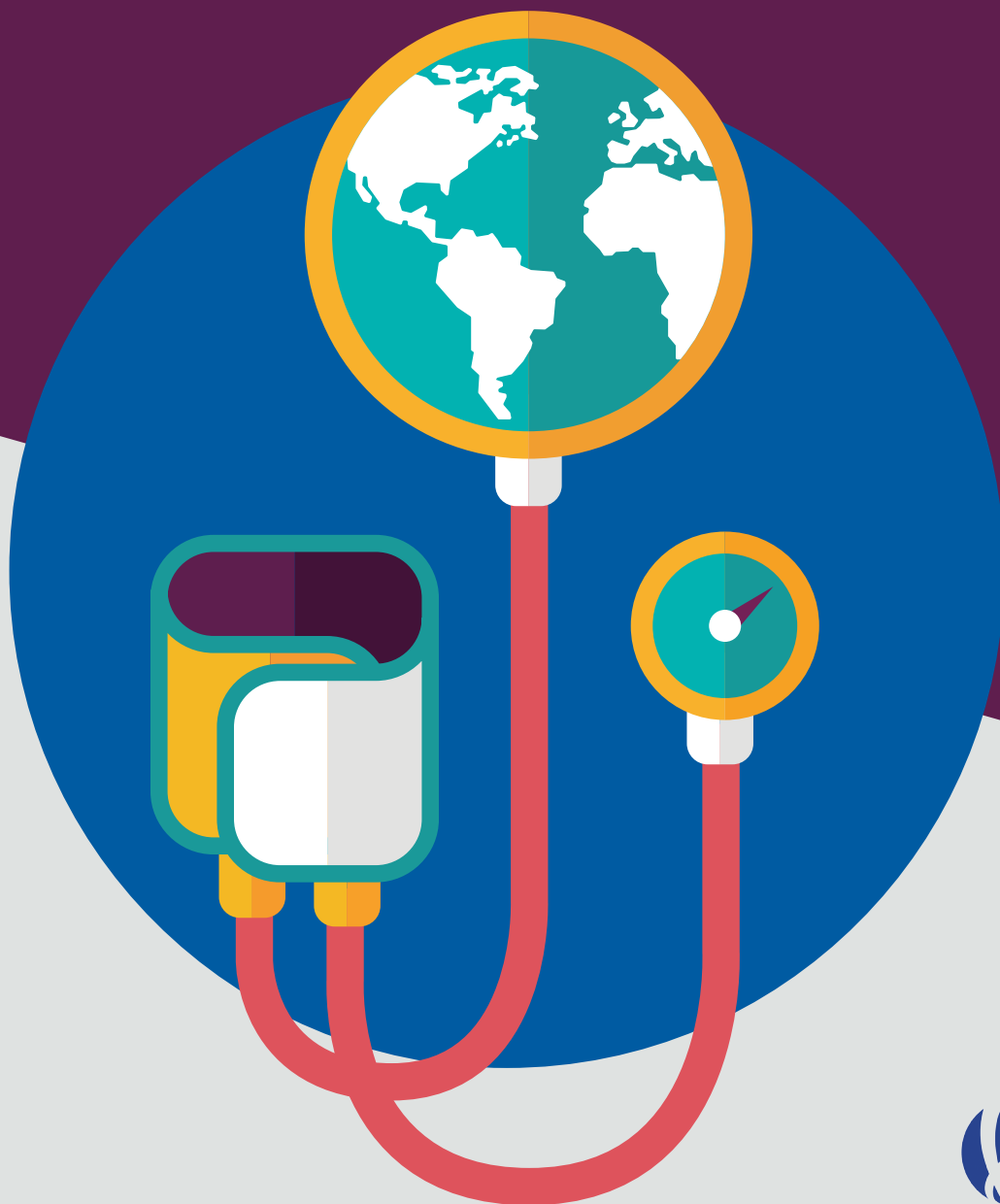


HYPERTENSION: PUTTING THE PRESSURE ON THE SILENT KILLER



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UNDERSTANDING HYPERTENSION AND THE LINK TO CARDIOVASCULAR DISEASE

Cardiovascular disease (CVD), or heart disease, is the number one cause of death in the world. 80% of deaths due to CVD occur in countries and poor communities where health systems are weak, and CVD accounts for nearly half of the estimated US\$500 billion annual lost economic output associated with noncommunicable diseases (NCDs) in low-income and middle-income countries. In 2012, CVD killed 17.5 million people – the equivalent of every 3 in 10 deaths.¹ Of these 17 million deaths a year, over half – 9.4 million - are caused by complications in hypertension, also commonly referred to as raised or high blood pressure². Hypertension is a risk factor for coronary heart disease and the single most important risk factor for stroke - it is responsible for at least 45% of deaths due to heart disease, and at least 51% of deaths due to stroke.

High blood pressure is defined as a systolic blood pressure at or above 140 mmHg and/or a diastolic blood pressure at or above 90 mmHg. Systolic blood pressure is the maximum pressure in the arteries when the heart contracts. Diastolic blood pressure is the minimum pressure in the arteries between the heart's contractions. High blood pressure causes the heart to have to work harder to push blood throughout the body. This stresses the body's blood vessels, causing them to stiffen, clog or weaken. Hypertension can lead to atherosclerosis – where the blood vessels become harder and narrower - making them more likely to block from blood clots or bits of fatty material breaking off from the lining of the blood vessel wall³. This leads to an increased likelihood of blockages, which could cause an ischaemic stroke – an increased risk of bleeding in the brain – haemorrhagic stroke – and ischaemic heart disease.

In 2013, all member states adopted the World Health Organization (WHO) target of reducing preventable mortality from non-communicable diseases (NCDs) – cardiovascular diseases, cancer, diabetes or chronic respiratory diseases - by 25% by 2025. Tackling hypertension has been identified as a key measure in achieving this, and one of the nine global targets set out by the WHO's Global Action Plan for the prevention and control of NCDs is: **“a 25% relative reduction in the prevalence of raised blood pressure.”**⁴

1 <http://www.who.int/mediacentre/factsheets/fs310/en/index2.html>

2 In this publication, raised and high blood pressure, and hypertension, will be used as interchangeable terms. WHO terms “raised blood pressure” as a systolic blood pressure of above 140 and/or diastolic pressure above 90. However, other definitions refer to raised blood pressure as a systolic blood pressure reading of 120, and hypertension as being 140 or above; in other words, raised blood pressure is the stage before hypertension.

