



Take Heart and Stop the Silent Killer

Prevent death from Atherosclerotic Cardiovascular Disease (ASCVD)

Discussion Paper: Improving health equity and patient outcomes



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Introduction

Heart disease and the impact and challenge of the silent killer, Atherosclerotic Cardiovascular Disease (ASCVD)

Cardiovascular disease (CVD) is the leading cause of deaths, including premature deaths, among both men and women. The World Health Organization (WHO) has reported that 17.9 million people died from CVD in 2019¹, translating to 31 percent of all deaths which is nearly every third death in that year. More than 75% of CVD deaths occur in low- and middle-income countries and 85% of deaths are caused by heart attack and stroke. The number of CVD deaths are expected to increase to over 23 million by 2030² and the resulting economic burden of the disease to also increase from an estimated USD 30.9bn in 2015³ in Latin America alone. There is clearly an urgent call for action, given the prevalence and significant socio-economic impact of CVD.

Cardiovascular diseases (CVD) are a group of disorders of the heart and blood vessels. Atherosclerotic Cardiovascular Disease (ASCVD) specifically, is caused by the build-up of fats, cholesterol, and other substances on the inner walls of arteries, causing them to narrow or harden, and reducing or blocking the flow of blood to the heart or brain. This build up is called plaque and can lead to blood clots, heart attacks and strokes. ASCVD is a major cause of premature deaths and disability from CVD⁴. Early diagnosis and treatment can stop atherosclerosis from worsening and ending in medical emergencies or death.

The build-up of plaque on the walls of arteries can be caused by several different factors: high levels of 'bad' cholesterol (low density lipoprotein or LDL), high blood pressure (which increases the rate of build-up of plaque), smoking, obesity, and a sedentary lifestyle. Conditions linked to ASCVD include diabetes, hypertension, and chronic kidney disease.

Excessive medication and unnecessary interventions put a strain on the public health system that has a limited budget to work with. A lack of quaternary prevention facilitates hypermedication and excessive interventions, especially in primary health care, for example a patient that doesn't need it takes a highly efficient statin, overloading the system, then another patient suffers a stroke and there is no thrombolytic in place
- Former Secretary of Primary Health Care/ Ministry of Health Brazil, physician specialized in Preventive Medicine and Public Health

The number 1 cause of death worldwide

Disease	Annual global deaths	Disease	Annual global deaths
CVDs	Over 17 million	Respiratory diseases	4 million
Cancers	8.2 million	Diabetes	1.5 million



31%
global deaths
from CVDs



Over 23 million
predicted deaths from
CVDs by 2030



Many CVDs are preventable
by addressing **behavioural
risk factors**



**Low and
middle income**
countries most affected
by CVD deaths



25% by 2025
World Health Organization
(WHO) target to reduce premature
deaths from non-communicable
diseases (NCDs) - of which CVDs
make up the largest proportion.



Heart disease and stroke cause
a third of all deaths in
women worldwide

To reduce the impact of CVD, health care systems have focused efforts on primary prevention of a cardiac event by encouraging lifestyle modifications to include healthy eating, regular physical activity, and smoking cessation. In addition, individuals are encouraged to undertake regular health check-ups to monitor and identify early any symptoms of CVD risks that need to be treated immediately, often through a course of drugs (mainly statins). However, the success of these primary prevention measures is overshadowed by the significant gap in efforts invested in secondary event prevention. The group at highest risk being the low- and middle-income population that are challenged to adhere to treatment given access challenges and competing financial priorities.

In 2019, there were more than 523.2 million cases of CVD recorded worldwide and experts predict that the global burden of CVD will grow exponentially in the next few years owing to the long-term effects of COVID⁵ and related unhealthy lifestyles assumed during the pandemic. Historically health systems have focused on prevention of CVD through lifestyle changes. However, once the disease of ASCVD has set in, lifestyle changes are not enough to prevent the secondary event of heart attack and stroke.

The barriers in the Latin American region include:

- low level of awareness among the general population and lack of communication from physicians on the seriousness of untreated CVD and ASCVD, and associated risk factors, such as diabetes, hypertension, obesity and smoking
- the lack of information and importance placed on managing diagnosed high risk levels of LDL levels and other related risk factors
- the unaffordability and inconvenience of proactive health check ups
- unequal access to effective treatment and care following CVD risk symptoms diagnosis
- limited research and study focusing on treating women with CVD, including the adverse impacts on pregnancy relating to the increased risk of CVD in mothers and their babies. The women at risk also extends to the younger and older populations where, in Chile⁶ for example, the root cause is lack of awareness of the severity of CVD and therefore the inaction in effectively diagnosing and treating the risk factors

Currently, health care systems do have provisions for secondary and tertiary treatment for CVD. Whereby, secondary treatment mostly involves referring patients who suffer a CVD event (such as a heart attack or stroke) to a specialist, who then prescribes a course of treatment. The objective of secondary care being focused on reducing the need for surgery and the occurrence of new cardiovascular events. Tertiary treatment, more commonly grouped under secondary treatment, is where the treatment to prevent new cardiovascular events extends to measures like surgical intervention, such as the insertion of stents in arteries, or bypass surgery. These procedures are expensive and a strain on already stretched medical resources, therefore not accessible to all patients and thereby ineffective in improving CVD patient outcomes.

Cardiovascular disease in women



35%

Of all deaths in women worldwide are caused by cardiovascular disease

275 million

women were diagnosed with cardiovascular disease in 2019

8.9 million

women died from cardiovascular disease in 2019

Cardiovascular disease among women is

Understudied,
under-recognized,
Underdiagnosed,
Undertreated,
And women are
under-represented
in clinical trials.

Read more:
[The Lancet women and cardiovascular disease Commission: reducing the global burden by 2030⁷](#)



Furthermore, within the public health care system, specifically considering the middle-and low-income population, there is limited support provided **to women** as the primary carers of the patient, who take on more responsibilities to sustain income as well as look after the home and family. This challenge on personal resources inevitably impacts the quality of care at home, de-prioritisation of adherence to treatment and the strain on health of the carer which then results in health risks for both the patient and the carer putting further strain on the health care system.

It must also be noted that CVD is the leading cause of death in women and despite efforts to raise awareness of the impact of the disease, the CVD burden remains high due to knowledge gaps in research, prevention, treatment, and access to care for women⁸. Focusing on women's health should be prioritised to address gender specific optimal treatment for improved outcomes and in parallel removing barriers for women to seek treatment like family care challenges or expectations of women determined by tradition or religion that deprioritizes self-care.

Overall, given the significant number of patients diagnosed with CVD, there is plenty more to be done to prevent premature deaths from CVD and improve quality of life for patients, while also reducing the burden on the health care system and socio-economic productivity. Furthermore, effectively addressing preventable diseases like CVD, frees up national health care resources to invest in treating the non-preventable diseases and improving overall health equity across populations.

The biggest challenge in the public system is access. Patient and medical education is an issue in both systems. Access to a multidisciplinary team in the private system is often difficult. Pharmaceuticals may offer support programs for the population and initiatives for medical education
- Member of the Brazilian Society of Cardiology

THE PURPOSE OF REPORT



The challenges in combating CVD differ in nature between countries, given the differing characteristics and maturity of their healthcare systems and socio-economic conditions. This report looks at the impact of CVD challenges, focused on ASCVD and the silent killer of heart attacks and stroke. There is significant opportunity for improved CVD secondary prevention care in the Latin America region, specifically looking at five countries: Argentina, Brazil, Chile, Colombia, and Mexico, accelerating and enhancing existing initiatives, sharing best practices, and building new initiatives.

A stylized map of the Latin American region is shown in a light green outline. Overlaid on the map is a network of thin green lines connecting various points, with some points highlighted as solid green dots. The text "ASCVD in LATAM Region" is written in white, bold, sans-serif font across the middle of the map.

ASCVD in LATAM Region

In Latin America, despite a trend in reducing CVD deaths in the 1990s, CVD now accounts for 38% of deaths from non-communicable diseases and is the leading cause of death with 1.09 million deaths per year in 2019. More specifically, coronary heart disease and stroke were seen to cause 42.5% and 28.8%, respectively of the CVD mortality in the region⁹. The trend is now pointing upwards for cardiovascular disease deaths resulting from demographic, economic and social changes in recent years. The poorest population sectors are seen to be disproportionally affected by the disease¹⁰ due to unequal health care access to manage and treat CVD risk factors.

The table below shows a comparison of the countries we discuss in this paper and raises the question of what Argentina is doing differently to Mexico where the latter has a lower rate of CVD deaths in the same year but a much higher rate of increase in CVD over the preceding decade when compared to Argentina. Is it due to the capacity of the health care system in treating CVD, could it be that the true impact of the disease has not been measured or is patient behaviour with regards to lifestyle and treatment adherence choices affecting this? Equally, it raises the question of how accurate and complete is the data collected in Argentina and whether the statistics reflect a true picture of the impact of CVD in the country. These are some of the factors we consider as we investigate the impact of CVD in all these countries.

Statistic Type	Argentina	Brazil	Chile	Colombia	Mexico
% CVD deaths (2019)	29.2	28.2	26.6	29.5	22.7
CVD total costs (USD, billion)	0.67 (2019)	17.3 (2015)	1.4 (2016)	2.1 (2016)	11.2 (2015)
% Increase in deaths from IHD and Stroke, between 2009- 2019	9.4 (IHD), 12.7 (Stroke)	27.5 (IHD), 13.8 (Stroke)	19.8 (IHD), 18.3 (Stroke)	24 (IHD), 17% (Stroke)	48 (IHD), 25.8 (Stroke)

Source: [Institute for Health Metrics and Evaluation | \(healthdata.org\)](https://www.healthdata.org/)

IHD: Ischemic Heart Disease

Looking beyond primary prevention of CVD is also critical in managing the mortality and co-morbidities resulting from CVD. There are over 500 million CVD cases recorded globally in 2019¹¹ that are at more risk and in need of effective secondary prevention health care and treatment support. Focusing on CVD secondary treatment will result in:

- Fewer premature deaths and a better quality of life for CVD patients
- A more effective healthcare system with less resource wastage
- Greater workforce productivity leading to stronger national economic growth
- Freeing up resources, including public funds, to invest in better health equity, community support and treatment of non-preventable diseases

Many of the solutions are already clear – the guidelines from WHO and other teams have clearly set out the focus on LDL. The question

IMPROVEMENTS ARE ESSENTIAL IN AWARENESS OF ASCVD RISK FACTORS SEVERITY AND ADHERENCE TO TREATMENTS...



is rarely 'what do we do to prevent ASCVD leading to heart attacks and stroke' but more 'how do we execute against what we know needs to be done'.

Solutions must address:

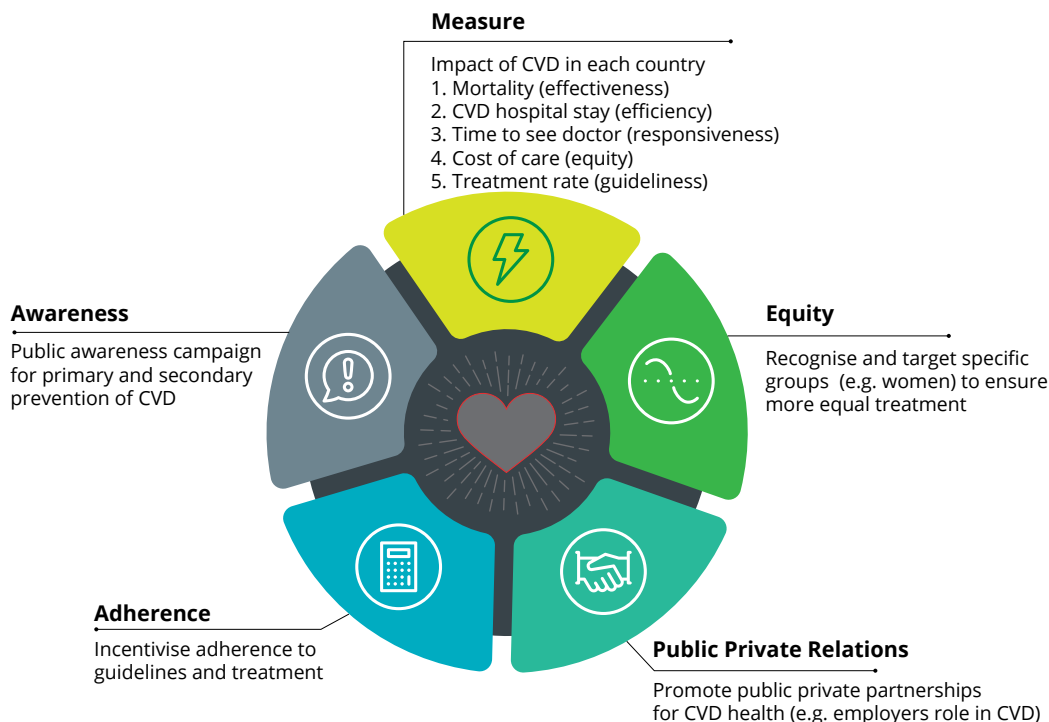
- **Implementing existing guidelines:** Although there are guidelines for the treatment of CVD, due to various reasons like the lack of incentives, limited training and stretched resources, there are gaps among healthcare providers in knowing the updated guidelines and in putting them into practice. Leveraging incentives linked to the guidelines, i.e., through financial or non-financial recognition of a Physician or Health Institution for evidencing a reduction in the rate of 2nd cardiac events because of conducting periodic LDL-C measurement tests (part of guidelines¹²), could encourage more proactive knowledge seeking and implementation of guidelines.
- **Awareness of CVD risk factors:** Low level of awareness of CVD risk factors and the implications of leaving these untreated, especially among poorer socio-economic groups. Individuals often only become aware of CVD after they experience a CVD medical emergency like Stroke or MI. It is critical that the HCS encourage proactive testing for CVD risk symptoms and actively treat diagnosed symptoms to both help the patient continue a healthy and active life and reduce the burden on HCS resources when the disease advances. In addition, non-health industries could also collaborate to support the HCS in communicating the importance of managing CVD, i.e., collaborative solutions between the consumer goods and digital technology industries, healthcare payer institutions and government organisations to improve CVD patient health. These solutions could be building off or also applicable to other prevalent disease management.
- **Adherence support for patients & carers:** Adherence to measures to prevent CVD is poor where people often lapse into unhealthy lifestyle behaviours and abandon courses of treatment. Insufficient communication and resource capacity between healthcare providers and patients have made it challenging to monitor adherence to treatments. Equally, insufficient support for the carers and families of ASCVD patients recovering from the first cardiac event have led to de-prioritising treatment and recovery measures where it is not logistically or financially accessible.
- **Robust local CVD Data is critical:** The lack of CVD related data on treatment rates, socio-economic impact and productivity contributes to undermining the impact of CVD across our populations. More robust data would inform the healthcare system how to further prioritise clinical investments to address the burden of CVD.

