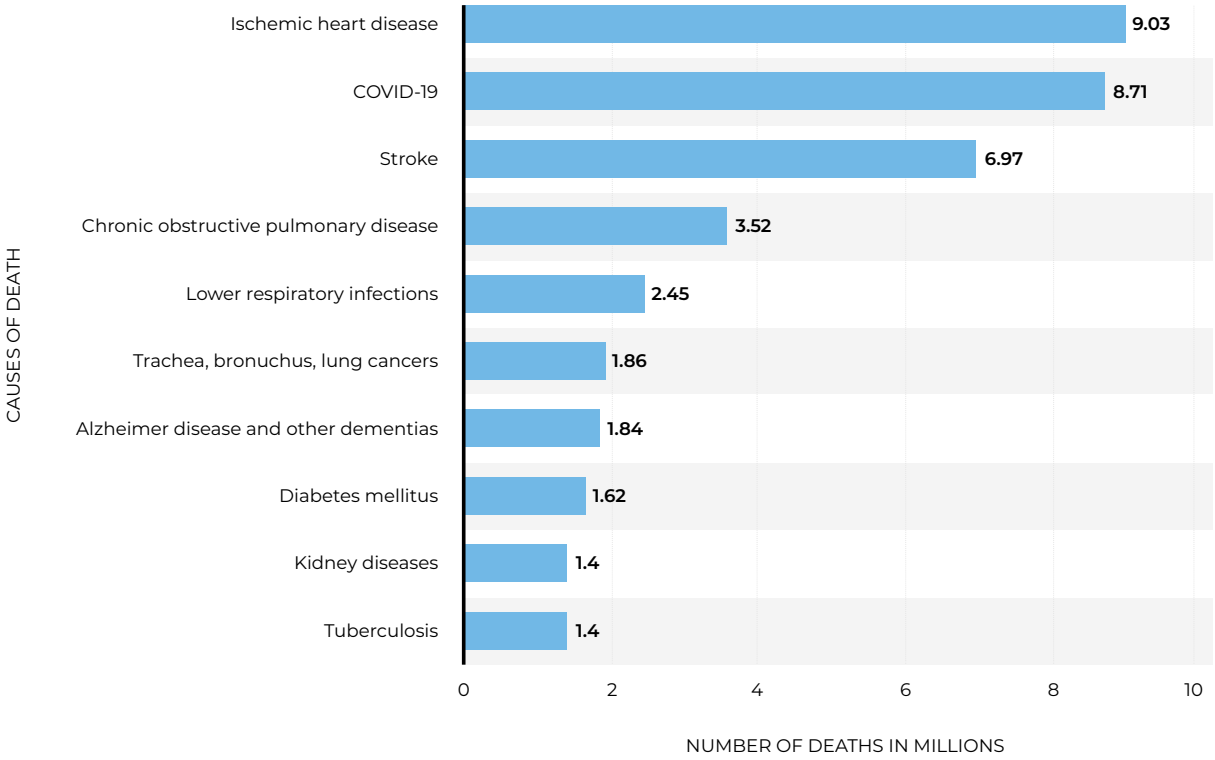


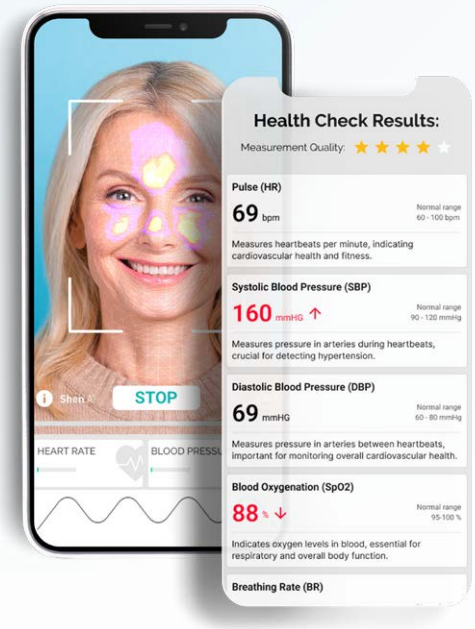
Figure 1: Causes of death worldwide, see source.

[3] Hypertension fact sheet, WHO
[4] "World Heart Report 2023", World Heart Federation
[5] "Global Burden of Disease 2021: Findings from the GBD 2021 Study", IHME
[6] "Deaths from cardiovascular disease surged 60% globally over the last 30 years: Report", WHF

Yet, many of these deaths are preventable. Research indicates that up to **80% of premature heart attacks and strokes** could be avoided through effective prevention[7], early detection, and timely medical intervention. However, millions remain undiagnosed or untreated due to inadequate screening, lack of awareness, and limited access to healthcare services – particularly in low- and middle-income countries.

Beyond individual health risks, CVDs pose an economic challenge. The global cost of cardiovascular disease, including healthcare expenses and lost productivity, is projected to exceed **$1 trillion annually by 2035**[8] in the USA alone. Despite this, investment in prevention remains low. In Europe, for example, the average expenditure on preventive health is **6% of total healthcare spending**[9], with some countries going as low as **1 or 2 percent.**

To reduce this growing burden,a greater focus on early detection, prevention, and lifestyle interventions is necessary. Medical experts emphasize the need for systemic changes, including increased accessibility to routine screenings, genetic testing, and AI-powered health monitoring solutions that can help detect cardiovascular risks before they escalate into life-threatening conditions.



[7] "Cardiovascular Diseases", NCD Alliance

[8] "Heart Disease and Stroke Statistics", American Heart Association

[9] "Preventive healthcare expenditure as a share of current expenditure on healthcare", Eurostat

“The data doesn’t lie. This report confirms the serious threat that cardiovascular disease poses all over the world, particularly in low- and middle-income countries.