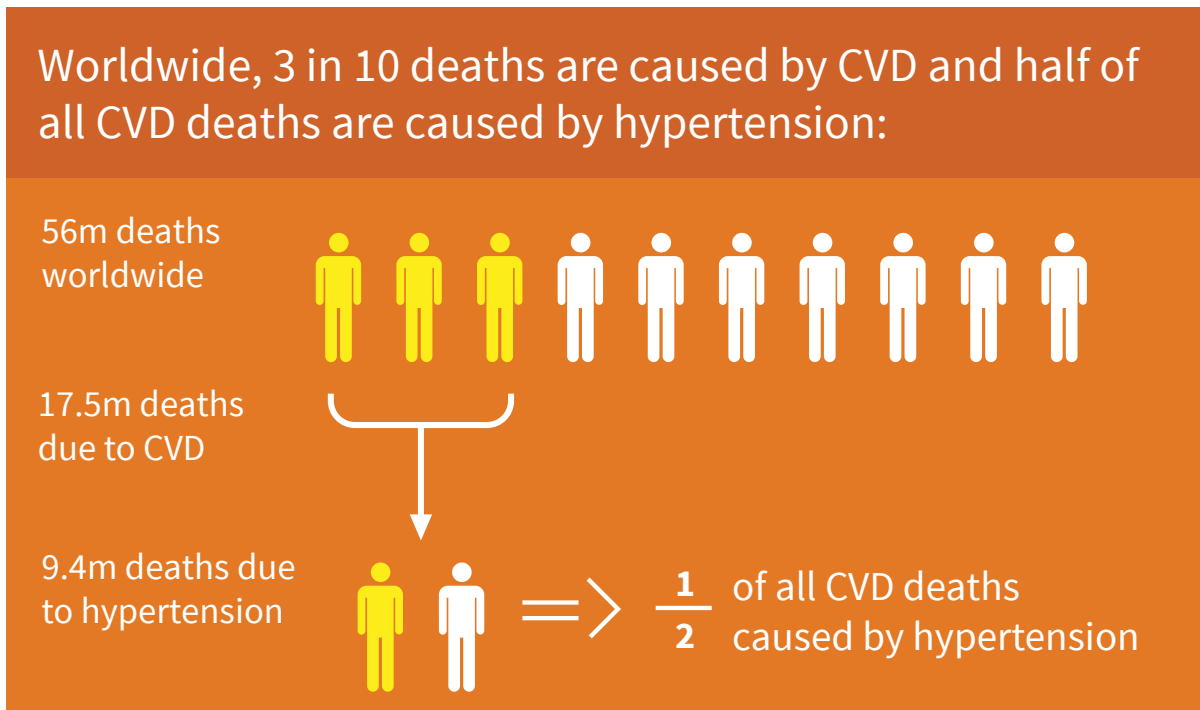
3 <http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/hypertension/>

4 Or to contain the prevalence of raised blood pressure, according to national circumstances.

THE SOCIAL AND ECONOMIC IMPACT OF HYPERTENSION

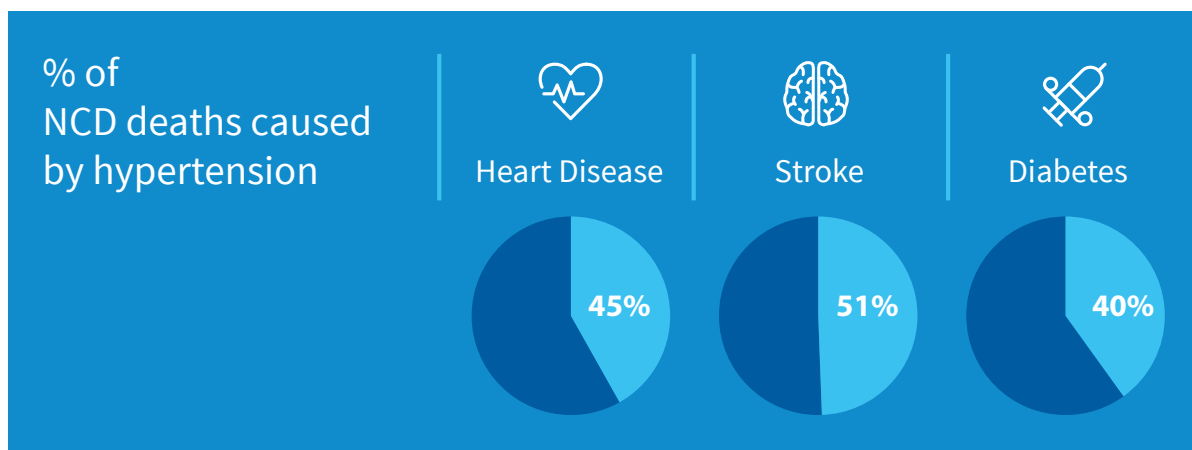
The figures relating to hypertension are simply staggering. In 2008, worldwide, an estimated 40% of adults aged 25 or above had been diagnosed with hypertension, with the number of cases rising from 600 million in 1980 to 1 billion in 2008 – almost 15% of the entire world’s population. By 2025, it is estimated over 1.5 billion people will have hypertension.⁵ More worryingly, two thirds of those with hypertension live in economically developing countries, where weak health systems mean it is even more likely that a substantial number of people with hypertension are undiagnosed, untreated and uncontrolled.

Complications of hypertension are thought to cause 9.4 million deaths each year – **more than all the deaths from infectious diseases combined**. It is thought to account for approximately 45% of deaths due to heart disease and 51% of deaths due to stroke⁶.



Hypertension is the leading risk factor for death and for disability globally.⁷ Aside from contributing to the burden of heart disease and stroke, hypertension also contributes to the burden of kidney failure and premature mortality and morbidity. Over 40% of deaths in people with diabetes are caused by increased blood pressure. It is clear that hypertension is a global public health issue.

5 <http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/hypertension/>
 6 WHO (2013) “A global brief on hypertension: silent killer, global public health crisis”
 7 WHO Global Burden of Disease study



Despite compelling evidence that hypertension is a public health concern that we cannot ignore, it often fails to attract significant attention. Known as the “silent killer”, hypertension rarely causes symptoms and many people go undiagnosed for years, with few, if any symptoms of discomfort. Symptoms that can be associated with hypertension include headache, shortness of breath, chest pain, dizziness and nose bleeds, are very generic and cannot necessarily be relied upon to diagnose hypertension and so also go unnoticed. Often hypertension fails to be picked up until a serious medical problem occurs because the patient is asymptomatic and therefore does not consult a healthcare professional early on. By then, it can be too late – hypertension can permanently damage eyes, lungs, the heart or kidneys – and of those with malignant, or highly elevated blood pressure, fewer than 10% will survive beyond 1-2 years.