WAYS FORWARD: A COMBINATION OF MEASURES IS CALLED FOR...



Addressing the silent killer and morbidity of heart attacks and stroke from ASCVD must consider the specific and unique features of the respective country health systems.

The common themes for action include:



- **AWARENESS** - Create public campaigns emphasizing the silent killer of ASCVD and heart attacks and that build awareness in both patients and health care providers: Campaigns and messaging should put into stark reality the impact of death from heart attacks and stroke. It should highlight CVD as the number one silent killer in LATAM and how positive health outcomes are achievable through managing the disease after diagnosis. Also, highlighting the specific needs of different patient groups (e.g., lower socio-economic groups) would highlight how to re-allocate resources in the healthcare systems for better outcomes.
- **ADHERENCE** - *Incentivising healthcare to drive adherence to medication:* This includes using the adherence measures in the guidelines to support lifestyles changes, to treat / reduce the impact from ASCVD.
- **PUBLIC and PRIVATE PARTNERSHIPS** - *Combining public and private forces and resources for change:* Partnerships between public, private health care institutions and charities will help accelerate treating preventable diseases like CVD that affects large populations, across primary, secondary, and tertiary healthcare.
- **EQUITY** - *Providing healthcare for all:* Health inequalities are numerous in LATAM. These create disproportionate burdens on the economy and families, especially for those not as well off. Identifying specific disadvantaged groups for secondary prevention of CVD can have a significant impact on outcomes (reduced mortality) and relieving burdens on families and local communities. For example, reducing ASCVD / secondary events in women will protect the critical family carers in some key groups of society. In addition, leveraging health care services already implemented to manage diseases during COVID, like tele-medicine and mobile heart nurse/doctor teams for people living in remote or rural areas, should be repurposed, or extended to meet the treatment needs of CVD patients.

- **MEASURE*** - Measuring the quantitative impact of CVD:

Government and healthcare institutions should build databases of interoperable and transferable health data, to improve access to CVD patient data. They should also utilise these data sources to draw insight on how the quality of care can be improved and how the prevalence of CVD related mortality and co-morbidities can be reduced. Recent study by the OECD and Harvard University detailed that the direct cost of CVD amounts to more than \$600 billion to G20+ health systems each year¹³.

Given the significant economic burden on the countries, it is imperative that better solutions are in place to measure the impact on the health care system and identify what levers can be utilised to sustainably treat and manage CVD. The OECD and Harvard University report outlined measuring health systems performance for CVD on efficiency (length of CVD related hospital stays), effectiveness (30-day mortality), responsiveness (waiting time to see specialist), equity (cost of care incl. Post stroke care). We would add treatment rates (such as the 4-drug regimen recommended by the PURE study) to this list that enables control of the key risk indicator of cholesterol for example.

***Based on Harvard University and OECD, The state of cardiovascular disease in G20+ countries, 2022**

Lines of care and protocols are written; however, they are not put into action. There must be engagement with many stakeholders to make it happen

- Former Secretary of Primary Health Care/ Ministry of Health, physician specialized in Preventive Medicine and Public Health (Brazil)

These themes, amongst others are relevant across all LATAM countries we have surveyed. They are also aligned to recommendations presented by other surveys and studies and endorsed by Cardiology Societies of Mexico, Brazil, Argentina and Colombia.¹⁴ We do however recognize that there are country specific challenges and the opportunities to draw on the strengths of ongoing initiatives in each of the countries, which therefore requires a different 'how to execute' in each of Argentina, Brazil, Chile, Colombia, and Mexico. In the upcoming sections, we discuss how to impactfully reduce CVD in each of these countries.

Argentina



CURRENT IMPACT OF HEART AND CARDIOVASCULAR DISEASE



CVD is the main causes of death and disability in Argentina. As of 2019, 29.2 percent of total deaths in the country were attributable to CVD; ASCVD was one of the main causes, largely through ischemic heart disease, and stroke¹⁵. Underlying this, we see that between 2013 and 2018, there was an overall increase in the main cardiovascular risks, notably excess weight, sedentariness (too much sitting and insufficient exercising) and hypertension¹⁶. These changes have been linked to lifestyle changes and behaviours and also cultural factors that have been hard to positively influence.

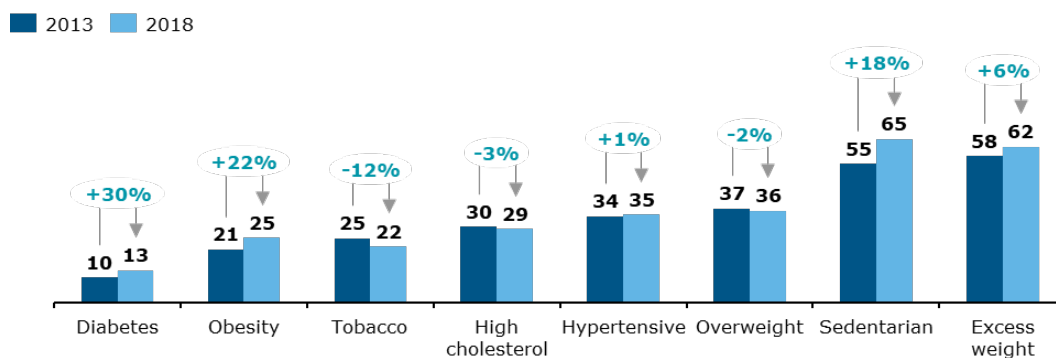


Figure 1: Main results of 4th National Risk Factor Survey

Source: Government of Argentina (2019). Fourth National Risk Factor Survey

In 2019, the incidence rate (rate of new cases) for CVD was 607.69 per 100,000 of the population and the prevalence of CVD was 5,952 per 100,000. The mortality rate was 225.5 per 100,000, amounting to 29.2 percent of all deaths in the year¹⁷.

These statistics indicate that the severity of CVD has not been adequately communicated to influence a CVD 'preventative mentality' within the lifestyle and behaviour choices of the general population. This is further substantiated by the lack of reduction in premature deaths resulting from CVD in 2017, following suggestion by PAHO/WHO in 2014 that Argentina would meet a World Health Federation '25 by 25' target to reduce CVD among individuals by 25 percent by 2025¹⁸.

PREVENTION AND CARE FOR CVD



Prevention and care for CVD needs to be seen within the context of the general healthcare system in Argentina.

The healthcare system in Argentina is made up of three components¹⁹:

- **A social security system**, covering 63 percent of the population. Social health insurance is mandatory for most workers, with contributions from both employees and employers into insurance schemes (obras sociales), most run by labour unions. There is also an insurance scheme for retirees (PAMI).
- **Private health insurance**, covering 16 percent of the population.
- **A public healthcare system**, for individuals without health insurance cover (36 percent of the population).

The above figures for health care system coverage exceed 100 percent because 15 percent of the population have **double coverage**, whereby individuals who already have private or social security health cover, exercise their right to also access certain public healthcare services, where it is seen to be of a better quality.

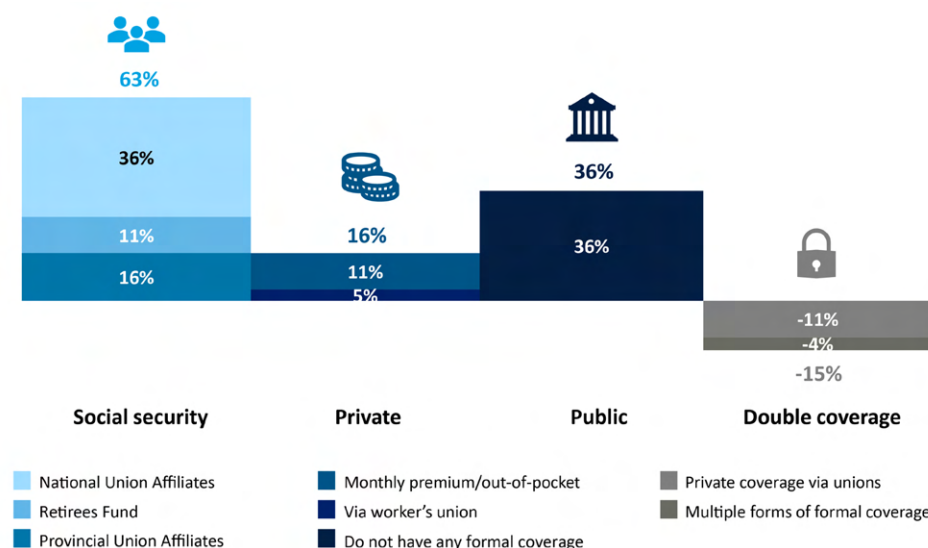


Figure 2:
Health Care
Insurance
Coverage

Source: Health Care Organization and Delivery in Argentina: A Case of Fragmentation, Inefficiency, and Inequality

Funding for the 3 components of the healthcare system is disproportionate to the demand on the services and as a result there are clear inequalities in the CVD medical care and patient outcomes within the Argentinean population.

Private health insurance funds provide much of the finance for private hospitals, health centers and other medical enterprises. The social security system provides funds to either public or private health organisations to pay for the treatment of members. Establishments in the public system (public hospitals and community centers) are administered autonomously by provincial, municipal, or national authorities within a highly decentralized system.

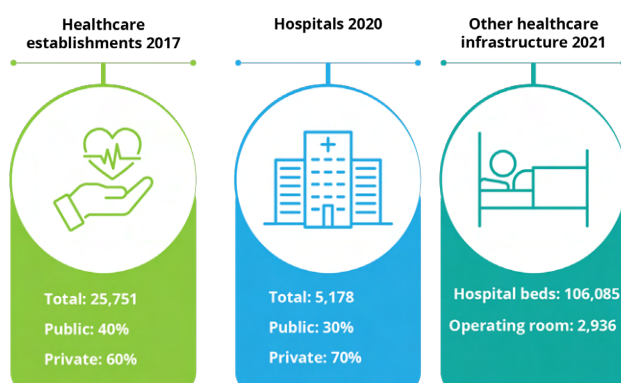


Figure 3: 2021 Number
of Establishments in Health
System and Services²⁰



In Argentina, as in other countries in Latin America, the main gateway to the health system is through a **Primary Healthcare Center (CAPS)**. CAPS provide healthcare programmes, including primary care for CVD.

Most activities at the primary care level are oriented towards health promotion and control within the community (primary prevention), screening for disease, and non-complex treatments. Secondary care addresses the diagnosis and treatment of patients who could not solve their health conditions through primary care and tertiary care involves rehabilitation treatments to help patients reintegrate into society post surgeries, or incurable disease related disabilities²¹.

Due to the resource inequalities within the fragmented healthcare system, access to secondary and tertiary treatment facilities are limited to a smaller, more well-off population group, putting significant pressure on the public and social system resource to treat over 75% of the population. In this regard, prevention, early diagnosis, and adherence to treatment to prevent secondary events becomes even more critical to avoid CVD patients becoming even more dependent on an already constrained health system.

That said, it should be noted that there are ongoing initiatives that are looking to address how better to improve patient care across the population and country. For instance, the **Argentine Health Interoperability Framework (MAIS)** are working on standardizing the exchange of clinical documentation, billing detail, and payments between providers and funders, to promote interoperability of patient record systems so that they can both better treat the patient, and better understand the prevalence of the disease and impact on socio-economic productivity and public resource consumption²².

Similarly, The National Directorate of Health Information Systems (DNSI) is working on the deployment of the **National Digital Health Strategy 2018-2024**, to develop the necessary infrastructure to facilitate interoperable health information systems in Argentina²³.

These initiatives are crucial for collecting patient data that allows the healthcare system to proactively identify CVD patients at risk, administer the right treatment, allocate resources to reduce the prevalence of CVD in most impacted geo-locations, communicate the severity and causes of the disease to society and equally measure the impact on patients and society of investing public resources on better cardiovascular disease management initiatives and treatments.

CHALLENGES FOR PATIENT CARE



There are several challenges for the provision of CVD healthcare in Argentina:

- Awareness
- Affordability and availability
- Adherence to treatment
- Constraints within the healthcare system

Awareness

Awareness among the population of CVD more generally, is currently limited and in general individuals do not become aware of the problem and the risks until after a cardiovascular event has occurred. According to local medical experts, Atherosclerosis is known to be one of the main causes of cardiovascular disease, however not enough importance is placed on the negative implications of not adhering to treatment or changing lifestyle behaviours once diagnosed with CVD risk factors. The Argentine health system

pays more attention to primary prevention to reduce the incidence and prevalence of CVD and the control of risk factors. Whilst that is important, significantly more needs to be done to help already diagnosed CVD patients to proactively prevent a second CVD event, by supporting them in re-building their health through accessible treatment and then re-integrating them back into society in a productive way.

Affordability and availability

To be successful in treating CVD, adherence to treatments should consider both the health system efforts as well as the patient's response. A study of the healthcare system in Argentina found that access to the system is affected directly by the socioeconomic level of individuals: the largest proportion of people relying exclusively on the public health system is at the lowest socioeconomic level, and those disparities ultimately affect the patient's results²⁴. Access also depends to some extent by geographical location, since the number of CAPS per head of population varies between the five geographical regions of the country.

Adherence to treatment

Individuals put on to a programme of treatment do not always adhere to it.

A 2011 PURE (Prospective Urban Rural Epidemiology) study²⁵ looking at the effectiveness of using secondary preventive drugs to treat CVD in communities with differing income levels, unsurprisingly showed that low-and-middle-income (LMIC) CVD patients were less adherent to long term treatment due to limited accessibility and lack of awareness on the importance of continuing the treatment to prevent severe secondary CVD events.

Similarly, looking at risk factors that lead to CVD, another 2019 PURE study showed only 32 percent of the patients with hypertension adequately control their illness²⁶. Here, the challenge starts with lack of awareness (medical diagnosis) of having CVD risk factors whereby in this case only 50% - 60% of the affected population were aware of their health issues. Among the entire population with hypertension (diagnosed or undiagnosed), overall treatment rate is 52%²⁷.