Up to 80 per cent of premature heart attacks and strokes can be prevented. It’s vital that countries prioritise rolling out tools and policies to protect people from CVD.

Good data can help drive good policy – the opportunity is stillthere to accelerate action towards reducing premature mortality from NCDs by one-third by 2030.

Professor Fausto Pinto
former president of the World Heart Federation, co-author of the “World Heart Report”

Quote source

What contributes to the development of heart disease?

Cardiovascular disease develops over time due to a combination of lifestyle, genetic, and environmental factors. While some risks, like age or family history, are beyond our control, many risks can be managed with the right interventions. Addressing these factors through early detection and preventive strategies can significantly reduce the likelihood of heart disease, stroke, and related complications.

High blood pressure

Hypertension is a leading risk factor for CVD, damaging blood vessels and raising the risk of heart attacks, strokes, and other serious complications. Hypertension is a global health concern, with studies showing that a staggering **50% of men** and **44% of women** worldwide are affected[10]. When left uncontrolled, high blood pressure can lead to a range of life-threatening issues, including heart failure, kidney disease, and vision loss. Early detection and effective management of hypertension through proactive lifestyle changes and appropriate medical treatment, are essential for reducing the burden of cardiovascular disease globally.

Smoking

Smoking is a major risk factor for the development of cardiovascular disease, as the nicotine in cigarettes can have several harmful effects on the cardiovascular system. Nicotine raises blood pressure by constricting blood vessels and increasing the heart's workload. Smoking increases the risk of blood clot formation, which can block blood flow and trigger heart attacks or strokes. Smokers **under 40** are five times more likely to experience a heart attack than

[10] "High blood pressure in the United States", CDC

non-smokers[11]. Quitting smoking, even later in life, can significantly reduce an individual's risk of cardiovascular diseases and improve heart health.

Diabetes

High blood sugar levels associated with diabetes can seriously damage blood vessels and nerves, significantly increasing the risk of heart disease, stroke, kidney disease, and other severe health problems. Type 1 diabetes, type 2 diabetes, and even pre-diabetic conditions all increase the risk of developing cardiovascular and other blood-related diseases. Uncontrolled high blood sugar can accelerate the progression of atherosclerosis, impair blood flow, and contribute to a wide range of life-threatening complications.

Overweight and obesity

Excess weight can affect cardiovascular health. Carrying extra pounds, particularly around the waistline, places significant strain on the heart and blood vessels. The added weight forces the heart to work harder to pump blood throughout the body, leading to high blood pressure. Obesity is closely linked to the development of insulin resistance and type 2 diabetes, both of which are major risk factors for cardiovascular disease.

Physical inactivity

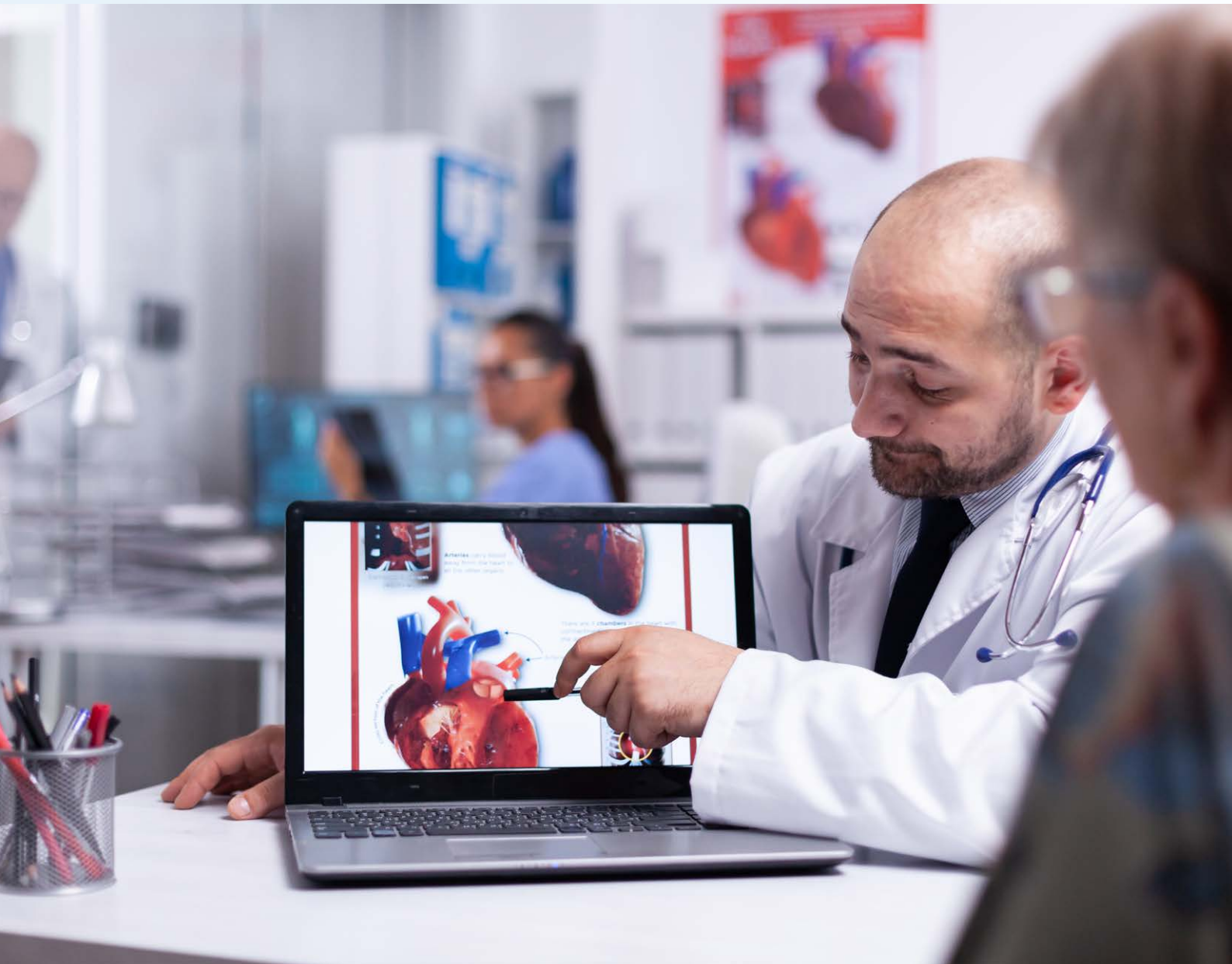
A sedentary lifestyle is a major contributor to the development of cardiovascular disease. Studies show that over half of adults engage in little to no physical activity, significantly increasing their risk of heart and vascular conditions. Lack of exercise can have a negative impact on cardiovascular function, as regular physical activity is essential for maintaining healthy blood pressure, cholesterol levels, and body weight – all key determinants of heart health.