Once hypertension causes complications, treating these complications entails costly interventions such as cardiac bypass surgery, carotid artery surgery and dialysis, all of which drain individual and government budgets. **An estimated 10% of health care spending is directly related to increased blood pressure** and its complications, increasing to as much as 25% of health care spending in Eastern Europe and Central Asia⁸. The African region has the highest prevalence of hypertension among adults aged over 25, implying a massive economic burden for the continent, including the cost of caring for all the complications arising from hypertension such as cerebrovascular disease, ischemic heart disease and congestive heart failure as well as indirect costs such as the lost productivity of workers struck by stroke, heart failure, and ischemic heart disease. Other costs include the lost savings and assets that are foregone when families must meet catastrophic healthcare expenditures, such as those associated with rehabilitation following stroke, or dialysis following renal failure.⁹

It is estimated that it will cost nearly US\$ 1 trillion if current global blood pressure levels persist over a 10-year period, and that if hypertension goes untreated, indirect costs could be as high as US\$ 3.6 trillion annually.¹⁰

8 <http://ish-world.com/news/a/WHL-and-ISH-Hypertension-Fact-Sheet/>

9 Van de Vijver et al (2013), “Status report on hypertension in Africa - Consultative review for the 6th Session of the African Union Conference of Ministers of Health on NCDs”, PanAfrican Medical Journal

10 Gaziano TA, Bitton A, Anand S, Weinstein MC (2009), “The global cost of non-optimal blood pressure”, International Society of Hypertension. J Hypertension 27: 1472-1477.

Increasing economic growth and development, accompanied by rapid unplanned urbanization in the developing world, can only serve to increase the prevalence of raised blood pressure, and in turn, lead to populations developing major cardiovascular problems. This is because, as is the case with all non-communicable diseases, behavioural factors play a major role in increasing blood pressure and hypertension therefore serves as a serious warning sign that major lifestyle changes are required.

LILLY AND PROJECT HOPE - AN INTEGRATED MODEL FOR ADDRESSING NCDs THROUGH A FOCUS ON HYPERTENSION AND DIABETES

In 2012, Project HOPE and the Lilly NCD Partnership launched the HOPE Center in Zandspruit on the outskirts of Johannesburg, South Africa. The center focuses on educating the community about chronic diseases - especially diabetes and hypertension - providing clinical services for the treatment and management of the diseases, and facilitating support through peer group education. While the HOPE Center has only been operating for a few years, it has implemented a number of innovative and effective NCD initiatives.

With a population of 83,600, Zandspruit is a typical peri-urban community with approximately 90% of the population living in shacks. 55% of households do not have access to basic services such as water, sanitation, electricity, street lights and waste collection. Unemployment is high (estimated at 70%). Community facilities are limited, with only two government-funded primary schools and one primary healthcare clinic, one community center and one transport hub.

In 2011, Project HOPE received a grant from Eli Lilly and Company Ltd to establish and operate the HOPE Centre for five years. The aim was 'to improve the lives of people at risk from or already living with NCDs by addressing visible gaps in the health system.' It was hoped that by modelling innovative approaches, it would cost-effectively improve service to community members and provide a replicable model that could easily be scaled up across the country and further afield.

The HOPE Center clinic operates three days per week to provide screenings, treatment, care and education to the community regarding NCDs. In addition to offering medical services in the clinic, the Centre runs a number of 'Health Promotion Days' often in collaboration with local churches or community groups to offer screening in the community. As part of the integrated care approach, Project HOPE has initiated a number of additional support programmes for patients and the wider community.

DIAGNOSING AND TREATING HYPERTENSION – WHAT IS OUT THERE?

The most effective way of tackling hypertension in many cases is to address and modify risk factors. Behavioural risk factors that lead to the development of hypertension are also synonymous with those related to other non-communicable diseases, such as diabetes: dietary factors such as consumption of excess salt in the diet, harmful levels of alcohol use, physical inactivity and lack of exercise, and poor stress management. Tobacco use is also a risk factor, which interacts with hypertension to further raise the likelihood of cardiovascular disease.

If hypertension is diagnosed early and appropriately treated, it is possible to minimize the risk of heart attack, heart failure, stroke and kidney failure. Prompt management of high blood pressure can also reduce the risk of other complications such as retinopathy, a disease of the retina which results in vision loss and impairment. Unlike with the diagnosis of other non-communicable diseases such as diabetes, **detecting high blood pressure is relatively straightforward, cost-effective and feasible in low-resource settings**, as well as something which all adults can do themselves, particularly where measurement devices are affordable and accessible. There are three types of devices that can be used to measure blood pressure: mercury, aneroid and electronic. WHO recommends the use of affordable and reliable electronic devices that have the option to select manual readings. In resource-constrained settings where batteries run down quite frequently, semi-automatic devices are valuable as they enable manual readings. Given that mercury is toxic, it has been recommended that they be phased out in favour of electronic devices. As for aneroid devices such as sphygmomanometers, these are recommended for use only if calibrated every six months and used by those who have been trained and assessed in how to measure blood pressure with such a device.

Digital blood pressure measurement machines enable blood pressure readings to be taken outside clinic settings, and can often be a better way to obtain a more convenient and accurate reading. This is because some people become anxious in clinical settings, which causes their blood pressure to rise – a phenomenon referred to as “white coat hypertension”. In contrast, some people have normal blood pressure readings in a doctor’s office but experience increases in blood pressure at other times of the day or in different settings - referred to as “masked hypertension”. Self-care and self-monitoring is even more important for people who have limited access to health services due to physical, geographic or economic reasons.

Blood pressure measurements need to be recorded for several days before a diagnosis of hypertension can be made. With the exception of UK and Canadian guidelines, the consensus is that a diagnosis of hypertension be based on multiple office blood pressure measurements, that recommend either automated unattended blood pressure measurement in the clinic or ambulatory blood pressure monitoring (measuring it as you move around) or home or out-of-office blood pressure management, taken on at least two separate visits, one to four weeks

apart.¹¹ Out of office blood pressure measurements also are increasingly being used to diagnose and monitor hypertension.

Other basic diagnostic technologies that are required for monitoring complications include weighing scales, urine albumin strips, fasting blood sugar tests and blood cholesterol tests.

COMPANIES TACKLING THE GROWING BURDEN OF HYPERTENSION IN DEVELOPING COUNTRIES THROUGH THE PROVISION OF MEDICAL EDUCATION AND SCREENING FOR HYPERTENSION AND CARDIOVASCULAR DISEASE (CVD)

Pfizer – tackling the growing burden of hypertension in Nigeria

Nigeria has an increasing burden of cardiovascular diseases. The general prevalence ranges from 8-46% depending on geographical area. A recent national survey showed the prevalence at 44.9%, a percentage similar to that of the Pfizer ACE study (44%) of out-patients attending a general practice clinic.