It is therefore of high priority that systemic approaches are implemented especially in low income and rural areas to both improve diagnosis and awareness of being affected by CVD risk factors and the subsequent long-term adherence to accessible treatments.

Constraints within the healthcare system

Another potential constraint on improving treatment for CVD is the availability of healthcare system resources and funding.

According to World Bank as of 2017 there were 8.7 physicians per 1,000 individuals, which compares well with other developed countries such as Germany, Italy, and Norway^{28, 29}. However, a 2017 survey of physicians found that at the time as many as 27 percent of respondents in public health were considering a move to the private sector because of over-work.

As in many other countries, the pressures on health spending in Argentina are increasing. In 2019 the domestic general government health expenditure as a percentage of GDP was 15.5%. However, there is not enough data to draw insight on what is the return on investment which would be valuable in understanding which investments have been impactful in improving patient outcomes, versus where resources are being wasted and need to be reallocated within the health care systems. The data will also help highlight where further funding is needed to improve population health and resulting socio-economic productivity and lifestyle improvements.

IMPROVING HEALTHCARE AND PATIENT OUTCOMES



The Argentine government has pursued several policies and programs to combat CVD, but their scope has been restricted by the fragmented nature of the healthcare system in the country.

Initiatives to improve patient outcomes in both primary and secondary care for CVD and other diseases will have different time horizons for achievement, but their effectiveness will depend on cooperation and collaboration between all the stakeholders in healthcare, particularly in the public system: the government and Ministry of Health, healthcare authorities at provincial and municipal level, CAPS and other healthcare institutions, the providers of finance, digital and data enablers, and patients themselves.

In the shorter term, the aim should be to establish a common pathway for the treatment of CVD. The authorities and healthcare institutions could:

- Include secondary prevention of ASCVD in public policies in both provincial and national CVD programs. The strategies should include the pathway to treatment for all causes of ASCVD: detection, diagnosis, severity assessment of CVD risk factors, primary and secondary prevention treatment, and treatment adherence and outcome monitoring,
- In collaboration with other stakeholders raise the awareness of the impact of ASCVD and disseminate important information about CVD risk factors and comorbidities through digital and traditional campaigns; this may also promote the implementation of Dyslipidemia guidelines,
- Prioritize Dyslipidemia in local (on-site) protocols and guidelines to create greater awareness of their impact and prevention measures, including CVD risk stratification,
- In collaboration with other stakeholders, pilot a CVD program at provincial or municipal level to promote health and prevent disease using the potentiality of digital methods, using digital technology to improve awareness and adherence to CVD preventive treatments,
- Successful pilot programmes at a provincial or municipal level could then be extended to a national reach.



According to the interviews conducted with health care specialists in Argentina, in the longer term, suitable policies, and programmes for improving care and reducing costs should include:

- Explore the co-creation of a financial and non-financial incentives programs for physicians focused on the achievement of the reduction of prevalence and incidence,
- Improve the integration of different levels of care; for example, improving adherence to treatment reduces hospitalizations, and therefore improves the timeliness and effectiveness of treatment and reduces the burden on the healthcare system which can reallocate resources to non-preventable disease treatments,
- Drive forward the Argentine Health Interoperability Framework (MAIS) to develop an interoperability network that gathers medical information from public and private sources and incorporates all required industry and regulatory standards. This will enhance the availability of data to support evidence driven decisions and understand healthcare funding and resource needs to impactfully reduce the prevalence of CVD across the population,
- Develop and execute evidence-based strategies with the support of the different levels of care and wider consumer ecosystem to modify CVD related risky behaviours. This will focus the interventions from the HCS to those individuals and populations that can significantly reduce incidence of CVD through both primary and secondary preventive lifestyle and treatment choices,
- Accelerate execution of action plans developed by healthcare professionals at key forums like the World Heart Federation, the Argentine Society of Cardiology (SAC) and the Argentine Federation of Cardiology (FAC) , that focus on reducing mortality caused by heart attacks by 30% by 2030.³⁰
- Furthermore, at a recent World Heart Federation roundtable in Argentina, a survey based on the opinions of 99 physicians³¹, from different specialties across Argentina, highlighted similar key initiatives as those detailed in this paper as the proposed approach to reduce CVD mortality. These include:
 1. Promoting the implementation of Clinical Practice Guidelines for the management of hypercholesterolemia across the health care system
 2. Encouraging the promotion of healthy and more active lifestyle and supporting state-driven regulatory public policies promoting cardiovascular health
 3. Facilitating more effective communication between health professionals and patients on cardiovascular risk
 4. Leveraging data and technology to provide better health information that empower the patient and the treating physician
 5. Collaborating between all sectors of the health system to jointly reduce cardiovascular mortality in Argentina
- **Key stakeholders to collaborate with:** National and Provincial Ministries of Health; municipal governments; Medical Societies; Healthcare professionals; Patient Associations and NGOs.

Source: Deloitte Analysis



Brazil



CURRENT IMPACT OF HEART AND CARDIOVASCULAR DISEASE



It has been estimated that in 2015, 28% of the total number of deaths in Brazil, and 38% of deaths among people of working age, were attributable to cardiovascular disease³². The total costs of CVD in that year, in terms of premature deaths, lost productivity and hospitalization, were in the region of US\$11 – 17 billion, equivalent to 0.7% of the national GDP^{21, 33}.

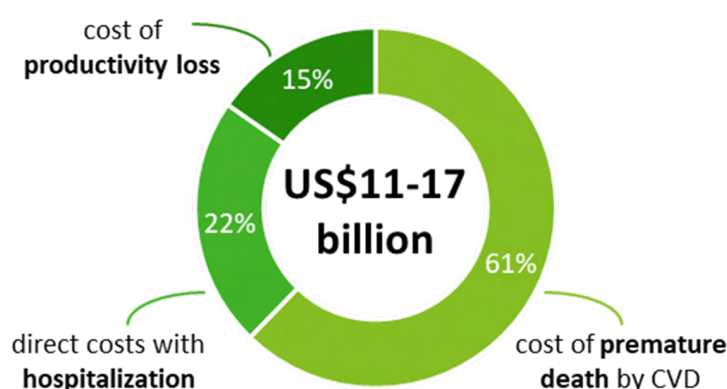


Figure 1: Economic impact of CVD (2015)

Source: Brazilian Society of Cardiology, World Heart Federation

Deaths in Brazil from ischemic heart disease and stroke increased by 27.5% and 13.8% respectively between 2009 and 2019³⁴, and the main risk factors were high blood pressure, high levels of LDL, overweight and obesity (a high body mass index), smoking and sedentariness (low physical activity).

In 2019, the incidence rate (rate of new cases) for CVD was 505.8 per 100,000 of the population and the prevalence of CVD was 5,833 per 100,000. The mortality rate was 183.7 per 100,000, amounting to 28.2 percent of all deaths in the year³⁵. More than 397,990 Brazilians died in 2019 from CV³⁶, mostly from a stroke or heart attack, and it has been forecast that without any significant initiative, there will be an increase of up to 250% in the incidence of CVD by 2040³⁷.

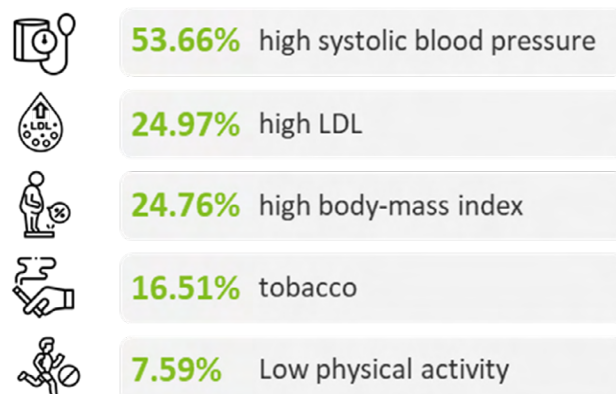


Figure 2: Impact of risk factors on CVD deaths (2019)

Source: Global Health Data Exchange

Although CVD mortality is increasing and there are several guidelines and protocols for the treatment of CVD, knowledge is not well disseminated among health professionals, and the general population's awareness of CVD and its risks is low.

PREVENTION AND CARE FOR ASCVD



The healthcare system in Brazil

Brazil has a fragmented health system which has made systematic prevention and treatment of CVD challenging. There is a public health system (**SUS**) which is available to everyone, and a supplementary (private) health system, financed by health insurance plans, which covers nearly 25 percent of the population. The SUS is the largest government-run public health care system in the world, by number of beneficiaries, and entirely free of any cost at the point of service for any person. Despite being a huge social advantage for the Brazilian population, the SUS faces many challenges. There is room for improvement in public funding, resource allocation, healthcare delivery, use of innovative technology such as telemedicine to improve access to specialized care, and expansion of regionalized networks for specific diseases.^{38, 39}

In the public health system, state and municipal health secretaries must follow national policies on health but are also able to implement health strategies to meet local requirements. It is the responsibility of the national councils to organise the exchange of experiences and provision of technical support at a state level (**CONASS**) and municipal level (**CONASEMS**). This could provide an opportunity for a state or municipal health secretary to pilot a CVD reducing health initiative, which may offer drugs, test a technology solution or treatment adherence programs to CVD patients that are not included in national level programs. The initiative could then be a substantiated business case for scaling at the national level and a success story for changing patient and HCP behaviour around treatment adherence.

From a healthcare expenditure perspective, there are both public and private hospitals and health centres, whereby the level of expenditure on health in the private system is higher than in the public system, even though it covers just 25 percent of the population. The public health system is severely underfunded, the SUS consumes only 3.8 percent of Brazil's GDP while covering three-quarters of the population. This clearly leads to health equity challenges with most of the population being offered a strained health service that has less resources to treat a much larger population.

Public versus Private System Coverage

Publicly covered population

213.3 Millions (100%)

Population with Health Plan
(Private system)

48.7 Millions (25%)

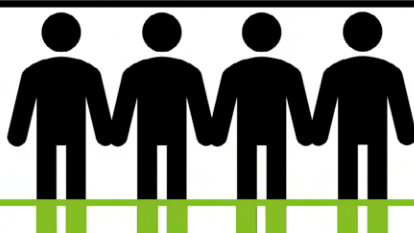
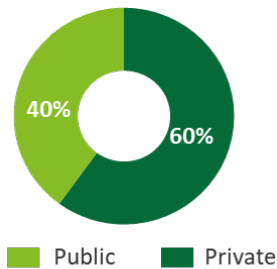


Figure 3: Public vs Private health cover

Public vs. Private Health Expenditure (2019)



Health Expenditure Per Capita (2019, US\$)

Public: 343,99
Private: 518,85

Current health expenditure (2019)

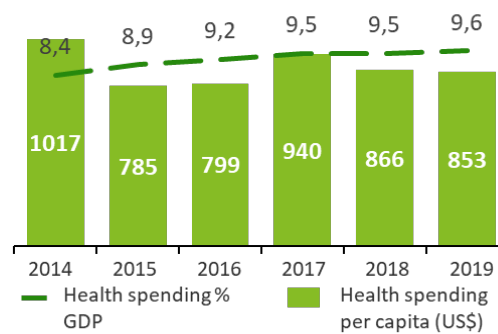


Figure 4:
Health Expenditure

Source: Brazilian Institute of Geography and Statistic (IBGE) and World Bank

In terms of CVD treatment, the focus of both public and private health systems is primarily on diagnosis and the treatment of patients when a condition occurs⁴⁰.

SUS allows access to specialized procedures, such as cardiac surgery, stent insertion and pacemaker surgery. However, the quality of assistance provided by the public system is varied. For example, accessing specialized care can take anywhere from 30 to 90 days, or even years depending on the region combined with the deficiencies in infrastructure of many hospitals. Getting patients into and staying on the clinical pathway is a key imperative.

Users of the private health sector have broader and easier access to specialized procedures and facilities (e.g., health insurance operators must guarantee a consultation with a cardiologist within 14 days)⁴¹. However, a higher number of procedures performed is not necessarily related to health needs and may reflect inappropriate use of those procedures with high reimbursement values, such as coronary angiography, a procedure that uses X-ray imaging to see your heart's blood vessels.⁴²

There is an opportunity for health officials to introduce better metrics focused on reducing secondary cardiac events with corresponding financial and non-financial incentives (e.g., league tables, patient feedback, awards). In addition, clear guidelines on when specialised procedures are to be provided to the patient and evidence of compliance to these guidelines could reduce the financial burden on public resources and encourage a focus on CVD prevention with HCPs and patients.

With greater prevention, we also see opportunity to initiate partnerships between private and public health sectors to reduce CVD cases. Collaborating between health systems, employers, and charities on CVD prevention campaigns (e.g., digital innovative CVD treatment pilots) could build bridges between private and state, municipal or even national efforts to develop impactful solutions that reduce CVD and improve overall community health.

Excessive medication and unnecessary interventions put a strain on the public health system that has a limited budget to work with. A lack of quaternary prevention facilitates hyper medication and excessive interventions, especially in primary health care, for example a patient that doesn't need takes a highly efficient statin, overloading the system, then another patient suffers a stroke and there is no thrombolytic in place.

- Former Secretary of Primary Health Care/ Ministry of Health, physician specialized in Preventive Medicine and Public Health (Brazil)

CHALLENGES FOR PATIENT CARE



The Brazilian challenges in the provision of healthcare in general and prevention and treatment of CVD and ASCVD include:

- Awareness
- Affordability and availability
- Adherence to treatment
- Constraints within the healthcare system.

Awareness

The four core determinants of health include genetics, environmental and physical influences, medical care, and social factors. While these determinants of health cannot be considered in isolation most efforts to improve health focus on a single determinant at a time. That is why diseases such as CVD are addressed in a highly fragmented way.

Although CVD has been the leading cause of death in Brazil, surveys show that the Brazilian population believes that cancer has a higher mortality rate than CVD⁴³. In Brazil, schools make efforts to teach children about the importance of healthy habits considering CVD risk factors such as diet, exercise, and sleep. However, the message is not reinforced frequently, and thus forgotten. If the focus on health awareness /CVD is not in the government's current agenda, the message on CVD health is only given sporadically, which is not enough. To be effective, awareness campaigns must be continuous and the messaging as emotive as the messaging around other diseases like cancer (e.g., 'Take Heart and Stop the Silent Killer of ASCVD').