[11] "Tobacco breaks hearts every day", June Shannon, Irish Heart Foundation

To reduce the burden of CVD, it is critical that individuals incorporate regular, moderate-to-vigorous physical activity into their daily routines, aiming for at least **150 minutes per week** as recommended by health authorities.

Alcohol abuse

Excessive alcohol consumption harms cardiovascular health by raising blood pressure, disrupting cholesterol and triglyceride levels, and gradually weakening the heart muscle. Chronic heavy drinking is strongly associated with an increased risk of developing high blood pressure, heart failure, and other life-threatening cardiovascular conditions. Moderation or abstinence from alcohol is strongly recommended to maintain optimal heart health.



Chronic stress

Chronic stress can significantly impact cardiovascular health. Prolonged anxiety, tension, or emotional strain can trigger physiological responses like elevated blood pressure, which, over time, may damage blood vessels and the heart. Managing chronic stress through relaxation techniques, counseling, or lifestyle adjustments is essential for protecting heart health and reducing the risk of cardiovascular disease.

Additional risk factors

Age & gender

CVD risk rises after **45 in men and 55 in women**, with postmenopausal women seeing a sharp increase.

Family history

Having a close relative with heart disease raises an individual's own risk.

Poor diet

Diets high in saturated fat, trans fat, and sodium contribute to hypertension and atherosclerosis.

Lipid imbalances

High triglycerides and low HDL cholesterol further heighten cardiovascular risk.

Mental health disorders

Depression and anxiety are increasingly linked to heart disease.

Sleep disturbances

Chronic sleep deprivation or excessive sleep can harm cardiovascular health.

Environmental exposure

Air pollution, noise, and exposure to heavy metals (such as lead and arsenic) negatively affect heart health.

Oral health

Gum disease has been associated with systemic inflammation and an increased risk of atherosclerosis.

Gender-specific factors

Pregnancy complications, early menopause, and erectile dysfunction can all signal heightened cardiovascular risk.

Years of cumulative risk factors – many of which are modifiable – lead to cardiovascular disease. Addressing lifestyle and environmental factors can have a significant impact, even while some hazards, such as age or heredity, cannot be avoided.

The risk of heart disease and its complications can be decreased by being proactive, which includes keeping an eye on important health metrics, making informed lifestyle choices and giving priority to preventative care. In addition to treatment, prevention, education, and a sustained dedication to health are the keys to improved heart health.

Prevention and early diagnosis

Clinical experts agree that early detection and preventive measures are essential to reducing the burden of cardiovascular disease, hypertension, and hypercholesterolemia. Cardiovascular diseases often develop silently over years, with patients unaware of their elevated risk until a serious event – like a heart attack or stroke – occurs. Effective prevention relies on identifying risk factors early and implementing targeted interventions to reduce long-term health consequences. A study published in The Lancet highlights the critical role of screening programs in reducing cardiovascular events[12]. The research found that early detection of hypertension and high cholesterol, combined with timely intervention, significantly lowered the risk of heart attacks and strokes. Despite this, screening efforts remain underutilized, particularly in low- and middle-income countries, where access to preventive healthcare is often limited.

To address this challenge, regular health assessments should become the norm rather than the exception. Healthcare professionals recommend routine screenings for:

- **Blood pressure levels** to detect hypertension before complications arise.
- **Lipid profiles (cholesterol levels)** to assess cardiovascular risk.
- **Blood glucose tests** to identify prediabetes or diabetes.
- **Body composition metrics** such as BMI and waist-to-height ratio, which correlate with metabolic health.

Preventive healthcare is also an economic imperative. Cardiovascular disease treatment accounts for nearly **16% of total healthcare**