Pfizer Nigeria is at the vanguard of tackling this growing burden through medical education for Health Care Professionals (for example through cardiovascular summits, GP Academies) and cardiovascular screenings that target religious organizations, NGOs, institutions and pharmacies in urban areas where the prevalence is much higher. The screening often covers provision of glucose and cholesterol strips, and provisions of screening machines. Screenings also considered job types (journalists, lecturers for example) as well as women.

Pfizer Nigeria’s Cardiovascular Screening Project has provided free medical screening for hypertension and cardiovascular disease to more than 15,000 people at risk across the country.

Merck KGaA – improving access to health awareness, identification and proper diagnosis of cardiovascular diseases in Pakistan

In Pakistan, Merck KGaA in partnership with local healthcare professionals, has arranged free heart rate and blood pressure screenings in order to improve access to health awareness, identification and proper diagnosis of cardiovascular diseases (CVDs) in Pakistan.

As discussed above, not all patients diagnosed with hypertension require medication. However, those at medium and high risk will most likely need one or more of the following essential medicines to lower their cardiovascular risk, most of which are often affordable and

11 Kjeldsen et al (2014), Drugs, “Updated National and International Hypertension Guidelines: A Review of Current Recommendations

readily available¹²

Common drugs used to relieve high blood pressure¹³:

TYPE OF MEDICATION	WHAT THEY DO	WHO THEY WORK ON
<p>ACE (angiotensin converting enzyme) inhibitors and ARB (angiotensin receptor blockers)</p>	<ul style="list-style-type: none"> • Block the formation or action of a hormone called angiotensin II, which causes the blood vessels to narrow • Prevent the heart from overworking • Improve the flow of blood around the body 	<ul style="list-style-type: none"> • People aged under 55 years • People of any age who are not of black African or Caribbean family origin (ACE inhibitors do not work as well in these groups of people.)
<p>Beta-blockers</p>	<ul style="list-style-type: none"> • Block the effects of a particular hormone in the patient’s body, which results in a slower heartbeat and improved blood flow • Long-established and effective in treating chronic heart failure 	<ul style="list-style-type: none"> • People who need four drugs to lower their blood pressure and who cannot take some other drugs • For some people a beta-blocker may be a compelling indication if they have heart disease • Not usually for those aged over 60 unless there is compelling indication
<p>Calcium channel blockers</p>	<ul style="list-style-type: none"> • Decrease blood pressure by relaxing the muscles that make up the walls of the arteries, causing the arteries to become wider, reducing the patient’s blood pressure 	<ul style="list-style-type: none"> • People who are aged over 55 years • Black people of any age who are of African or Caribbean family origin
<p>Diuretics</p>	<ul style="list-style-type: none"> • Work on the kidneys by increasing the amount of salt and water that comes out through urine. Too much salt can cause extra fluid to build up in blood vessels, raising blood pressure • Lower blood pressure by flushing salt out of the body, taking this unwanted extra fluid with it 	<ul style="list-style-type: none"> • Most people, particularly the elderly

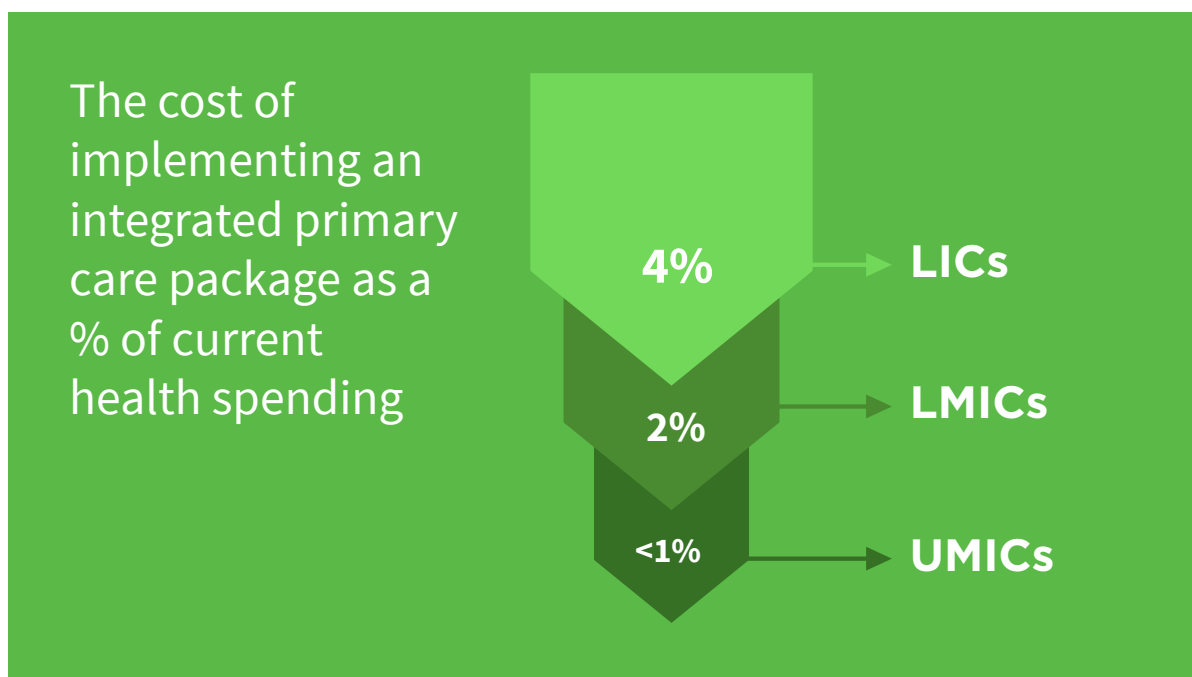
12 WHO (2013) “A global brief on hypertension: silent killer, global public health crisis”

13 Adapted from Charles River Associates (2013), “Assessing the value of biopharmaceutical innovation in key therapy areas in middle-income countries” and NICE guidance on treating high blood pressure with drugs: <https://www.nice.org.uk/guidance/cg127/ifp/chapter/treating-high-blood-pressure-with-drugs>

CHALLENGES TO TACKLING HYPERTENSION

As illustrated in the previous section, there are many effective pharmacological treatments available to aid the control of blood pressure, and yet, **the global rate of uncontrolled blood pressure remains high**. For example, in the UK alone, it is estimated that if hypertension were controlled in all patients, the incidence of stroke would be reduced by 28-44% and coronary heart disease (CHD) by 20-35%¹⁴. Globally, it has been estimated that treating just half of the 1 billion hypertension sufferers worldwide could avert 10 million heart attacks and strokes over 10 years.¹⁵

Implementing an integrated primary care programme to prevent heart attack, stroke and kidney failure, using blood pressure as an entry point, has been estimated by the WHO to be very cost-effective. In low-income countries, the cost of implementing such a programme – which includes primary care outpatient visits for consultation, counselling, diagnostics and medicines – is less than US\$1 per head; in lower-middle income countries it is less than US\$1.50 per head and in upper middle-income countries, US\$2.50 a head¹⁶.