Affordability and availability

Health care *inequality* is a critical challenge that needs to be addressed. There is a shortage of funding for the public health system, directly affecting CVD. Spending on health by the government was cut in 2015, and a 20-year cap on public spending was introduced in 2016. A consequence has been that public health spending per capita fell from R\$595 in 2014 to R\$555 in 2019⁴⁴. A study shows the direct loss to CVD: in 2017, one year into Brazil's 20-year constitutional cap on public spending, the budget for Brazil's 'Farmácia Popular' program, which improves access to essential medicines for diabetes, hypertension and dyslipidaemia through a network of public pharmacies, dropped 15% leading to the closure of 314 pharmacies mostly located in the poorest regions⁴⁵.

In addition, the distribution of health service providers is uneven across the country. There is a heavy concentration in the southeast of the country, particularly in São Paulo and Rio de Janeiro, where the private health sector is larger than the public sector. There is also an uneven distribution of physicians between the public and private health systems. A research study found that in a sample of 2,400 physicians, 21.5 percent worked exclusively in the public system, 28.3 percent worked exclusively in the private system, and 50.2 percent worked in both⁴⁶. There is a significant opportunity to find new solutions, especially with the private sector, to improve the access to physicians in underserved areas.

Adherence to treatment

Adherence by patients is low, for both drug and non-drug treatment after a first CVD event and is likely to diminish among patients over time for treatments that involve a lifestyle change. Patients may not make follow-up appointments, and instead may seek medical advice via the internet and start self-treatment by purchasing over-the-counter medicines. Research in 2016 (by Avezum et al) found that 20 percent of individuals who had suffered from a coronary heart disease and 30 percent of those who had suffered a stroke took no medication for their treatment, although guidelines suggest an uptake of antiplatelet, ACEi/ARB, B-Blocker, and statins after an event⁴⁷.

Proportion of Medication in Individuals with Coronary Heart Disease (CHD) or Stroke in Brazil - The PURE Study

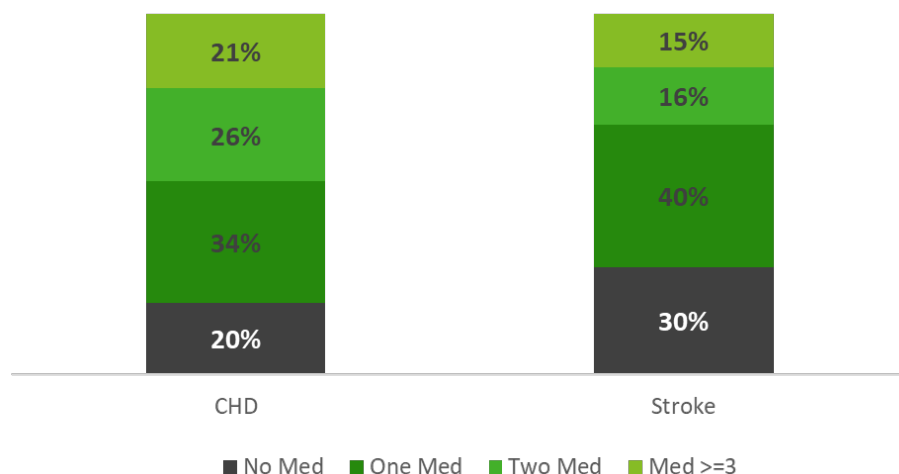


Figure 5: Proportion of Medication in Individuals with Coronary Heart Disease (CHD) or Stroke in Brazil - The Pure Study

Source: The PURE study, adapted from Avezum, 2016

A possible explanation for this drop in adherence could be the de-prioritisation of treatment due to limited availability of drugs, logistical inconvenience of receiving treatment given physician and clinical shortages in poorer regions and due to underestimation of the severity of the CVD risk factors.

Constraints within the healthcare system

There are constraints within the healthcare system, particularly the public system, and challenges that need to be met and overcome to reduce inefficiencies and wastage of health care resources and to improve patient outcomes

- There is currently insufficient integration between different parts of the healthcare system, especially between health providers in the public and private systems and between the three levels of care
- There is also limited knowledge sharing and exchanges of patient data and information about risks and treatments within the healthcare system
- Many healthcare professionals have insufficient knowledge about treating CVD and therefore do not communicate the severity of CVD risk factors and treatment needs to the diagnosed patients, that would prevent cardiac events
- CVD is not recognised at a national level as a critical disease that is a burden on the patient's support network and the healthcare system. Instead, programs focus on conditions that can lead to CVD, such as diabetes, hypertension, obesity, and smoking. Insufficient attention is given to the risks from high cholesterol levels which results in no emphasis paid to the importance of behavioural and lifestyle changes of diagnosed CVD patients.

IMPROVING HEALTHCARE AND PATIENT OUTCOMES



The national government has a track record of implementing successful strategies and promoting healthcare policies in the public system, such as 'Estratégia da Saúde da Família' and 'Farmácia Popular' program. A more recent initiative in 2021 has been the publication of a cardiovascular strategy in primary care⁴⁸.

A variety of initiatives could be pursued throughout the health system, at state and municipal level and at the level of health service providers.

In the short term, measures could be undertaken (at national, state, municipal or even local level) to improve public awareness of the high prevalence of CVD and its risks of mortality and disability. Measures could take the form, for example, of teaching in schools and at health clinics, and through public health messages on web sites, social media, or TV.

For the medium term, a valuable initiative would be to put into action an ASCVD line of care in national level as there is no specific national guideline or public policy for cholesterol and ASCVD. The guidelines could be developed based on the following steps:

- **Refine formal guidelines for the management and treatment of ASCVD**, initiated by the government in consultation with key stakeholders in the health system. The key stakeholders could include medical societies, patient associations, health technology providers and cardiology specialist centres,
- Selecting **locations to pilot** the guidelines in alignment with the state, municipal and national healthcare providers,
- Based on the locations, **identify key stakeholders** to participate in the pilot program to test the guidelines on ASCVD line of care,
- **Sharing the results of the pilot** scheme widely, including analysis on effectiveness and a proposed roadmap for how the pilot could be scaled to increase the benefit to the patients and health care systems,
- Rolling out the pilot **guidelines at a national level** supported by CVD policies mandating guideline use and introducing evidence-based incentives (financial and non-financial) to encourage the implementation of the guidelines.

This initiative could be based on the successful Line of Stroke Care that was developed in 2008 to improve the care of stroke and heart attack patients, which led to the National Stroke Policy Act in 2012⁴⁹.

In the medium to long-term, there are also opportunities to **improve secondary prevention with health coaches and telehealth combined with the ASCVD line of care initiative**. In addition, health coaches can collect monitoring data, essential for identifying the expanse of the CVD diagnosed population and the socio-economic impact of CVD. Again, this could be part of the pilot approach for the guidelines, which is then expanded by sharing results with relevant stakeholders such as CONASEMS, CO-NITEC and Medical and Patient Associations.

An important digital tool for health coaches is telemedicine, which offers enormous potential for improving productivity and effective treatment in CVD healthcare, namely:

- Individuals are then able to consult physicians and other healthcare professionals remotely, taking away barriers to early diagnosis and adherence to treatment due to logistical challenges,
- Patients can monitor their physical conditions, such as blood pressure, glucose levels and LDL, which will help manage risk factors and reduce the occurrence of a second cardiac event,
- Physicians can remotely monitor the adherence of patients to their treatment and influence behaviour change and sustainable improved health outcomes,
- Physicians can store data about their patients digitally and share the data with other specialists as needed as well as identify how to improve overall treatment of the disease based on specific patient needs,
- Cost savings realized from remote consultations and access to online customized patient treatment information could be transferred to the patient, reducing cost of treatment.



Although Brazil does not have a general regulation or strategy for the use of telemedicine, it was authorized, exceptionally, during the COVID-19 pandemic; and both health professionals and patients expressed satisfaction with its effectiveness. Plans to upgrade to 5G wireless internet in 2022 will support the availability and quality of telemedicine in Brazil⁵⁰. Despite the lack of a national strategy, the use of telehealth services and treatments is increasing. In 2021, 20 percent of facilities used remote monitoring of patients, a fourfold increase since 2013⁵¹.

In the long term and in collaboration with stakeholders, efforts could be made to advocate CVD to be on public policies to diminish health inequalities to diagnosis and to the right treatment, for example:

- Include cholesterol indicator along with other seven strategic indicators in **“Pre-vine Brasil”**, the federal funding policy for primary health care, in order to create a financial incentive for HCPs focused on the achievement of the reduction of prevalence and incidence,
- Engage with new initiative **“Cardiovascular Health Strategy in Primary Health Care and Hearts”**,
- Advocate CVD strategies at the next **2030-2040 Strategic Action Plan** for Non-communicable Disease,
- Use diabetes public policies as benchmark, **2002 Plan for Reorganization of Care to Diabetes and Hypertension** and 2019 law that established the National Policy for Diabetes Prevention for the public system, which there must be awareness campaigns on the importance of assessing and managing blood glucose levels,
- Main stakeholders for successful advocacy for effective CVD public policies are Secretaries of Ministry of Health; CONASEMS; CONASS; CIT; Medical and Patient Associations; and Parliamentary Group in favour of cardiovascular disease.

The effectiveness of initiatives will depend to a large extent on cooperation and collaboration between administrators and health institutions, to improve the exchange of knowledge and data.

A considerable investment in digital technology would be needed to create interoperable databases for the storing, analysis, and exchange of data between institutions. Despite current public and national initiatives as the **National Health Data Network (RNDS)** created in 2020⁵², which aims at promoting the exchange of information across healthcare facilities in the public system and the ongoing discussion to create an integrated open health data platform for the supplementary system inspired in “open banking”⁵³, the **development of interoperable data systems for the exchange of data** should be seen as a crucial long term goal that must be addressed in collaboration with the associations of pharmaceuticals Interfarma and Ministry of Health.

The government on its own cannot implement impactful initiatives, it needs to engage several other stakeholders. It can, for instance, choose to partner with a startup working with solutions that involve data and monitoring.

- Patient Association simultaneously dedicated to the two main causes of mortality - cancer and cardiovascular diseases (Brazil)

Chile



CURRENT IMPACT OF HEART AND CARDIOVASCULAR DISEASE



In the last 20 years, CVD risk factors in Chile have increased within the population and is a major cause of death and disability. In 2019, 26.6 percent of total deaths in the country were attributable to CVD⁵⁴. Between 2009 and 2019, the non-communicable diseases with the highest rates of increase in incidence were related to CVD, in particular: ASCVD (ischaemic heart disease, stroke), chronic kidney disease and diabetes⁵⁵.

Major risk factors contributing to CVD in Chile are high systolic blood pressure, high levels of cholesterol, high body-mass index (obesity) and smoking⁵⁶. CVD risk factors affect men and women differently. While globally one third of deaths in women worldwide are due to CVD, women in Chile are unaware of the seriousness of CVD. Research in 2016 found that CVD risks increase after the menopause for about 80 percent of middle-aged women, due largely to diabetes, smoking, high cholesterol, and obesity. Despite this, women in general are unaware of the seriousness of the risks and consider CVD to be a 'man's problem'⁵⁷.

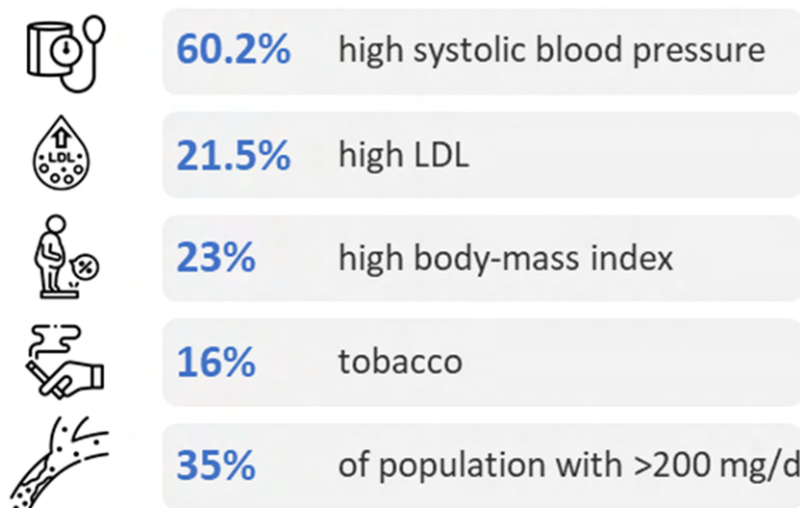


Figure 1: Impact of risk factors on CVD deaths (2019)

Source: Institute for Health Metrics and Evaluation

The 2016-2017 Chilean national survey was conducted in a sample of 5,755 participants, older than 20 years, studying the prevalence of CVD survivors where the results were shown according to gender (female/male). The results were an average age of 46 years, 52% women and 48% men, with a CVD prevalence of 6.4% women vs. 5.9% men as shown below⁵⁸:

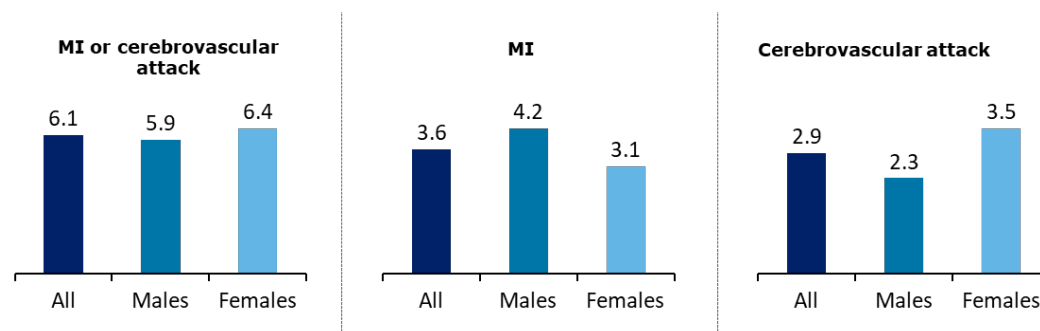


Figure 2: Prevalence of CVD survivors by gender, Chilean National Survey (2017)

Source: Chilean National Survey

On the other hand, within the population of CVD survivors' sample of 455 individuals, of whom 28.7% had their first event before 2005:

- Overall, only 27.8% had an optimal LDL level, 37.9% used statins, 41.3% used aspirin, 37.8% had controlled BP, 78.3% were nonsmokers, and 84.3% had good glycaemic control.
- The prevalence of optimal LDL and BP control was 6.0%.
- 0.5%, 0.8% and 0.3% of men and women, respectively, had high quality of care for men and women, respectively.
- Women and men are nearly equal in optimal LDL levels.