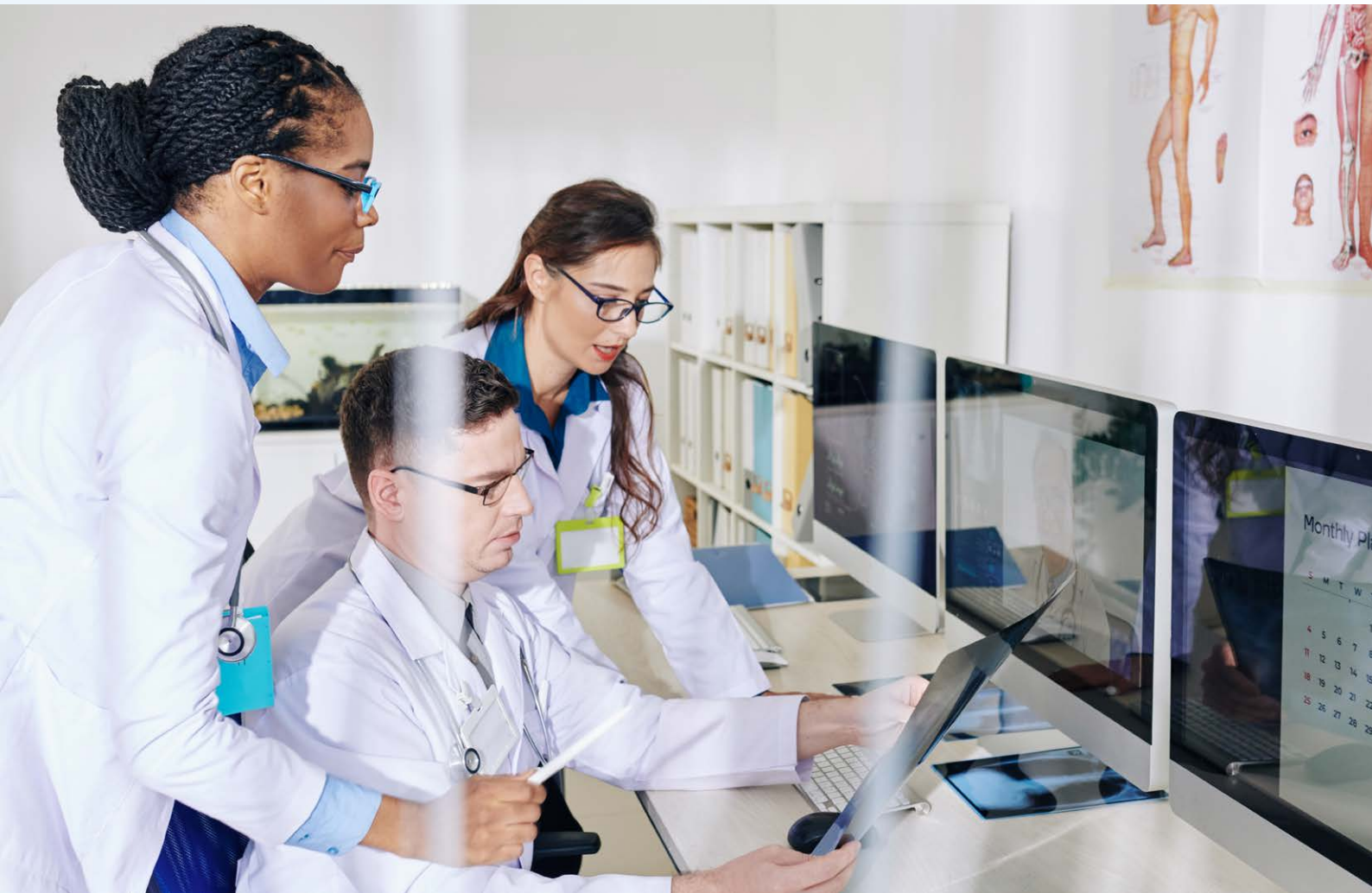
[12] "Cardiovascular disease prevention: Risk factor modification at the heart of the matter", Ameenathul M. Fawzy, Gregory Y.H. Lip

spending in high-income European countries[13]. It is estimated that CVD costs the EU economy **€282 billion annually**[14] – a figure that could be significantly reduced through investments in preventive measures and early diagnosis.

While these figures highlight the urgent need for systemic change, prevention requires more than just clinical screenings. Experts advocate for integrating digital health solutions – such as AI-driven monitoring tools – to bridge gaps in care, increase accessibility, and empower individuals to take control of their cardiovascular health reducing the need for medical intervention.

[13] "European Society of Cardiology: the 2023 Atlas of Cardiovascular Disease Statistics", Adam Timmis, Victor Aboyans, Panos Vardas, Nick Townsend, Aleksandra Torbica, Maryam Kavousi, Giuseppe Boriani, Radu Huculeci, Denis Kazakiewicz, Daniel Scherr, Efstratios Karagiannidis, Marta Cvijic, Agnieszka Kapłon-Cieślicka, Barbara Ignatiuk, Pekka Raatikainen, Delphine De Smedt, Angela Wood, Dariusz Dudek, Eric Van Belle, Franz Weidinger; ESC National Cardiac Societies

[14] "Economic burden of cardiovascular diseases in the European Union: a population-based cost study", Ramon Luengo-Fernandez, Marjan Walli-Attaei, Alastair Gray, Aleksandra Torbica, Aldo P Maggioni, Radu Huculeci, Firoozeh Bairami, Victor Aboyans, Adam D Timmis, Panos Vardas, Jose Leal



How to reduce the risk of cardiovascular disease

Cardiovascular diseases are largely preventable, with lifestyle changes playing a key role in reducing risk. Maintaining heart health doesn't require drastic changes – rather, it's about adopting consistent, science-backed habits that help regulate blood pressure, improve cholesterol levels, and support overall cardiovascular well-being.

Follow a heart-healthy diet

A well-balanced diet helps reduce inflammation, regulate blood pressure, and maintain healthy cholesterol levels. WHO estimates that excessive sodium intake contributes to **1.89 million cardiovascular deaths annually**, making dietary adjustments one of the most impactful interventions[15].