However, despite the clear evidence base that dealing with hypertension can yield significant benefits, it is clear that further efforts are needed to improve hypertension control. Several national and international guidelines for the management of hypertension have been published over time, with some broad consensus on the best practice for diagnosing and managing

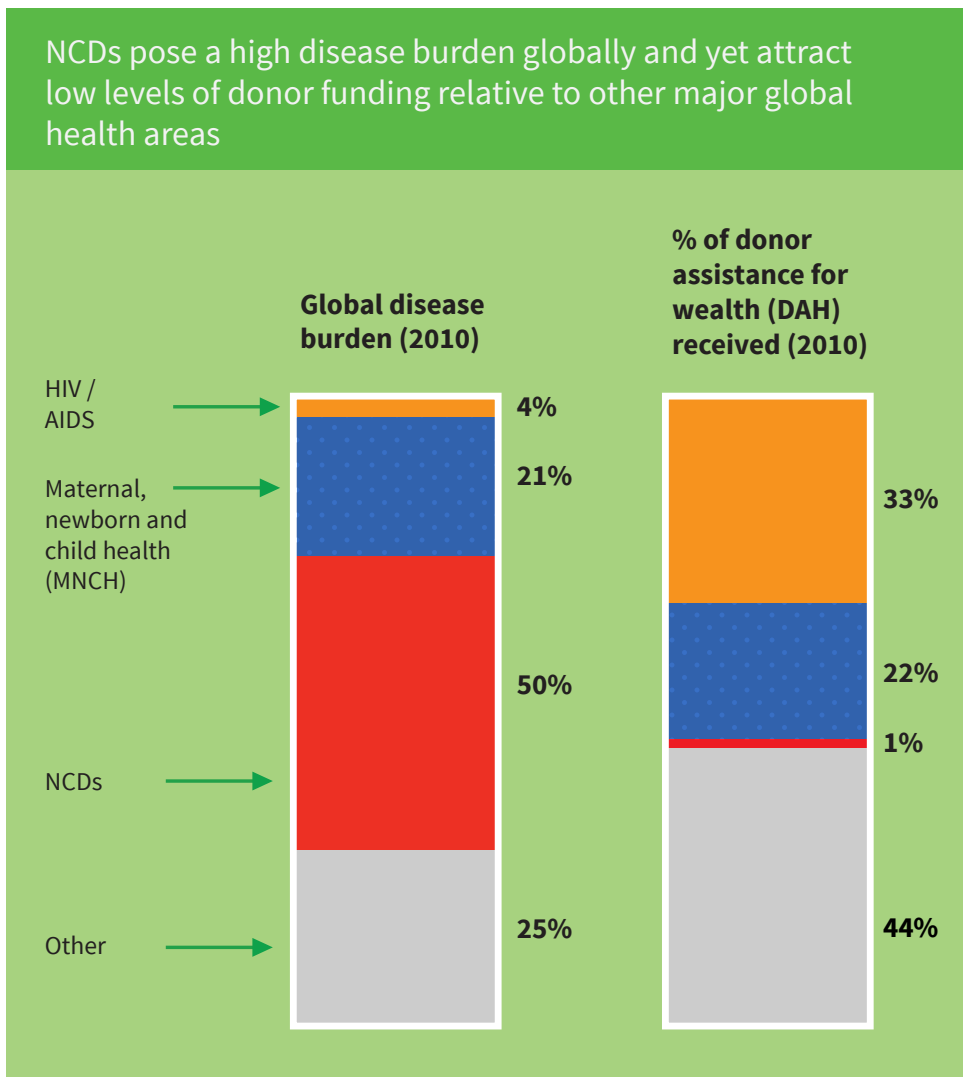
14 Kjeldsen et al (2014), Drugs, “Updated National and International Hypertension Guidelines: A Review of Current Recommendations

15 Angell, De Cock, Frieden (2015), “A public health approach to global management of hypertension, Viewpoint, The Lancet 2015, Vol 385:825-27

16 WHO (2013) “A global brief on hypertension: silent killer, global public health crisis”

hypertension, and tried and tested ways are available.

Another barrier to achieving effective NCD prevention and control is the limited development assistance available for NCDs. Despite the significant disease burden which NCDs pose on global health and the exorbitant costs of NCDs, including often lengthy and expensive treatment and the loss of breadwinners that forces millions of people into poverty, NCDs continue to attract minute levels of funding in comparison with vertically-integrated programs such as malaria and HIV/AIDS. NCDs receive the smallest amount of donor funding of all major global health areas, accounting for only 1.2%¹⁷ of all donor assistance for health. Bilateral donors, who are a dominant funding force in global health, provided only 11% of donor assistance for health in 2011 – a sign that much more still needs to be done.