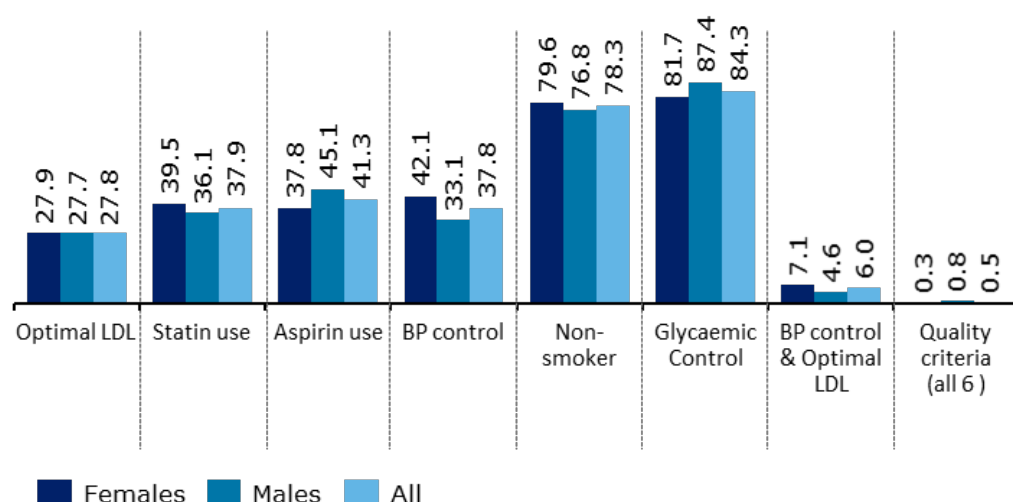


Figure 3: Quality of care indicators in CVD survivors (2017)

Source: Chilean National Survey

PREVENTION AND CARE FOR CVD



The healthcare system in Chile⁵⁹

The finance for healthcare comes from three sources:

- A public system managed by **FONASA**, which covers about 77 percent of the population. Beneficiaries are grouped into four classifications, depending on income; and those in employment make regular contributions to the system out of their pay.

- Private health insurance through **Social Security Health Institutions (ISAPRES)**, currently composed of nine insurers (six open and three closed)
- Separate healthcare arrangements for Ministry of Defense employees, such as army, air force, navy, and police

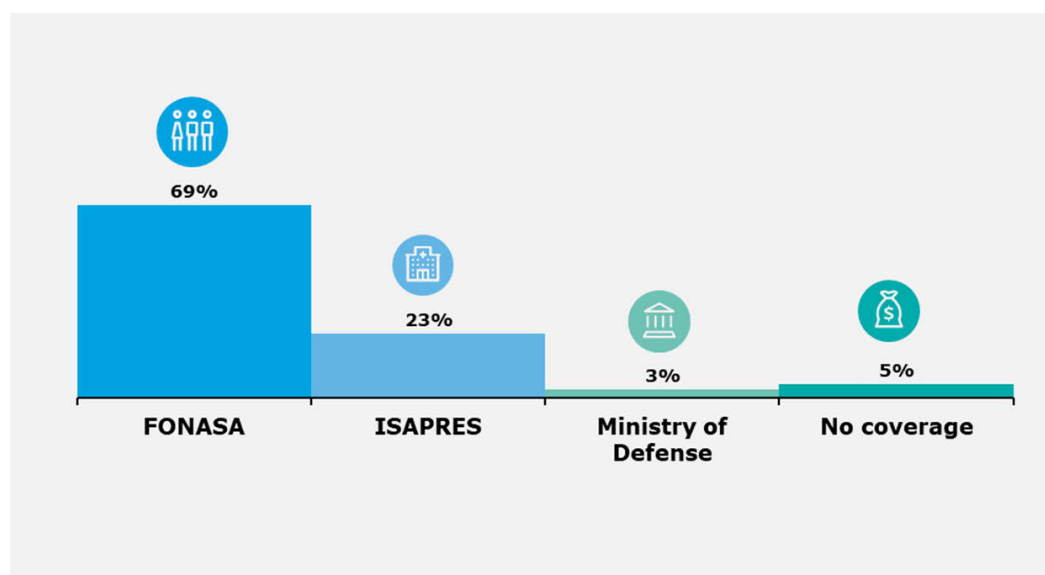


Figure 4: Health Care Insurance Coverage

Source: Statistics Report, FONASA

For benefits under the public health system there is a system of enforceable guarantees for a range of priority diseases, under the Acceso Universal con Garantías Explícitas (AUGE). AUGE specifies four basic guarantees for these diseases: access, quality, timeliness, and financial protection for patients⁶⁰.

Chilean Health System implemented Universal Health Coverage better known as “**Ley de Garantías Explícitas en Salud**” (GES) or **AUGE program**. The objective is to generate the right to universal access and guaranteeing treatment for the most relevant health problem, including ASCVD and other CVDs, by partnering with private and public institutions to provide financing and quality care.

While this has contributed to a decrease in age-adjusted cardiovascular mortality, there is limited information about coverage and quality of chronic health care given to CVD survivors at the national level. This is of course essential to continue to keep mortality low⁶¹.

Primary, secondary, and tertiary care

There is a decentralized system of primary care, managed by regional health authorities (**SEREMIS**) in compliance with the national policies of the government. A Cardiovascular Health Program provides guidelines for detection, diagnosis, and timely intervention for cardiovascular risk factors, through a testing and monitoring system⁶². A large range of health checks are covered by AUGE under the **Examen de Medicina Preventiva (EMP)**, although the uptake of EMP testing is low, due largely to a low level of public awareness⁶³.

In Chile, the use of medication for secondary prevention of coronary heart disease was very low. According to the **PURE (Prospective Urban Rural Epidemiological)** study, people with a better socioeconomic level have a better adherence to treatment; on the other hand, it was identified that after the implementation of AUGE program, the use of some CVD drugs has increased by more than 50%⁶⁴.

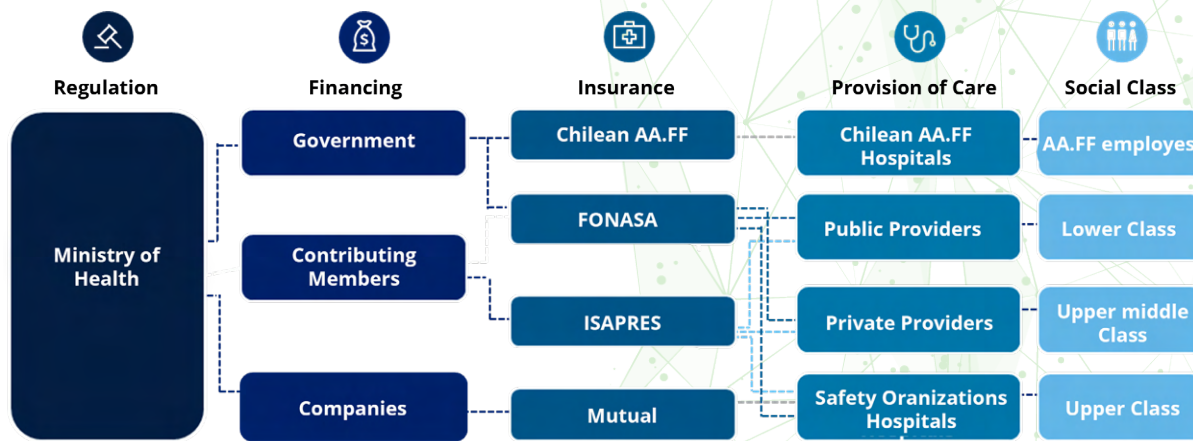
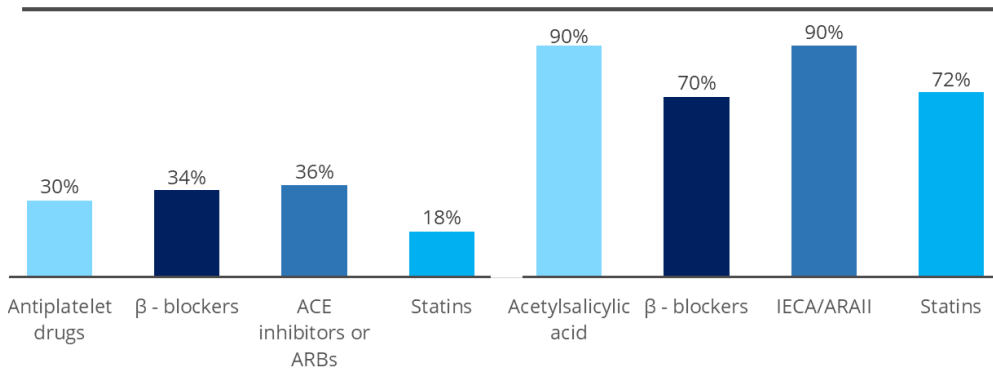


Figure 5: Health Care Insurance Coverage

Source: Executive Summary "Sizing of the private health sector in Chile 2018"

Chilean use of medicine in CVD



Chilean use of medicine in CVD After AUGÉ Program

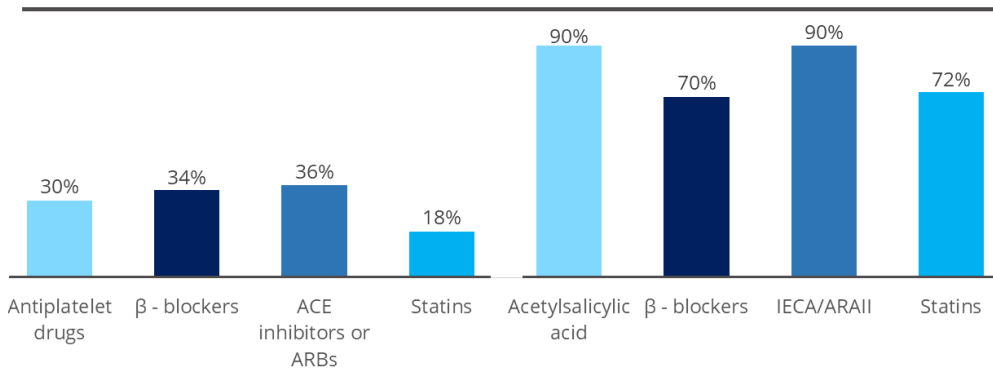


Figure 6: PURE study: Adherence to treatment (2009)

Source: Adherence to pharmacologic treatment in secondary prevention of cardiovascular disease

Government initiatives

In addition to the **Cardiovascular Health Program** and **AUGÉ**, the government has taken several initiatives to promote healthy living and to reduce CVD risks. Chile was one of the first countries to adopt the **WHO Global HEARTS initiative** to control hypertension⁶⁵. The Ministry of Health created the **Pharmacy Fund** to reinforce the provision of free access to medicines for the treatment of conditions such as hypertension, diabetes and high cholesterol⁶⁶. In addition, MoH has developed a branch of digital hospitals that will be able to provide new technologies for the detection of various potentially lethal diseases, this project is known as **Digital Hospital**. It is a new healthcare model, which focuses on the needs of the patient and takes advantage of technology to bring them closer to the healthcare system, adding an alternative to the traditional model. All citizens have access to the Digital Hospital, regardless of their healthcare provision⁶⁷.

Health expenditure in Chile is relatively high: in 2019 it amounted to 9.3 percent of GDP or US\$1,376 per capita. And according to the World Bank, in 2018 Chile had 5.2 physicians per 1,000 of the population (about average for OECD countries) and 13.3 nurses per 1,000 (one of the highest ratios among OECD countries)⁶⁸.

According to a Harvard study, the \$ savings realized from interoperability efficiency between public and private systems, represents 5% of total annual healthcare spending. Based on this study, CENS estimates that in Chile, the equivalent of 10% of health spending could be saved, which is around USD \$170 million, as a result of improved medical decision making through better data availability⁶⁹.

The **National Health Strategy of Health Goals to 2030**, which includes cardiovascular diseases in its agenda, has recently been published. Based on which, Chile aims to reduce the burden of disease due to cardiovascular and cerebrovascular diseases in people over 18 years of age through the following goals:

- Increase the rate of arterial hypertension control at the population level
- Increase coverage of effective treatment for Cardiovascular and Cerebrovascular Disease
- Increase the effective coverage of integrated treatment of cardiovascular risk in the health care network with a gender focus
- Increase the effective coverage of cost-effective treatments for people at high cardiovascular risk
- Increase the coverage and quality of early and continuous multidisciplinary rehabilitation associated with cardiovascular and cerebrovascular events

CHALLENGES FOR PATIENT CARE



Progress has been made in preventing, diagnosing, and treating non-communicable diseases, including CVD. However, although the health system is well funded, there are opportunities for improvement.

- Public awareness of CVD risks, for example from unhealthy lifestyles, remains low. More patients need to be encouraged to have health checks and to adhere to treatments if diagnosed with a condition.
- The use of medication for secondary treatment of coronary heart disease is low. A PURE (Prospective Urban Rural Epidemiological) study identified socioeconomic status as one of the main factors influencing the use of drugs for secondary prevention. Individuals at a higher socioeconomic level adhere better to treatments. The challenge is to broaden this across to all parts of society.
- The **HL7 (Health Level Seven - a non-profit organisation)**⁷⁰ Chile initiative was launched in 2019, with the objective of promoting the use of interoperability standards in IT systems and improving capacity for the exchange and management of data within the health system. However much more progress is needed to achieve data operability and improve management of CVD.
- The foundations for telemedicine exist but are not yet a reality for most patients. The Ministry of Health has developed a number of 'digital hospitals' that use technology to bring individuals closer to the healthcare system. Again, however, much further progress is needed in the use of telemedicine for remote consultations, health checks and treatment of conditions.

“
Adherence to treatment is an important and multifactorial issue, and in a chronic disease that requires many treatments, adherence in patients is more complicated; with an alternative that simplifies the treatments could improve adherence rates.
- Clinical Nutritionist Chairman Member of IAS Leader (Chile)

IMPROVING HEALTHCARE AND PATIENT OUTCOMES



In the short term, a number of initiatives could be taken to improve public awareness of CVD risks and the availability of health checks and monitoring.