- **Avoid highly processed foods**, which are sources of trans fats, which increases the risk of stroke and heart disease.
- **Limit sodium** if you suffer from hypertension. The appropriate amount of sodium is about a teaspoon of salt. However, most of our sodium intake comes from processed foods, which can make tracking challenging.
- **Increase the amount of fiber**, that is, eat more whole-grain products, vegetables, and fruits. A daily increase in whole grain consumption of **15 grams** is linked to a **2% to 19% decrease** in the overall number of deaths and incidences of colorectal cancer, coronary heart disease, and Type 2 diabetes[16].

[15] "Sodium reduction" factsheet, WHO

[16] "High-fiber diet linked to lower risk of death and chronic diseases", Nina Avramova, CNN

- **Follow the Dietary Approaches to Stop Hypertension[17] (DASH) diet**, recognized as the gold standard for heart health. It effectively lowers blood pressure, improves cholesterol levels, and reduces the risk of heart disease and type 2 diabetes.
- **Eat fatty fish rich in n-3 PUFA** at least once a week and limit red meat. A diet rich with fish is linked to a decreased risk of cardiovascular disease[18].
- **Limit sugar**, especially in sweetened beverages. Adding one sugary beverage daily was linked to an approximately **18% higher risk** of cardiovascular disease, no matter the individual's level of physical activity[19].

[17] "DASH diet: Healthy eating to lower your blood pressure", Mayo Clinic

[18] "Fish intake is associated with lower cardiovascular risk in a Mediterranean population: Prospective results from the Moli-sani study", M. Bonaccio, E. Ruggiero, A. Di Castelnuovo, S. Costanzo, M. Persichillo, A. De Curtis, C. Cerletti, M.B. Donati, G. de Gaetano, L. Iacoviello, Moli-sani study Investigators

[19] "Sugary drinks increase risk of cardiovascular disease, regardless of how much you exercise", Harvard T.H. Chan School of Public Health

Avoid harmful stimulants

- **Quit smoking.** Tobacco is responsible for **20% of deaths** from coronary heart disease. There's also good news, though: if tobacco users take immediate action and quit, then their risk of heart disease will decrease by **50% after** one year of not smoking[20].
- **Limit alcohol consumption.** Excessive alcohol intake is strongly linked to high blood pressure and heart failure, with cardiovascular disease being the leading cause of alcohol-related deaths[21].
- **Drink filtered coffee in moderation.** According to research, the relationship between habitual coffee consumption and CVD risk is nonlinear. When compared to individuals consuming **1–2 cups/day**, the CVD risk was higher for non-drinkers, decaffeinated coffee drinkers, and those who claimed to drink more than **6 cups/day**, with odds increasing by **11%, 7%, and 22%**[22], respectively. Additionally, cafestol and kahweol present in unfiltered coffee interfere with the body's ability to break down and regulate cholesterol. Regular consumption of unfiltered coffee raises LDL cholesterol levels, increasing the risk of atherosclerosis and cardiovascular disease[23].

Be physically active

Regular exercise is one of the most effective ways to manage blood pressure and reduce cardiovascular risk. Studies confirm that even **15 minutes** of low-intensity activity per day provides measurable benefits[24].

- **Aim for 2.5 to 5 hours of moderate aerobic activity** per week or **1.25 to 2.5 hours** of high-intensity aerobic activity.

[20] "Tobacco responsible for 20% of deaths from coronary heart disease", WHO

[21] "Alcohol use" factsheet, WHO

[22] "Long-term coffee consumption, caffeine metabolism genetics, and risk of cardiovascular disease: a prospective analysis of up to 347,077 individuals and 8368 cases", Zhou Ang, Hyppönen Elina

[23] "Impact of Coffee Consumption on Cardiovascular Health", Michael F Mendoza, Ralf Martz Sulague, Therese Posas-Mendoza, Carl J Lavie

[24] "15 minutes daily exercise may be reasonable target in older adults", European Society of Cardiology

- **Include strength training** at least **twice per week,** as it improves circulation, lowers blood pressure, and enhances overall cardiovascular function.
- **Moderate-intensity activities** include brisk walking **(4.8 km/h+)**, swimming, cycling, ballroom dancing, and water aerobics.
- **High-intensity activities** include jogging, running, interval training, and climbing.

Manage stress and mental health

Chronic stress has long been associated with hypertension and increased cardiovascular incidents. Psychological distress can lead to hormonal imbalances, elevated blood pressure, and an increased risk of atherosclerosis.

- **Engage in stress-reducing activities** such as mindfulness, meditation, or yoga.
- **Prioritize sleep.** Chronic sleep deprivation is linked to higher blood pressure[25].
- **Maintain strong social connections**, as loneliness and social isolation are increasingly recognized as cardiovascular risk factors[26].

Take care of your oral hygiene

Oral hygiene plays a surprising but critical role in cardiovascular health. Studies show that people with periodontal disease have two to three times the risk of having a heart attack, stroke, or other serious cardiovascular event[27] .

[25] "Sleep Deprivation Is Associated With Increased Risk for Hypertensive Heart Disease: A Nationwide Population-Based Cohort Study", Endurance O Evbayekha, Henry O Aiwuyo, Arthur Dilibe, Bede N Nriagu, Abiodun B Idowu, Ruth Y Eletta, Evidence E Ohikhuai

[26] "Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies", Nicole K Valtorta, Mona Kanaan, Simon Gilbody, Sara Ronzi, Barbara Hanratty

[27] "Gum disease and heart disease: The common thread", Harvard Health Publishing

- **Visit your dentist** every six months for regular gum health check-ups.
- **Maintain proper brushing and flossing habits** to prevent bacterial infections that could contribute to atherosclerosis.

Preventive screenings and risk factor management

Regular check-ups help catch risk factors early, before they escalate into serious conditions. Despite the importance of routine health monitoring, studies show that many people remain undiagnosed until cardiovascular disease has already progressed[28].