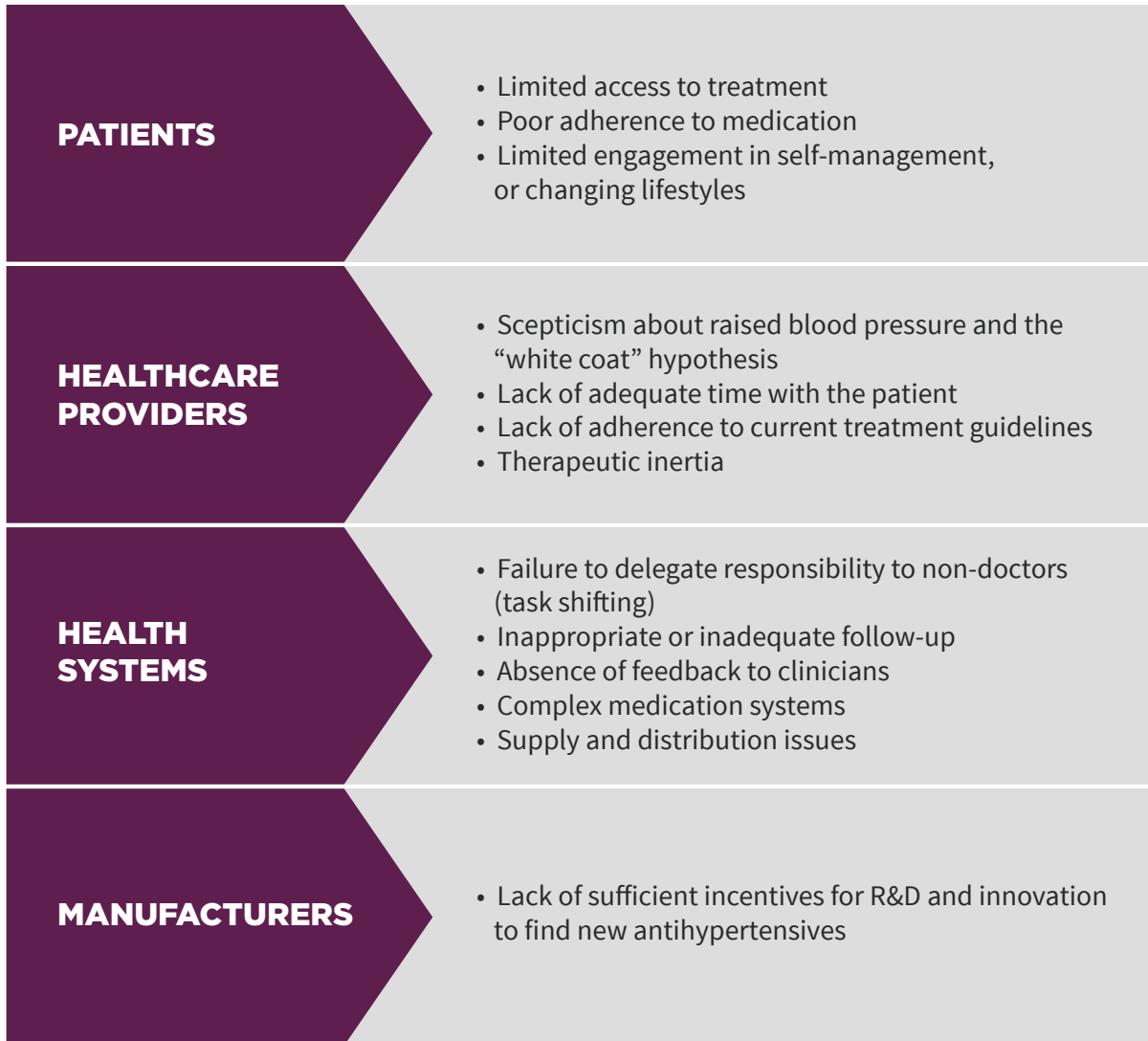
What issues do we face?

Across the different stakeholders and players - patients, healthcare professionals, governments,

17 WHO (2015) “Report of the first dialogue convened by the World Health Organization Global Coordination Mechanism on Noncommunicable Diseases”, Geneva, 20-21 April 2015 http://www.who.int/global-coordination-mechanism/final_meeting_report_dialogue_ncd_development_april15_en.pdf?ua=1

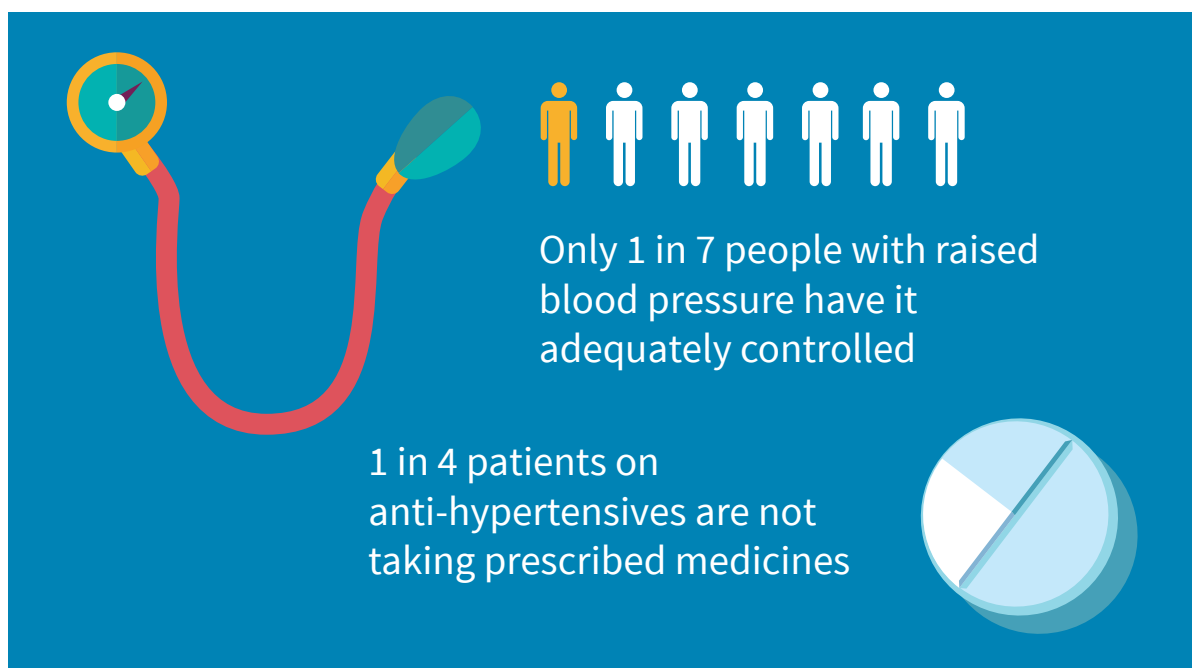
distributors and manufacturers – a number of issues have been identified as barriers to effectively tackling hypertension. These span from affordability and access to healthy foods such as fruit and vegetables, adherence at the patient level, to doctors’ attitudes towards hypertension management, to health systems facing distribution issues, to manufacturers lacking appropriate incentives to find new and innovative medicines.

The multi-dimensional barriers to blood pressure control



PATIENTS AND HEALTHCARE PROVIDERS

Adherence



Access to medication is only part of the story in terms of the challenges that need to be overcome. Once patients have access to anti-hypertensive agents, it is not necessarily the case that they comply or adhere to the treatment. In fact, it is well-documented that a substantial proportion of those who have been diagnosed as having high blood pressure still do not adhere to the prescribed regimen. Alarming, the majority of the drop-off in compliance with treatment occurs in the first six months.

Certain **cultural and behavioural dispositions** can determine adherence levels. For example, adherence in the elderly population is becoming a growing issue of concern for a number of reasons: the demographic shift has increased the proportion of medication-seeking population that is elderly; elderly patients often experience a decline in cognitive function and physical well-being that decreases the chances of them adhering; and multiple comorbidities and complex treatment regimens that occur in older age also increase the difficulty of ensuring adherence.