- Understanding the patient's journey, from their eyes, to redesign the steps of the process that are not functional. Developing a patient outreach campaign using surveys, interviews and dialogue between the health sector and patients
- Develop a guideline that addresses cardiovascular risk rather than talking about risk factors and diseases separately. While risk factors driving CVD are different, targeting them separately loses the awareness of the overall longer-term consequences in terms of cardiac events.
- In collaboration with other stakeholders, the government could undertake a digital campaign, to spread information about the Cardiovascular Health Program in order to improve public awareness of CVD and its risks, and to promote healthy living. This awareness message can also be tailored to healthcare professionals and patients respectively.
- Prioritize cardiovascular risk factors in protocols and guidelines to create greater awareness of their impact and define prevention measures
- Risk stratification should be updated and aligned with current Chilean statistics. For example, the government /health system could collaborate with a broader set of stakeholders to investigate the reasons for relatively high mortality rates from CVD among middle aged and older women

In the medium-to-longer term, progress can be made in several areas.

- There are opportunities to extend the use of telemedicine, to monitor CVD and to engage healthcare professionals in digital patient care. Digital tracking systems can be used to provide data and analysis in real time, managing prevention and detection and monitoring measures such as blood pressure and glucose and LDL (cholesterol) levels. Closer monitoring should lead to an improvement in adherence to treatments
- Partnerships between healthcare providers should be encouraged to reinforce primary care for CVD, through education programs, monitoring and timely treatment. Healthcare providers in the private health system should be encouraged to increase their involvement in primary care
- Efforts should be made to integrate the different levels of healthcare (primary, secondary, and tertiary treatment) to improve the effective capacity of the health system and reduce duplication of effort
- A digital system could be created for centralizing the storing of health data from both public and private institutions. This would improve the interoperability of data, to provide all healthcare providers with better clinical histories of patients.

Colombia



CURRENT IMPACT OF HEART AND CARDIOVASCULAR DISEASE



Cardiovascular disease is the main cause of death in Colombia. In 2019, the incidence rate (rate of new cases) for CVD was 471.15 per 100,000 of the population and the prevalence of CVD was 4,773 per 100,000. The mortality rate was 152 per 100,000, amounting to 29.5 percent of all deaths in the year^{71, 72}.

Between 2009 and 2019, the non-communicable diseases with the biggest increases in mortality rates were all for conditions associated with CVD: ischemic heart disease, stroke, chronic kidney diseases and diabetes. In 2019, the main risks contributing to the total number of disability-adjusted life years (DALYs) – equivalent years lost due to early death or disability – were also linked to CVD⁷³.

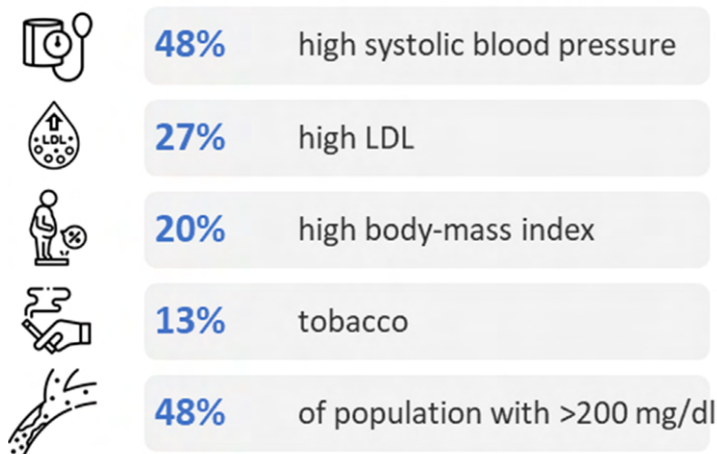


Figure 1: Impact of risk factors on CVD deaths (2019)

Source: Institute for Health Metrics and Evaluation

It was estimated that in 2016 the total annual cost of CVD was US\$2.1 billion, comprising productivity loss (40 percent) and public healthcare spending (60 percent)⁷⁴.

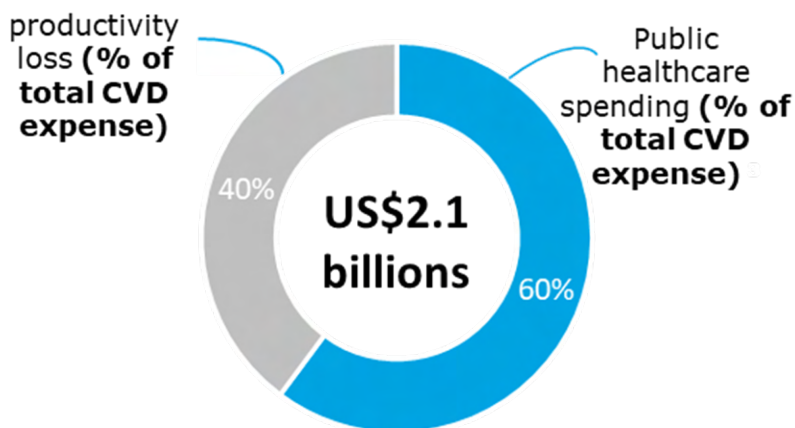


Figure 2: Economic impact of CVD (2016)

Source: World Heart Federation

There are only a handful of active public health policies specifically addressing the reduction of CVD. However, combined with a lack of information communicated to the affected population on the severity of CVD, the details of the policies and the fragmented levels of care in the healthcare system, it has continued to be a significant challenge to effectively treat and reduce the prevalence of the disease.

For instance, the Ministry of Health and Social Protection are progressing on the **Ten-Year Action Plan for cardiovascular health, and the prevention and control of Diabetes 2014-2024**⁷⁵, which aims to reduce mortality rates (by 20%) and premature mortality (by 35%) from CVD, focusing on acute myocardial infarction (MI) and cerebrovascular disease (stroke). However, there is still more work to be done on how this ten-year plan will be executed, how the impact will be measured, and how the details of the plan will be communicated to the HCPs and patients in order to successfully achieve the target CVD reduction goals.

PREVENTION AND CARE FOR CVD



Outline of the healthcare system in Colombia

There is a public system for universal healthcare coverage of the population (SGSSS), which operates at a mixture of national, state, and municipal levels. The public system is funded by health care insurance, which is divided in a contributive scheme (mandatory payroll deductions paid by employees and employers), a subsidized scheme (publicly funded) and a special regime for state-owned companies, the military and public teachers⁷⁶. The HMOs or Entidades Prestadoras de Salud (EPSs) act as an intermediary between individuals needing a consultation or treatment and the providers of the healthcare (clinics and hospitals) also called Instituciones Prestadoras de Salud or IPSs⁷⁷.

There is also a voluntary private health system, and about three percent of Colombians have private health insurance and plans, provided mostly as an employment benefit⁷⁸. Individuals covered by private healthcare can benefit from easier administration, a shorter waiting time for appointments and depending on the coverage provided by the insurance plan, access to specialized teams equipped with up-to-date technology⁷⁹.

As a result, the healthcare system is fragmented in how they serve CVD patients, where the healthcare available to individuals depends on their arrangements with their EPSs or private healthcare insurances. The most notable effect of fragmentation on effective access to medication is seen in the differences between the contributive and subsidized schemes in the public system. Despite all CVD and ASCVD treatments being covered, the contributive scheme accounts for most prescriptions even though between the two schemes they cover almost half of the population each.

This potentially implies that the less financially able who do not personally contribute to healthcare payments, continue to be at a disadvantage in terms of access to HCPs and this could be due to various underlying factors like not enough hospitals in rural areas and therefore less access to HCPs, not enough awareness of the disease and therefore not enough diagnosis and treatment of CVD risk factors or limited adherence to treatment due to misconceptions of how severe the CVD risk factors could be if not treated over the long term.

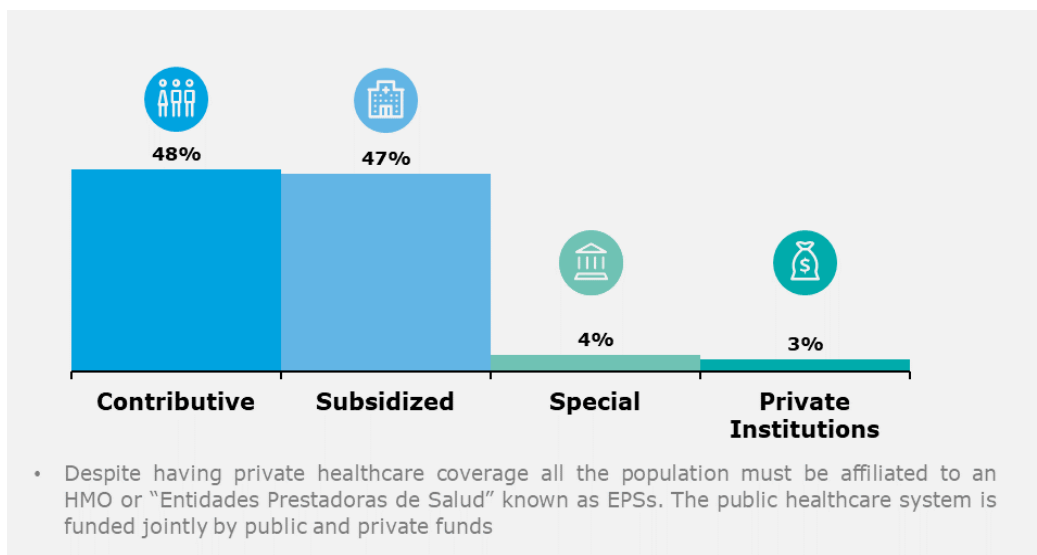


Figure 3: Health Care Insurance Coverage

Source: Deloitte Analysis and Ministry of Health

Even with the healthcare system mostly financed by public funds, most insurers (EPSs) and providers (IPSS) are privately owned⁸⁰. This particularity of the Colombian health system opens opportunities for public-private partnerships, and several stakeholders can intervene to reduce the access and quality gaps of specific populations such as those affiliated to the subsidized scheme (longer waiting times and less effective access). In addition to the above, new regulations such as the budget ceilings, included in the National Development Plan 2018-2022, may undermine the access to innovative medications in CVD (services and technologies not financed in the Health Benefits Plan or PBS)⁸¹.

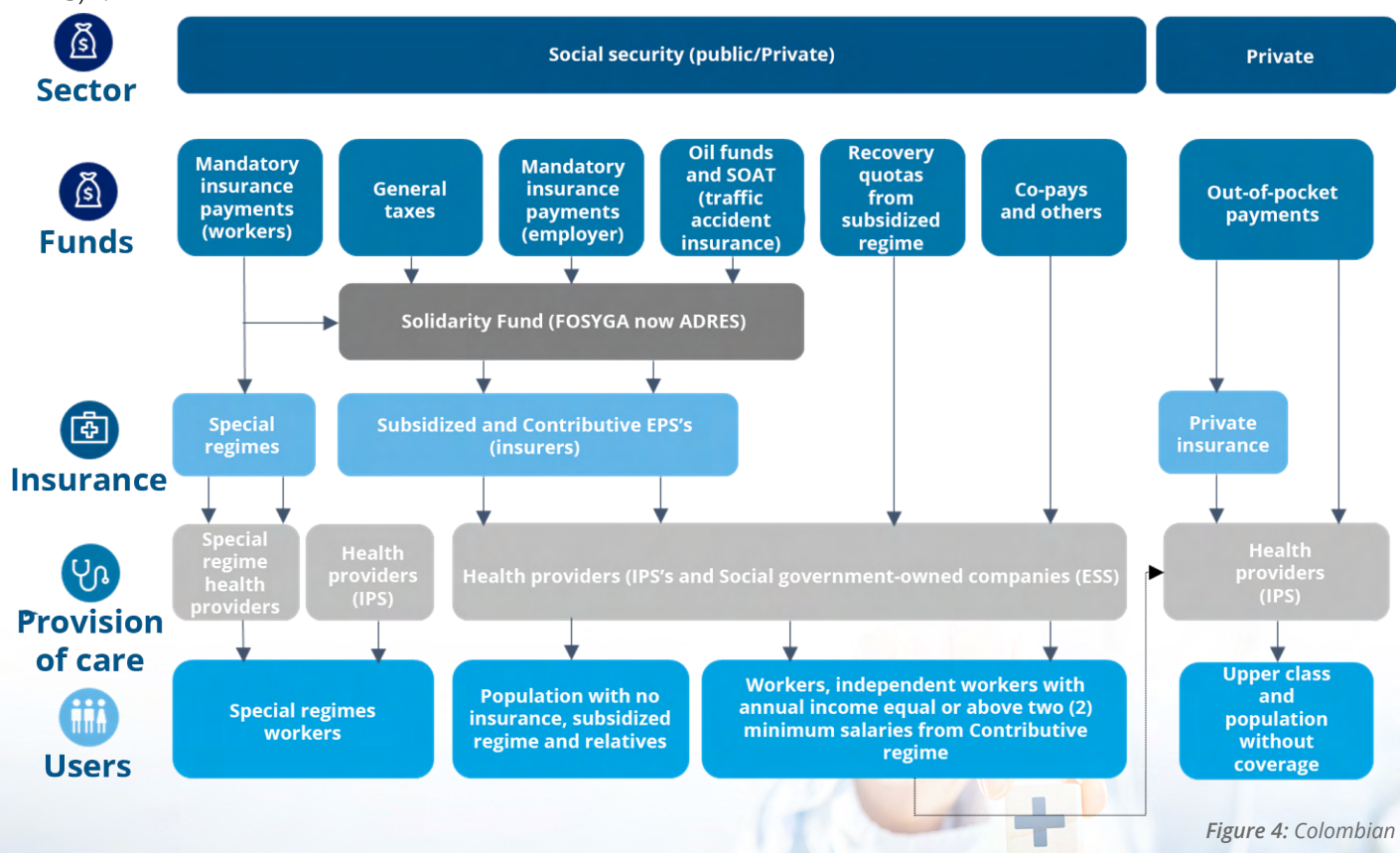


Figure 4: Colombian Health Care System

Source: Guerrero, M., Gallego, A., Vasquez, J., Becerril-Montekio, V. (2011). The health system of Colombia

CVD treatment

The clinical outcome of CVD treatment for patients depends on several factors such as point of entry into the system, access to prescribed treatments, waiting times for medication, and communication between doctors and their patients.

Figure5: CVD patient pathway in Colombia



Source: Deloitte Analysis and Integrated Healthcare Pathways (RIAS)

The Colombian Society of Cardiology (SCC) has issued guidelines, based on those of the European Society of Cardiology, which include targets for managing dyslipidaemias to reduce cardiovascular risk, such as targets for smoking and diet, physical activity, body weight, blood pressure, LDL, and cholesterol⁸².