Recommended screenings include:

- **Blood pressure measurement** – at least once a year.
- **Fasting glucose test** – to monitor diabetes risk.
- **Lipid panel (cholesterol test)** – younger adults should take the screening every **5 years**. **Men aged 45-65** and **women aged 55-65** should be screened every **1 to 2 years**, and later in life, it's recommended to check the lipid panel yearly[29].

By making proactive lifestyle changes, minimizing harmful risk factors, and keeping up with routine screenings, individuals can significantly lower their chances of developing cardiovascular disease. When combined with education, early detection, and innovative digital health tools, cardiovascular prevention becomes more effective, accessible, and impactful worldwide.

[28] "About Heart Disease", CDC

[29] "Blood Cholesterol - Diagnosis", National Heart, Lung, and Blood Institute, NIH

The importance of blood pressure monitoring

Hypertension is a condition in which blood pressure in the arteries is permanently elevated. It is usually defined as values of systolic pressure equal to or higher than **140 mmHg** or diastolic pressure equal to or higher than **90 mmHg.** Normal blood pressure is usually around **120/80 mmHg.**

Research underscores the benefits of early diagnosis and effective-treatment, as prolonged high blood pressure contributes to vascular disease over time. Early screening helps reduce the gap between detection and intervention, improving long-term health outcomes.

It is recommended that blood pressure measurements be taken occasionally: during routine primary care visits, including all adults on their first visit to the facility, and periodically thereafter (e.g. annually) if the results are normal. Any patient with elevated blood pressure readings requires immediate follow-up. Experts stress that many patients remain unaware of their disease because they do not perform preventive examinations. Therefore, it is important to educate and create awareness among the public at events held in cities, work environments and public places.

Blood pressure measurements should follow the **European Society of Hypertension (ESH)** guidelines to ensure accuracy and reliable diagnosis. Proper technique is essential, as incorrect readings can lead to misdiagnosis or inappropriate treatment.

“Hypertension is the strongest or one of thestrongest risk factors for almost all different cardiovascular diseases acquired during life, including coronary disease, left ventricular hypertrophy and valvular heart diseases, cardiac arrhythmias including atrial fibrillation, cerebral stroke and renal failure.

Sverre Kjelsen
former President of European Society of Hypertension Professor Emeritus and Chief Physician at Department of Cardiology, Oslo University Hospital

Quote source

The ESH recommends:

- **Rest before measurement** – sit quietly for at least **5 minutes** before taking a reading.
- **Correct positioning** – keep the arm at heart level, supported, and free from restrictive clothing.
- **Multiple readings** – take at least two measurements, **1–2 minutes** apart, and calculate the average.
- **Consistent timing** – measure at the same time **each day**, preferably in the morning and evening.
- **Home monitoring** – use validated devices, ensuring **at least three days** of measurements for a reliable diagnosis.

Figure 2: Summary of home blood pressure measurement, see source.

Blood pressure measurement: from in-clinic to AI health monitoring

Accurate blood pressure measurement is essential for diagnosing and managing hypertension. Several methods are available, each offering distinct advantages for assessing cardiovascular risk.

Home blood pressure measurement

Home blood pressure monitoring (HBPM) is a key method for assessing long-term blood pressure trends, minimizing the white coat effect, and improving treatment adherence. Unlike single office measurements, HBPM provides multiple readings over time, offering a more comprehensive picture of a patient's blood pressure profile. To ensure accuracy, patients should take **two readings in the morning and two in the evening each day**, continuing for at least **3–7 consecutive days** before clinical evaluation.

Measurement in the office

Conducted under standardized conditions after at least **5 minutes of rest** in a seated position. While useful for clinical evaluation, single office measurements may not fully reflect a patient's usual blood pressure due to the white coat effect – a temporary increase in blood pressure caused by the presence of medical personnel.

Unsupervised automatic measurement

With the availability of fully automated sphygmomanometers that can take several readings while the patient remains relaxed, it is unnecessary to have staff present during BP recording.
These measurements are called **automated office blood pressure (AOBP)**, and they are more precise than traditional manual office BP as well as unaffected by the white coat effect. AOBP measurements

closely resemble the awake ambulatory BP and home BP readings, both of which serve as fairly accurate indicators of cardiovascular risk.

24-hour blood pressure monitoring

Considered the gold standard for blood pressure assessment, **Ambulatory Blood Pressure Monitoring (ABPM)** provides continuous readings throughout the day and night, offering a better predictor of cardiovascular risk than isolated office measurements.

Remote blood pressure measurement

Advancements in AI-based health monitoring, such as Shen AI, now enable remote blood pressure measurement using **rPPG (remote photoplethysmography)**. Shen AI analyzes light signals reflected from the skin, capturing subtle changes in blood vessel volume as blood pulses through them. By correlating these changes with known physiological markers, Shen can estimate blood pressure without traditional cuffs or additional hardware.

One of Shen's innovative AI implementations can be found in checkbp.com, an open-access, AI- and video-based health monitoring platform. Designed to make critical health insights accessible to everyone, checkbp.com leverages advanced algorithms and real-time video analysis to measure key vital signs – such as heart rate, blood pressure, and more.