All elements of the health care system are key to shaping a patient's willingness to adhere to a medication regimen. However, what is particularly crucial is the **patient-provider relationship**. This can be impacted – in both developing and developed countries alike – by a number of factors: poor and inconsistent communication, lack of knowledge of professionals, and lack of follow-up by the healthcare provider. In certain developing countries, the role of the pharmacist is also not to be underestimated in terms of their importance in supporting adherence, particularly in more remote communities.

The “silent killer” nature of hypertension also has an impact on patients' adherence to treatment for the condition. Like many other non-communicable diseases, hypertension does not show

signs of manifestation until the serious, systemic end-organ damage that can appear years after a diagnosis becomes symptomatic. What this means in practice is that **patients fail to see the immediate effects of their daily medication** and so are less incentivised to strictly adhere to their regimen. In other cases, fear over side-effects can affect a patient's adherence, and some patients can end up mixing medication types and dosages, which has a severe impact on adherence. Again, having a strong relationship with a doctor or pharmacist can in part help to educate patients on the need to "stick to the routine", although the resources necessary to establish and maintain a strong control over disease progression are often lacking even in developed countries. Notably, "non-adherent" patients are shown to have significantly higher blood pressure, and develop adverse outcomes that then place increased pressure on healthcare systems. One study found that the risk of hospitalisation, rehospitalisation and premature death among non-adherent patients is 5.4 times higher in hypertension.¹⁸

HEALTHCARE SYSTEMS

Distribution

The imposition of various duties, taxes and mark-ups on manufacturers' prices substantially increase the cost of medicines for individuals in low and middle-income countries, worsening a situation where CVD medicines are already low in availability in the public sector. The degree of medicine price build-up is also influenced by regulation and level of discounting. Lack of appropriate regulation and government controls on the retail mark-up in some countries, can for example, result in significant build-up in the price of a medicine. In other countries, import duties and medicine sales taxes can also contribute heavily to price build-up and have significant impacts on the end user price.

The cumulative post-manufacture pharmaceutical tariffs placed on freight, storage and distribution of CVD medicines are also another notable barrier to access. Tariffs can be as high as 55% in India – and more often than not, this ends up representing a form of regressive taxation which disproportionately affects the poorest and most in need.

The availability of CVD medicines is also significantly impacted upon by the extent to which local procurement practices are efficient. Inefficient supply chain management is often a function of factors such as human resource constraints, insufficient funding for training and poor performance incentives for supply managers. As a result, regular stock-out of medicines occurs – for example, in Uganda, availability of atenolol was only 10%, 20% for captopril, and the average length of stock-outs is almost 6 months¹⁹. Addressing the stock-out dimension of availability will however, involve improving the supply chain and in many cases, stamping out theft and corruption, both at the level of the dispensary and further up.

18 Al-Lawati (2014), "A report on patient non-adherence in Ireland", https://www.pfizer.ie/UserFiles/file/news_releases/Adherence%20Report%20Final.pdf

19 Kishore et al (2011), "Promoting global cardiovascular health: ensuring access to essential cardiovascular medicines in low- and middle-income countries, *Journal of American College of Cardiology*, Vol 57 No. 20

MANUFACTURERS

R&D

Approximately one-third of hypertensive patients who seek treatment fail to reach their goals, either because they are resistant to drug therapy or stop treatment due to side-effect issues²⁰. Although this suggests there is a medical need for new antihypertensive agents with improved risk-benefit profiles, factors such as the plethora of generic drugs available, the advent of polypharmacology, and the difficulty of identifying agents that are better than the standard of care all combine to create a challenging environment for innovation.

20 Carpino and Flynn (2012), "Review of companies and drug classes in the 2007-2011 antihypertensive patent literature" <http://www.ncbi.nlm.nih.gov/pubmed/24236713>

OPPORTUNITIES AND FOCUS AREAS FOR POLICYMAKERS

The case for tackling hypertension is clear and compelling. The social and economic costs of hypertension are crippling, and yet so many deaths from cardiovascular disease and stroke – for which hypertension is the major risk factor – are preventable and needless. A number of ways to address hypertension across both developed and developing countries have been identified throughout literature, and more effort needs to be invested in making these all the more effective.

Some efforts are being made by the research-based pharmaceutical industry. Initiatives to address hypertension aim to apply the more general lessons of chronic disease care – for example the need for strong primary healthcare prevention strategies, improved healthcare and self-management and improvements in monitoring. One innovative program – Healthy Heart Africa – has recently been launched by AstraZeneca, and aims to ensure that 10 million patients in Africa with hypertension are on treatments which control their condition by 2025, supporting the World Health Organization's (WHO's) '25 by 25' global monitoring framework for preventing and controlling non-communicable diseases. The action is timely given Africa has the highest prevalence of adults with hypertension at 46%, and a quarter of all premature deaths in Africa are attributable to the condition.²¹

21 <http://partnerships.ifpma.org/partnership/healthy-heart-africa>

HEALTHY HEART AFRICA – AN APPROACH TO TACKLING HYPERTENSION AND CONTRIBUTING TO WHO TARGETS

With over a century of experience in developing products to treat cardiovascular diseases, AstraZeneca launched **Healthy Heart Africa (HHA)** to support governments in reducing the burden of hypertension, and by extension heart disease, across the continent in a sustainable way.

Working in partnership with governments, local and global partners and local communities, HHA is built on a number of key principles:

- **More than Medicines:** While widely affordable and available antihypertensive medicines are an important part of the solution, interventions along the full patient pathway are essential. HHA takes a comprehensive health system strengthening approach, scaling education, screening and treatment services which are integrated into existing health platforms.
- **Sustainability:** HHA was established with the ambition of being a sustainable program rather than a corporate social responsibility effort. AstraZeneca medicines are being sold as part of the program at a significant discount, but one that enables a no-profit, no-loss business model.
- **Learning by Doing:** AstraZeneca is working side-by-side with its implementing partners to find solutions to the challenges that arise in driving increased access to chronic care in under-resourced settings. Through this embedded approach, the program is driving a continuous cycle of improvements that enables HHA to adjust its model often and flexibly.

Launched in Kenya in 2014, HHA continues to test different ways of addressing the barriers currently preventing access to care for hypertensive patients, including the integration of hypertension services into USAID-supported HIV/AIDS care platforms, networks of private primary care providers and pharmacies and public and faith-based clinics. AstraZeneca has taken this knowledge to Ethiopia where it launched HHA in early 2016.

Approaching hypertension effectively requires taking an approach similar to that advocated for tackling non-communicable diseases – population-wide interventions, supported by systematic surveillance at the national level, and the regular collection of data on a large scale.