The government has pursued several initiatives to promote healthy lifestyles and the treatment of CVD-related conditions. These include:

- **Clinical Practice Guide for the Prevention**, Early Detection, Diagnosis, Treatment and Monitoring of Dyslipidaemias in the Population over 18 Years of Age (2014).⁸³
- There are also **Integrated Healthcare Pathways (RIAS)** for several diseases and health conditions, which specify technical guidelines for health promotion, setting out the key elements of evidence-based care and best practices, and promoting the organized integration of treatment through the sequencing of multidisciplinary actions by healthcare providers⁸⁴.

The integrated approach model of the 3 types of RIAS needs to be pushed to amplify its impact in the population⁸⁵.

- Health promotion and maintenance routes** (collective and individual risk management and the promotion of healthy environments),
- Risk group routes** (timely identification of risk factors to prevent the onset of a specific health condition or to make a diagnosis and referral),
- Specific care routes** (addresses specific prioritized health conditions).

As reference of leveraging initiative that are already working, advances in the implementation of the Cardio Cerebral Vascular and Metabolic RIAS in the Bogotá Public Network shed light on how to implement the initiative, its costs, and benefits as well as the steps to be taken⁸⁶.

- Integrated Social Protection Information System (SISPRO) is made up of sector databases and information systems on the supply and demand of health services, quality of services, insurance, financing, and the provision of health services. A proper coordination with stakeholders will improve the interoperability of this data to provide better solutions that can be very useful for evidence-based decision making to improve CVD patient treatments.

In the private sector:

- Between January 1st and September 30th of 2020 there was a 117% increase in the number of health service providers offering telemedicine services and a 192% increase in the number of services offered in this modality⁸⁷. This is clearly a platform to accelerate ongoing and new private - public health care system collaboration, whereby tele-medicine related private initiatives are scaled up nationally to help reduce health care access gaps within the public system.
- Colombian Society of Cardiology and Cardiovascular Surgery (SCC) registers⁸⁸.
- Patient-focused medical registries have the strength of bringing doctors, patients, and scientists together to obtain data-driven information that will enable the creation of high-value services, optimize current therapies, and create medical knowledge that will benefit patients who may have this condition.
- The country's cardiology society has 4 active registries of cardiovascular patients:
 1. Familial hypercholesterolemia,
 2. Acute coronary syndrome,
 3. Heart failure (RECOLFACA),
 4. Interspire

CHALLENGES FOR PATIENT CARE



Awareness

CVD is the leading cause of death and disability in Colombia. Despite this fact, CVD and specifically ASCVD are not widely known. In Colombia 4 out of 10 adults suffer from hypertension, half of them are unaware, while 33% fail to control their blood pressure. Regardless the impact of CVD, much of the Colombian population is unaware of the existence of these diseases, their risk factors, and their consequences⁸⁹.

According to Colombian medical experts it is more common to practice a “healing” medicine instead of a preventive medicine and that is one of the reasons the awareness of CVD is low. Patients do not realize they suffer from a cardiac or ASCVD condition until they have an event (heart attack, stroke, ischemic condition, etc.)

Affordability and availability

The healthcare system is mostly publicly funded and in 2019 total spending on health amounted to 7.7 percent of GDP or US\$495 per capita⁹⁰. However, data shows further investment is needed to make CVD treatment more available as the current healthcare system is not equipped to sufficiently address chronic diseases like CVD.

For instance, there is a relative shortage of physicians and nurses within the health care systems overall. The OECD found that in 2019, there were 1.7 available hospital beds, 2.3 doctors and 1.4 nurses per 1,000 of the population, all below the average for OECD countries. The average ‘density’ of physicians in the OECD was much greater in urban areas (4.7 per 1,000 of population) than in rural areas (2.9 per 1,000)⁹¹. In response, a National Rural Health Plan was announced in 2018 to reduce the gap in healthcare coverage between rural and urban areas⁹². However, there is no consistent measure of the impact and how this specifically addresses CVD treatment requirements and therefore no way of assessing whether the health plan is working for the rural impacted patient population.

In addition, other working conditions for HCPs need to be assessed to enable them to be more effective. For example, extensive regulations have placed an administrative burden on doctors which has thereby reduced the time available for consultations and prescribing treatments. Lack of interoperable systems to capture patient and disease details reduces efficiency, meeting patient CVD treatment needs in a timely and effective manner.

It must be noted that there has been progress in the digital evolution of healthcare for example through the implementation of the eHealth platform that is used for diagnosis, treatment, and monitoring support for NCDs. Introducing this platform has also led to upskilling of medical support staff to use more efficient digital solutions and relieve the burden on current professionals constrained by legacy systems and processes.

This is a positive step towards making CVD treatment support more available for the wider population by leveraging the platform to:

- encourage adherence to treatment through more consistent monitoring of health recovery,
- building patient awareness of primary and secondary preventive care,
- and reallocating healthcare provider time to patients with more critical CVD conditions

Adherence to treatment

Access to treatment depends on a combination of factors, such as where the patients are located and where treatment is provided, and the extent of cover provided by the healthcare insurance policy. The time lapse between prescribing treatment by a doctor and the delivery of the CVD medicine to the patient can be long, and delay can affect adherence to the treatment and subsequent patient outcome.

A challenge for the Colombian health system regarding equity is effective access to health services and technologies which in turn encourages adherence to accessible treatment over the long term.

A 2019 study⁹³ showed that the regime to which Colombians are affiliated is an indicator of their income level. There is a close relationship between being affiliated to the subsidized scheme and greater morbidity and premature mortality associated with social determinants of health. The same study shows that those affiliated to the subsidized regime also have less access to healthcare facilities (medical appointments, surgeries), a higher risk of dying from malnutrition in relation to the contributive regime (31.7 times) and reduced access to sexual and reproductive health plans; this can be extrapolated to the care received by this population in terms of cardiovascular diseases as well.

There is a major opportunity here for stakeholders to push initiatives to improve and sustain adherence among CVD patients from both regimes, with special emphasis on those of the subsidized regime: incentives for achieving treatment goals, patient education (to transform patients into active stakeholders), innovative ways to monitor and follow-up on CVD diagnosis and treatment (digital tools) and treatment adherence through improved accessibility.

There is also an opportunity here to build partnerships between the subsidized and contributive health care systems to improve scalability of CVD secondary prevention solutions will allow patients to contribute back to society through improved health and productivity and ease the burden on personal carers who are also often put at risk due to the strains of juggling both caring and other family responsibilities.



Furthermore, financial, and non-financial incentives for patients and HCPs to encourage measurable improved adherence to CVD preventive treatment could also be a key influencer for changing behaviours and improving patient outcomes in the subsidized healthcare regime.

Constraints within the healthcare system

There is a lack of communication and information sharing on the risks of CVD and contributing risk factors between doctors and their patients, with the result that a CVD risk factor is often not diagnosed as early as it could be, which leads to delays in the treatment and monitoring of patients and eventually more serious health deterioration. Doctors may also have only a limited up-to-date medical knowledge for the prevention, diagnosis, and treatment of CVD, which in turn leads to poor adherence to treatment by patients and ineffective execution of secondary preventive treatment. CVD treatment guidelines, consistently updated CVD treatment information and seamless access to CVD information, including impacted patient data are some of the key changes that need to be implemented immediately to help HCPs better treat CVD patients.



In terms of secondary prevention, the biggest challenge is doctor-patient integration. In this relationship, the doctor must have an ethical attitude when he sees the patient in the HPS, he cannot see the patient as a statistic. The doctor should tell the patient to reduce salt intake, stop smoking, give up sugar, as well as being diligent in taking his or her medication. The limited time to help patients means that doctors cannot do their job well and that patients maintain and deepen their medical conditions

- Cardiologist from Global Medical Center (Colombia)

Technological and digital enabling tools that allow access to patient health data is a major gap to be addressed: there is limited or no interoperability between the databases and digital systems of healthcare providers and managers. However, some progress has been made. Through Act 2015 of 2020, the government set out basic requirements for the implementation of Interoperable Electronic Health Records (IEHR), but this law will take some years to implement fully. A more immediate solution that may be piloted in a selected geography and then scaled to cover larger CV patient populations based on learnings could deliver the progress needed to illustrate the benefits and the return on investment in implementing digital solutions to improve CVD patient outcome.

Experience with COVID-19 has shown that initiatives are also needed to increase the use of telemedicine, and the government is currently working on publishing a National Telehealth Plan with a scope up to 2030⁹⁴. These are good examples of initiatives to leverage to accelerate the impact delivered to the CVD patient population.

IMPROVING HEALTHCARE AND PATIENT OUTCOMES



A variety of initiatives could be taken to reduce the incidence of ASCVD.

More specifically, measures that could have an impact in the short term would be to:

- Expand and leverage existing monetary incentives (adjustments to per capita amounts granted to HMOs to control priority pathologies such as hypertension, diabetes mellitus (DM0 and chronic kidney disease (CKD)) to atherosclerotic cardiovascular diseases (ASCVD). Since the conditions are included in the incentive model because of the importance of morbidity and mortality, the impact of ASCVD should be evaluated to make them part of the priority diseases.
- Set specific goals for this ASCVD policy to measure the effectiveness of the policy when implemented. These goals must consider CVD risk factors (hypertension, DM, and CKD) and their clinical pathway (detection, diagnosis, prevention, monitoring, pharma, and no pharma treatment) to address the condition depending on the particularities of individuals as a secondary prevention action.
- Accelerate the development of Integrated Healthcare Pathways (RIAS) to improve the detection and control of ASCVD, using an integrated approach to treatments.
- Medical societies can foster peer to peer education to encourage worthwhile medical updates.

In the **medium to longer term**, further measures would be to:

- One solution could be to incentivize doctors to practice in remote areas of the country. Another breakthrough to physician supply may be the decentralization of medical schools and the diversification of the geographical origin of students accepted to medical schools.
- Develop rapid tests for CVD (blood pressure, glucose levels, LDL) to achieve speedy diagnosis and support risk stratification: the use of digital tracking systems would provide healthcare professionals with real-time data for analysis.
- Encourage public-private partnerships to promote the use of state-of-the-art technology at scale for diagnosis and treatment adherence.
- Develop policies that integrate primary and secondary treatment of ASCVD.
- Continue to improve the medical knowledge of healthcare workers and their understanding of ASCVD.
- Foster the effective implementation of digital systems to centralize medical data, and improve the interoperability of systems.
- Continue to extend the use of telemedicine, including making it available to the rural population.



Mexico



CURRENT IMPACT OF HEART AND CARDIOVASCULAR DISEASE



Cardiovascular disease is one of the main causes of morbidity and disability in Mexico⁹⁵. The main risk factors affecting CVD deaths in 2019 were high levels of systolic blood pressure, LDL, and body-mass index⁹⁶. In 2019, the incidence rate (rate of new cases) for CVD was 449.2 per 100,000 of the population, the prevalence of CVD was 4,706 per 100,000 and the mortality rate was 29.5 percent of all deaths.

Between 2009 and 2019, the non-communicable diseases (NCDs) with the biggest percentage increases were related to CVD: ischemic heart disease, diabetes, chronic kidney disease and stroke. In 2018, 30.6 percent of the population had a high level of cholesterol, in excess of what might be considered 'healthy' (more than 100 milligrams per decilitre)⁹⁷. In 2015, the NCD group generated the greatest loss of Healthy Life Years (DALYs) in IMSS, with 9,038,214 and a rate of 169.6 per 1,000 beneficiaries⁹⁸.

(2019)¹



52% high systolic blood pressure



31.1% high LDL



24.9% high body-mass index



10.6% tobacco



30.6% of population with >200 mg/dl

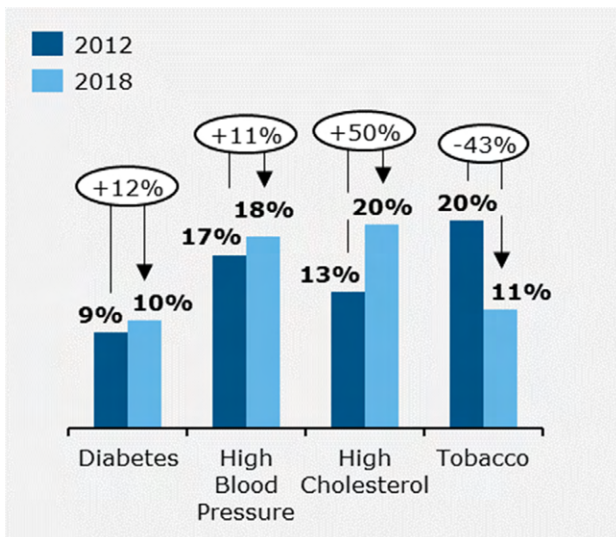
Figure 1: Impact of risk factors on CVD deaths (2019)

“One of the biggest mortality problems is that the general population does not understand the disease or the disease process, nor that the disease should be treated. So, they think they are apparently healthy and asymptomatic, but ischemic heart disease debuts 30% of the time as sudden death, 30% with an event and 30% with symptoms - which is the stage where we can work most with the patient.

- Cardiologist specialist of a well-known private hospital in Mexico

Source: Institute for Health Metrics and Evaluation

In 2018, the results of the **Fourth National Survey of Risk Factors** showed that over the previous five years, there had been an increase in the percentage of the population over 20 years of age with the main cardiovascular risks⁹⁹.