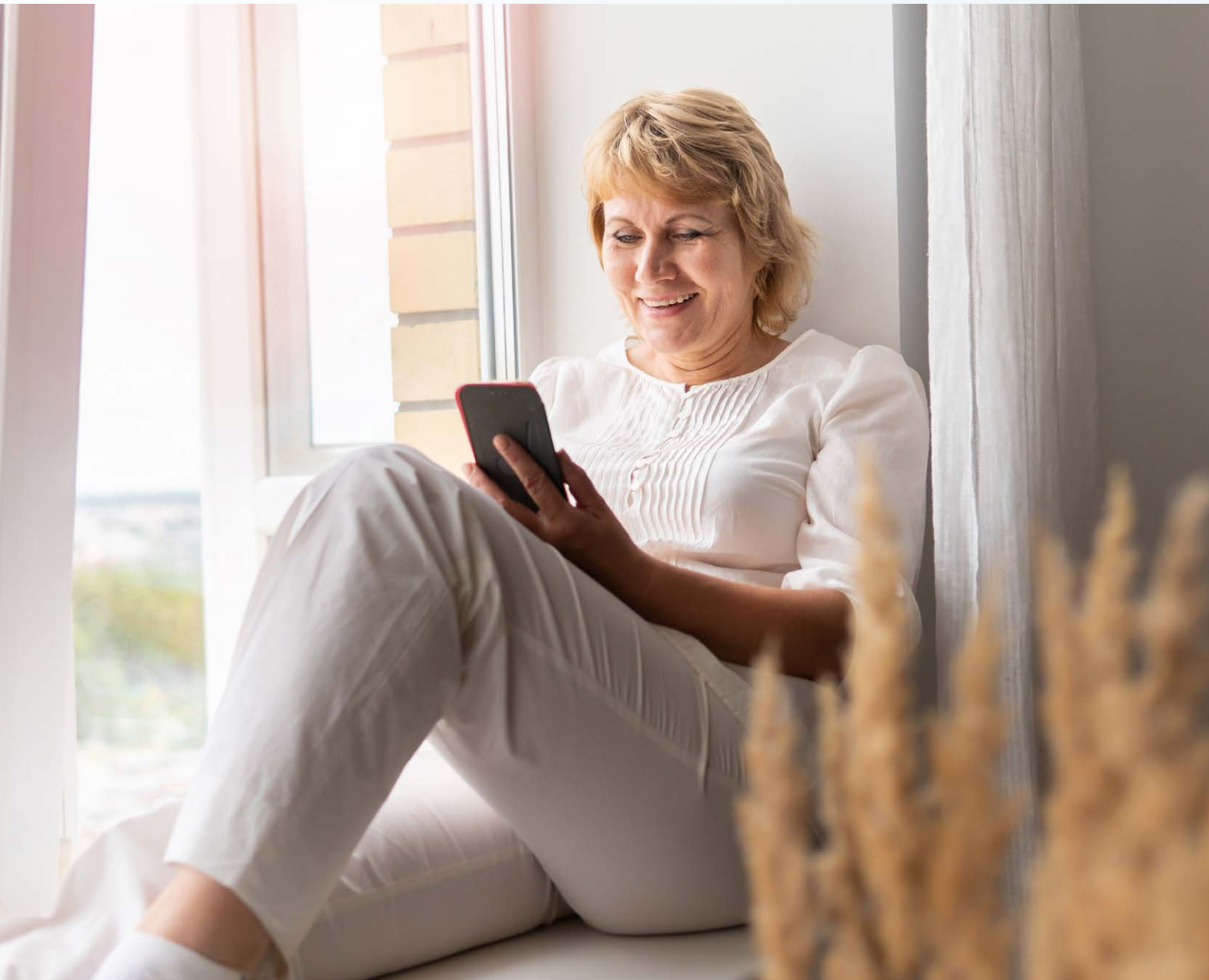
By providing instant insights into blood pressure, heart rate, cardiac workload, stress levels, BMI, and more, checkbp.com helps users better understand their health and take proactive steps toward prevention. No special equipment is needed – just a camera and one minute of your time.

Scan yourself with checkbp.com

Shen AI uses AI and camera-based technology to measure vital signs with just a **60-second** face scan. It can track over **27 health markers**, including blood pressure, BMI, heart rate, heart rate variability, and health risk indices.

Empowering patients with self-monitoring

Regardless of the method used, patient self-monitoring plays a crucial role in improving adherence to treatment and achieving better blood pressure control. The integration of accessible, AI-powered solutions into daily health management is opening new possibilities for proactive hypertension care.



Impact of education and prevention

Preventive strategies can greatly reduce cardiovascular disease-related deaths, enhance quality of life, and ease the social and economic impact of heart disease. The effectiveness of promotional and educational activities is confirmed by the results of studies conducted in Western European countries and the United States. Studies by Goldman and Cook showed that the decline in mortality from ischemic heart disease in the United States **between 1968 and 1975** was more than **50%** due to lifestyle changes and improved control of risk factors for the disease[30].

Similarly, Finland's North Karelia Project in the **1970s** pioneered a nationwide approach to reducing high blood pressure, cholesterol, and smoking rates[31]. In the **1990s**, levels of the three main risk factors (smoking, systolic blood pressure, cholesterol) contributed to about **75% of the reduction** in coronary heart disease mortality. The project was successful enough to lead to its nationwide expansion, contributing to an **82% reduction** in cardiovascular mortality among working-age men and **84% for women** in the same age group **by 2012**. It serves as a model for WHO-supported prevention programs in **24 countries**.

Research indicates that population-wide interventions targeting salt reduction and smoking cessation are both cost-effective and impactful in reducing cardiovascular disease mortality, particularly in low- and middle-income countries. A study published in the British Medical Journal found that a national policy intervention to reduce sodium intake remained highly cost-effective globally and by world

[30] "The decline in ischemic heart disease mortality rates. An analysis of the comparative effects of medical interventions and changes in lifestyle", L Goldman, E F Cook

[31] "Primary prevention and risk factor reduction in coronary heart disease mortality among working aged men and women in eastern Finland over 40 years: population based observational study", Pekka Jousilahti, Tiina Laatikainen, Markku Peltonen, Katja Borodulin, Satu Männistö, Antti Jula, Veikko Salomaa, Kennet Harald, Pekka Puska, Erkki Vartiainen

region, even with modest reductions. For instance, achieving a **30% reduction** in sodium intake was more cost-effective than smaller reductions, but even modest reductions **(10% or 0.5 g/day over 10 years)** were highly cost-effective. The estimated cost is less than **5% of GDP** per capita in most world regions[32].