MEASURING MAKES IMPLEMENTATION MORE EFFECTIVE

Implementing secondary prevention of cardiovascular disease requires a commitment to community surveillance programs and the collection of mortality and morbidity data to identify

high-risk individuals. Particularly in resource-poor settings, targeting those at higher-risk tends to be a cost-effective approach. For example, advanced profiling was used in the treatment of hypertension in South Africa and found to be cost-effective²².

Hypertension registries are also seen as extremely valuable. Ideally created through simple and robust electronic systems, they collect and store clinical information on patients who have the condition and create the evidence base for evaluating the effectiveness of interventions and changes in population needs. This “basic roster” allows for baseline descriptive data on blood pressure measurement, prescribed treatments, target setting and monitoring of progress. In the US, a hypertension registry created to support systems-level improvements for 600,000 patients raised hypertension control rates from 44% to 80% over 8 years²³. The benefits of such registries are clear, and over time, they could later be expanded to monitor other health risks such as tobacco use and glycaemic control²⁴.

REDUCING RISK FACTORS FOR HYPERTENSION REQUIRES POPULATION-WIDE APPROACHES AKIN TO NCDs

Much of the human and social impact caused each year by NCD-related morbidity and mortality could be averted through population level interventions that are well-understood, cost-effective and feasible.²⁵

The population-based approach is based on the observation that effective reduction of cardiovascular disease rates in a population usually calls for community-wide changes in environments that promote unhealthy behaviour, or reduction in mean risk factor levels. Such interventions target the population, community, worksites and schools, with the aim of modifying social and environmental determinants²⁶.

Population-based approaches that are used to reduce high blood pressure are very similar to those required to address major non-communicable diseases. Often referred to as “evidence-based, cost-effective interventions” or “best buys” in the context of non-communicable diseases, these interventions require public policies to reduce the exposure of the whole population to risk factors such as unhealthy diet, physical inactivity, harmful alcohol use and tobacco use. The benefits from such interventions can be sizeable – for example, a reduction in salt intake from the current level of 9-12g/day to the recommended WHO maximum target of 5g/day would reduce strokes by 24%, coronary heart disease by 18% and prevent 2.5 million deaths worldwide every year.²⁷

22 Stewart and Sliwa (2009), “Preventing CVD in Resource-Poor areas: Perspectives from the ‘Real World’, *Nature Reviews Cardiology*, Vol 6: 489-92

23 Angell, De Cock, Frieden (2015), “A public health approach to global management of hypertension, *Viewpoint, The Lancet* 2015, Vol 385:825-27

24 Council on Foreign Relations (2014), “The Emerging Global Health Crisis: Non-communicable diseases in Low- and Middle-income countries”

25 WHO (2010), *NCD Global Status Report*

26 WHO (2013) “A global brief on hypertension: silent killer, global public health crisis”

27 He et al (2012), “Reducing salt intake to prevent hypertension and cardiovascular disease”

Tackling key risk factors through the “best buy” interventions²⁸

RISK FACTOR	INTERVENTION
Tobacco use	<ul style="list-style-type: none"> • Excise tax increases • Smoke-free indoor workplaces and public places • Health information and warnings • Bans on tobacco advertising, promotion and sponsorship
Harmful alcohol use	<ul style="list-style-type: none"> • Excise tax increases on alcohol • Restricted access to retailed alcohol • Bans on alcohol advertising
Unhealthy diet and physical activity	<ul style="list-style-type: none"> • Reduced salt intake in food • Replacement of trans fats with polyunsaturated fats • Public awareness programme about diet and physical activity

A number of focus areas require greater attention by policymakers and the wider healthcare community, if we are to achieve significant progress in tackling hypertension, which in turn has implications for cardiovascular disease, stroke and other related health conditions:

A lifecourse approach to CVD prevention is needed – evidence indicates that atherosclerotic and hypertensive processes begin early in life and are influenced over time by both non-modifiable and potentially modifiable behaviours, risk factors and environmental exposures. Efforts to promote cardiovascular health and reduce the risk and burden of CVD globally must extend beyond the level of the individual, and include various contexts – from the family to the broader community, and at population-level. This further reiterates the ongoing need for CVD prevention guidelines aimed at different parts of the lifecourse: children, adolescents, adults and the elderly.

Primary care access to CVD risk assessment and providing essential medicines for reducing CVD risk is necessary, as well as tackling those at highest risk – the majority of cases of hypertension can be managed effectively at the primary care level, and non-physician health workers can play a crucial role in the detection and management of hypertension. In an age where health systems are coming under immense pressure on resources, the importance of task shifting in addressing factors such as hypertension cannot be underestimated. Community health workers can also play a major role in influencing behaviour change, such as improving diets or undertaking physical exercise.

Strengthening national surveillance health information systems to monitor the impact of action to prevent and control hypertension and other NCD risk factors is a must – countries require greater support to set baselines and national targets, and to meet agreed global targets. Monitoring systems are needed to collect reliable information on risk factors, their determinants,

28 WHO, World Economic Forum (2011) “From Burden to “Best Buys”: Reducing the economic impact of non-communicable diseases in low- and middle-income countries

non-communicable disease mortality, and illness – data which is critical to policy development and yet which is severely lacking in many countries. Capacity, particularly in low and middle-income countries, needs to be strengthened in this regard.

Using both cutting-edge and existing technologies and applications to tackle hypertension needs scaling up – Electronic health interventions can help to overcome the limitations posed by visiting doctors and pharmacists in person. Ubiquitous technological solutions such as mobile health (mHealth) technology can help circumvent the technical challenges of electronic health systems and provide a more flexible platform to enhance patient self-care. mHealth applications are particularly appropriate for interventions that depend on patients' sustained adherence to monitoring schedules and prescribed treatments. Other solutions such as the radio and television also provide cost-effective ways of reaching patients and healthcare workers alike.

Improving health literacy - patients who proactively participate in managing their hypertension tend to have better blood pressure control. Many studies have demonstrated that an individual's health literacy status – defined by the WHO as the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health - may play a role in failure to recognize the early signs and symptoms of a chronic illness, and in seeking health care intervention early on. By committing to lifestyle and behaviour changes, taking medications as prescribed and participating in self-measurement of blood pressure, patients can make significant contributions to their overall health and well-being. Doctors can play an important role here, by encouraging patients to become more involved.²⁹

29 See for example, the American Medical Association (AMA)'s STEPS Forward program, which provides free online modules that tackle the main barriers to hypertension control for patients, and which includes practical strategies and tools that can be implemented immediately: <https://www.stepsforward.org/modules/hypertension-blood-pressure-control>

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