Research indicates that smoking cessation interventions are also both cost-effective and impactful in reducing cardiovascular disease mortality. For instance, a nurse-led smoking cessation program demonstrated **1/25 the cost** of treatments like statins or ACE inhibitors for coronary heart disease[33].

The evidence is clear: comprehesive prevention strategies – spanning public health policies, behavioral interventions, and clinical care – are essential for reducing the burden of cardiovascular disease worldwide.

[32] "Cost effectiveness of a government supported policy strategy to decrease sodium intake: global analysis across 183 nations", Michael Webb, Saman Fahimi, Gitanjali M Singh, Shahab Khatibzadeh, Renata Micha, John Powles, Dariush Mozaffarian

[33] "Cost effectiveness of a smoking cessation program in patients admitted for coronary heart disease", Petter Quist-Paulsen, Stian Lydersen, Per S Bakke, Frode Gallefoss

Conclusions

Cardiovascular diseases remain the leading cause of death worldwide, yet most cases can be prevented through early detection and lifestyle modifications.

Millions suffer from heart disease each year, and high blood pressure is a leading risk factor. Alarmingly, many remain undiagnosed until they experience a heart attack or stroke. Limited routine screenings and restricted access to preventive care result in missed opportunities for early intervention. Addressing this crisis requires a collective effort – between individuals, healthcare professionals, and policymakers – to ensure greater access to screenings, increased health awareness, and stronger preventive care strategies. Routine monitoring, lifestyle adjustments, and better education on heart health can significantly reduce risks and improve overall well-being.

Preventive care is the most effective way to reduce premature deaths and improve long-term health outcomes, yet access to screenings remains limited in many regions. That's why we launched checkbp.com – an AI-powered tool that makes vital health insights accessible to everyone, anywhere and everywhere.

- **No special devices needed** – measure key health markers like heart rate and blood pressure using just your smartphone or laptop.
- **Quick & easy** – get insights on blood pressure, heart rate, cardiac workload, and more in **under a minute**.
- **Accessible to all** – whether you're in a clinic or at home, checkbp.com provides free, instant assessments.

Check your health with a quick face scan

CheckBP

Welcome to Check BP!

Measure your heart rate, blood pressure, and more with a 1-minute camera-based health assessment.

How to take a health assessment with checkbp.com?

1. Find a well-lit space. Choose a location with good lighting so your face is clearly visible. Natural daylight works best, but a well-lit room also does the job.
2. Sit comfortably. Taking a measurement on the move will influence your results. Make sure to position yourself so your face is fully visible within the frames on the screen.
3. Follow on-screen instructions. Keep your device stable and start the measurement. Avoid talking and making sudden movements.

That's it! After **60 seconds**, you will see a detailed health report. For even deeper insights, you can add details like your age and lifestyle factors to assess your health risks more accurately.

Closing notes: A collective responsibility for change

The burden of cardiovascular disease is a pressing global challenge that requires our collective action. The evidence presented in this report highlights the critical importance of prevention, early detection, and lifestyle modifications in mitigating the risks associated with cardiovascular conditions.

It is essential that individuals take responsibility for their health by adopting heart-healthy habits and seeking regular screenings. Healthcare professionals play a vital role in educating patients about risk factors and encouraging proactive measures. Meanwhile, policymakers must prioritize investments in preventive healthcare and support initiatives aimed at reducing the incidence of cardiovascular disease.

As we move forward, we must recognize that improving heart health is a shared responsibility that involves collaboration among individuals, healthcare providers, and government officials. Together, we can create an environment that fosters awareness, promotes healthy lifestyles, and ensures equitable access to life-saving healthcare.

Let’s commit to making cardiovascular health a priority, empowering everyone to take charge of their health and reduce the devastating impacts of heart disease.

Democratize Health with AI

This report was developed as part of the ***Democratize Health with AI*** campaign – an initiative aimed at leveraging artificial intelligence to improve global health outcomes. The campaign focuses on addressing key public health challenges, including hypertension, diabetes, and obesity, with a strong emphasis on increasing access to preventive care, particularly in underserved communities.

To advance this mission, we are providing our AI-powered health monitoring technology at no cost to non-profit organizations, offering up to **1,000,000 scans per partner**. Additionally, we ensure seamless implementation through technical support, staff training, and continuous guidance to optimize impact and usability.

This initiative is driven by the belief that technology can play a transformative role in democratizing healthcare, enhancing early detection, and reducing the burden of chronic diseases worldwide. By integrating AI-driven solutions into existing healthcare systems, we aim to bridge gaps in care and empower individuals to take a proactive approach to their health.

Ways to contribute and get involved:

- **Institutional partnerships** – collaborate with us to implement AI-driven health monitoring in your organization or region.
- **Awareness and advocacy** – share this initiative with key stakeholders to support broader adoption.
- **Resource contribution** – support the campaign's expansion through funding or other resources.

Learn more

The information provided in the report is for educational purposes only and should not be considered medical advice. Please consult healthcare professionals for personal medical advice, diagnosis, or treatment. Statistics and findings presented in the report are based on available research and may be subject to change as new studies emerge.

Shen.AI

Heart disease in numbers: A report on the leading global killer
Shen AI, February 2025

www.shen.ai