Source: National Health and Nutrition Survey (2018)

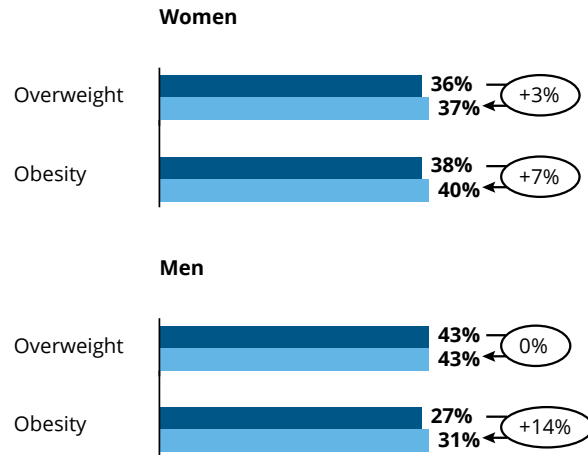
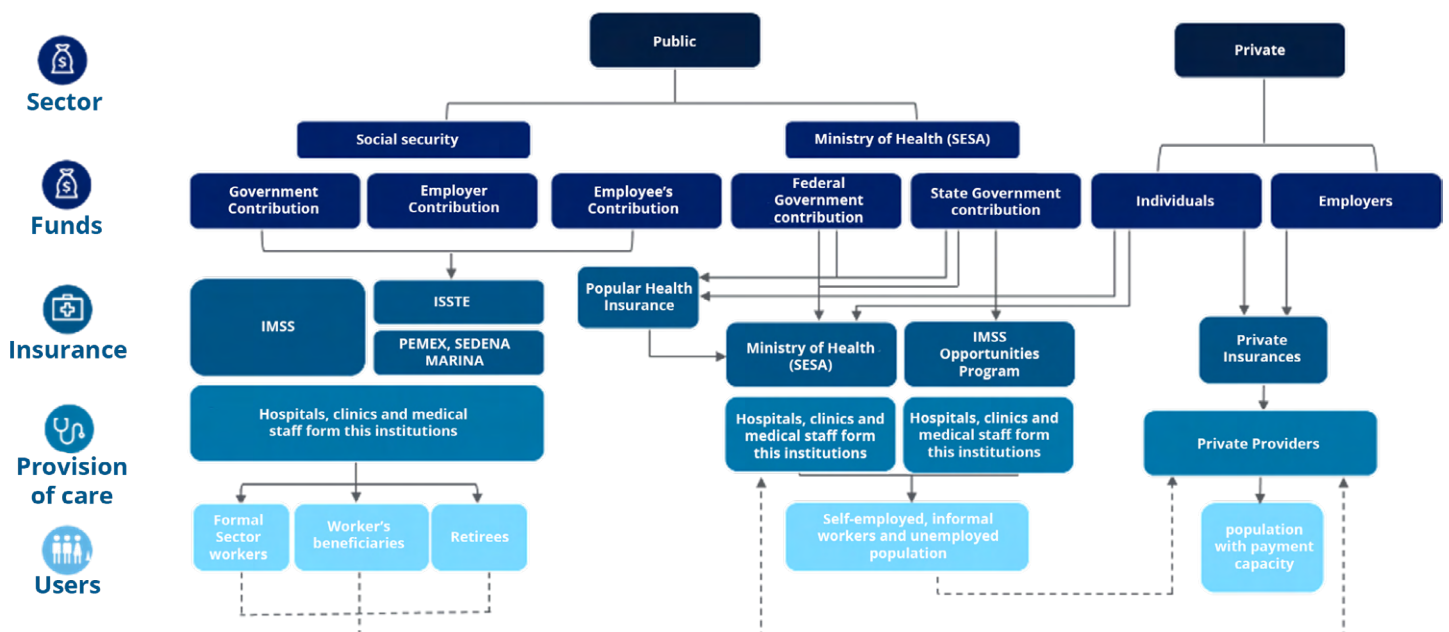


Figure 2: Main Results of the National Health and Nutrition Survey 2018

PREVENTION AND CARE FOR CVD



Mexico has a fragmented healthcare system based on providers that render services for specific populations: IMSS and ISSSTE for employees, INSABI as a social program and the private companies' that insure medical expenses.



Source:

Figure 3: Mexican Healthcare System

In public system, there is INSABI which is a program created in 2020 to replace “Seguro Popular”¹⁰⁰. This program is aimed to cover the population without other types of health coverage. In social security, IMSS (Social Security Subsystem) grants health coverage to private-sector employees and their dependents¹⁰¹. The private subsystem is aimed to supplement the other two schemes and can be contracted through insurance companies that offer individual and collective policies¹⁰².

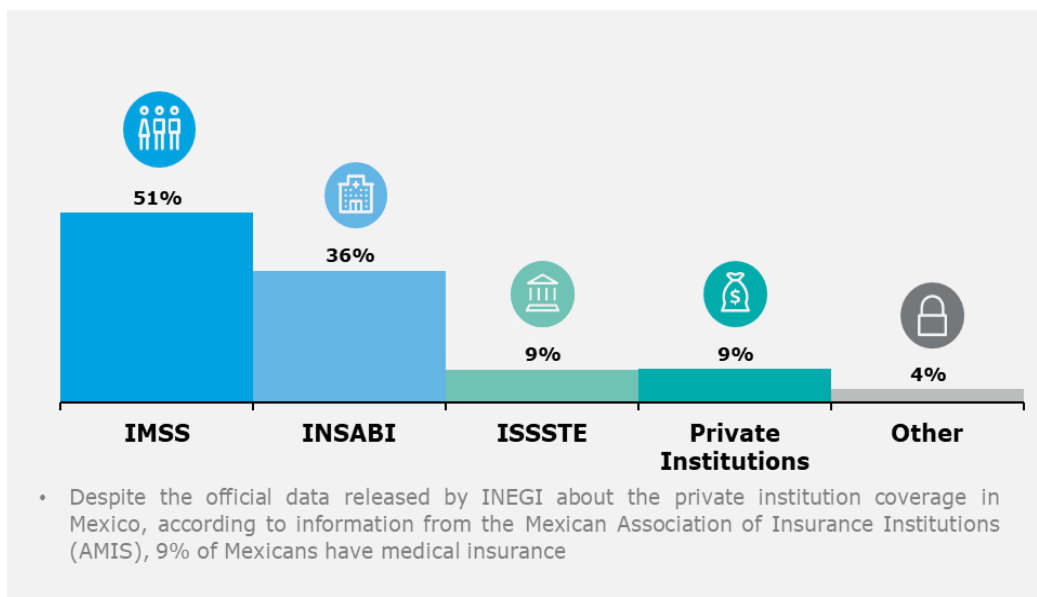


Figure 4: Healthcare insurance coverage

Source: INEGI 2021, AMIS 2021

For the **Institutional Program of the Mexican Institute of Social Security (IMSS) 2020-2024**, there are 6 main priority objectives ¹⁰³:

1. Universal and free access to health services and medicines
2. Guarantee the quality and coverage of institutional services
3. Strengthen IMSS infrastructure and human resources
4. Guaranteeing the right to childcare and sports social benefits
5. Ensure sustainability through efficient spending and increased revenue collection
6. Ensure that the Institute has the mechanisms to meet the needs and meet the demands of the population

Within the same plan, the importance of adopting a comprehensive health model that focuses institutional actions on the reduction of risk factors and the containment and mitigation of Chronic Non-Communicable Diseases (NCDs) is mentioned.

In order to make decisions on how to address these health problems, the causes of these problems must be sought. Quantifying the loss of health caused by diseases and injuries, as well as the social and environmental determinants and risk factors, both collective and individual, will make it possible to plan actions to improve health and eliminate inequalities.

The government is aware of CVD risks and has implemented several strategies to address them, some going in the right direction such as:

- **The Official Norm for the Prevention, Treatment and Control of Dyslipidaemia (NOM-037-SSA2-2012)** and the **Clinical Practice Guideline on the Diagnosis and Treatment of Dyslipidaemias** establish guidelines for the treatment of unhealthy levels of fat (cholesterol) in the blood. NOM-037-SSA2-2012 establishes a four-step system for the treatment of this disease, based on diagnostic checks for individuals over 20 years old, measurement of their cardiovascular risk based on several risk factors, monitoring changes over time, and treatment of individuals who are found to be at high risk¹⁰⁴.
- **Código Infarto** The Heart Attack Code strategy is part of the “A Todo Corazón” comprehensive care program, which aims to strengthen actions for the prevention and care of cardiovascular diseases. Is a strategy for emergency departments in hospitals for the rapid diagnosis and treatment of patients with symptoms of chest pain or shortness of breath. This has achieved a 15% reduction in mortality due to heart attacks¹⁰⁵.
- **PrevenIMSS:** This is a strategy of the Mexican Social Security Institute, which organizes and systematizes the provision of preventive services through five major programs ¹⁰⁶:
 - Child Health (under 10 years)
 - Adolescent Health (10 to 19 years)
 - Women’s Health (20 to 59 years old)
 - Men’s Health (20 to 59 years old)
 - Elderly Health (60 and over)
- **PrevenISSSTE:** Aims to empower its beneficiaries to achieve the regression of overweight and obesity; timely detection of breast and cervical cancer; diabetes and other chronic degenerative disease¹⁰⁷.
- As a measure to reduce cardiovascular risk factors, Mexico issued **NOM-051-SCFI/SSA1-2010**, which makes labelling mandatory for pre-packaged foods and non-alcoholic beverages. This labelling consists of 5 seals on the front of the product that visibly indicate when a product contains excess nutrients and critical ingredients such as: calories, saturated fats, trans fats, sugar, and sodium¹⁰⁸.
- Mexico officially joined **HEARTS** in the Americas, a PAHO/WHO initiative aimed at improving the prevention and control of high blood pressure.
- **Comprehensive Care Protocols (PAI)**, recently implemented by the IMSS for the comprehensive care of the three levels of care for chronic diseases and their complications, where prevention, diagnosis and treatment must be applied to patients with heart conditions such as arterial hypertension, acute heart attack, cerebrovascular disease, and diabetes mellitus.
- Two new digital applications have recently been launched in Mexico, “IAMMX” and “CUIDA TU CORAZÓN”.

IAMMX is an app for the transfer and interpretation of electrocardiograms in the Infarto Mexico network, with the aim of helping the doctor in case of suspected heart attack

CUIDA TU CORAZÓN is an application that helps people to control and prevent heart attacks through medical information

- Other government programs include a **National Strategy for the Prevention and Control of Overweight, Obesity and Diabetes**; and the IMSS **recently published** a new guideline for CVD, based on those of the European society of Cardiology.



In private sector:

- **“Clínicas del Azúcar”** are the integrated solution that provides high-quality affordable diabetes and hypertension care to low-income Mexicans by offering integrated treatment for a flat-rate membership fee depending on the condition being treated. Its solution has 3 main purposes:
 - **One-stop-shop** for diabetes and hypertension care: An integrated system that allow patients to follow-up the treatment in 90 minutes
 - **Fixed-fee membership:** Flexible installments and discounts for people without the ability to pay
 - **Tailor made treatment:** According to each patient needs¹⁰⁹.
- **CUMBRE IC** Is the first alliance of eight leading companies in innovation in the treatment and diagnosis of heart failure, which proposes to bring together virtually health experts (pharmaceuticals, cardiologists, internists, general practitioners) in various conferences and roundtable discussions focused on the diagnosis and treatment of heart failure¹¹⁰.
- There are patient societies such as Salvando Latidos, Fundación Mexicana del Corazón, Pacientes de Corazón among others which also carry out different strategies to reduce cardiovascular risks through education, early detection of cardiovascular factors, and health development in disadvantaged areas¹¹¹.

Despite government initiatives there is a need for greater dissemination of knowledge and the implementation of guidelines, in order to achieve greater success in reducing mortality rates from CVD.



CHALLENGES FOR PATIENT CARE



Awareness

According to Mexican medical experts, ASCVD is not widely known, and CVD is considered a silent disease; patients usually become aware of CVD conditions after the first event. Mexicans are not familiar with ASCVD risk stratification. Which is why the time spent where patients have had the disease without showing any symptoms is considered as a residual risk and is not prioritized for proactive diagnosis adequately.

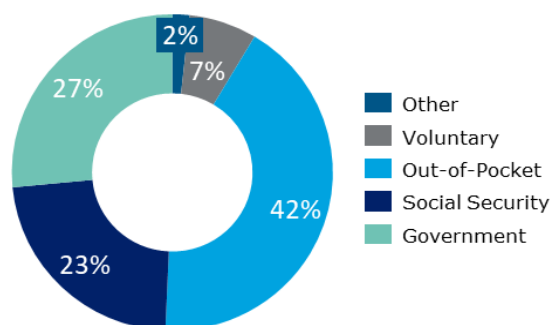
A potential problem in Mexico is the lack of knowledge about the importance of this ASCVD disease, since it can be considered as public enemy number 1. Concept is lost in the books and there is no specific data registry for the disease.

- Cardiologist Member of Mexican Cardiology Institute "Ignacio Chávez"

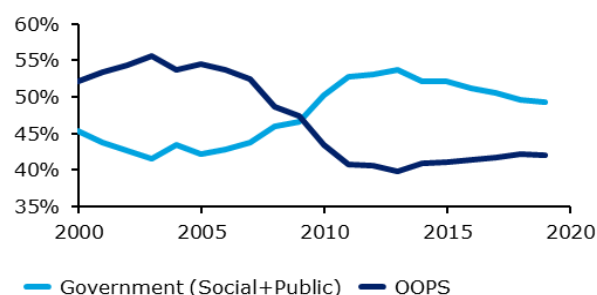
Affordability and availability

Spending on healthcare in Mexico, at 5.4 percent of GDP in 2019, which is low compared to similar countries and results from a large proportion of health care spending being financed 'out of pocket' ¹¹².

Health expenditure by source (2019)



Domestic Government Expenditure and Out-of-pocket Spending (2019)



Source: WHO Global Health Expenditure Database

Figure 5: Health expenditure by source (2019) and domestic government expenditure and out-of-pocket spending (2019)

The numbers of healthcare professionals are also relatively low. In 2019 there were just 2.4 physicians and 2.9 nurses per 1,000 people: these are among the lowest rates among all OECD countries¹¹³. Healthcare resources are also unevenly distributed: most hospitals and healthcare professionals are concentrated in urban areas (although the government, through INSABI, plans to improve services outside urban areas and to people not covered by social security), thereby constraining healthcare services to a notable amount of CVD patients located in rural areas.

It can be difficult to manage the process of finding the right specialist for a cardiovascular patient as well as obtaining all necessary medication, so the process of obtaining secondary care can be time consuming. In addition, the referral rate from one physician or specialist to another is low, which increases the difficulty in obtaining and adhering to treatment.

Overall, Mexico has great inequality in health care services provided across the CVD patient population and requires the State to reduce this inequity through improved access to health care services that would drive better health outcomes for CVD patients. Collecting patient and disease data could be one approach to understanding the impact of the disease and where critical improvements in the treatment process, be it preventive or interceptive, need to be addressed as a priority to benefit the patient, the healthcare system and the country's economic productivity in general.

Adherence to treatment

According to the study **Therapeutic Adherence: A Health Care Problem**, by the Angeles Group medical journal, despite past efforts to increase adherence, it is estimated that only 60% of patients with cardiovascular diseases adhere to their treatment (e.g., statins, antihypertensives, antithrombotic agents, etc.)¹¹⁴.

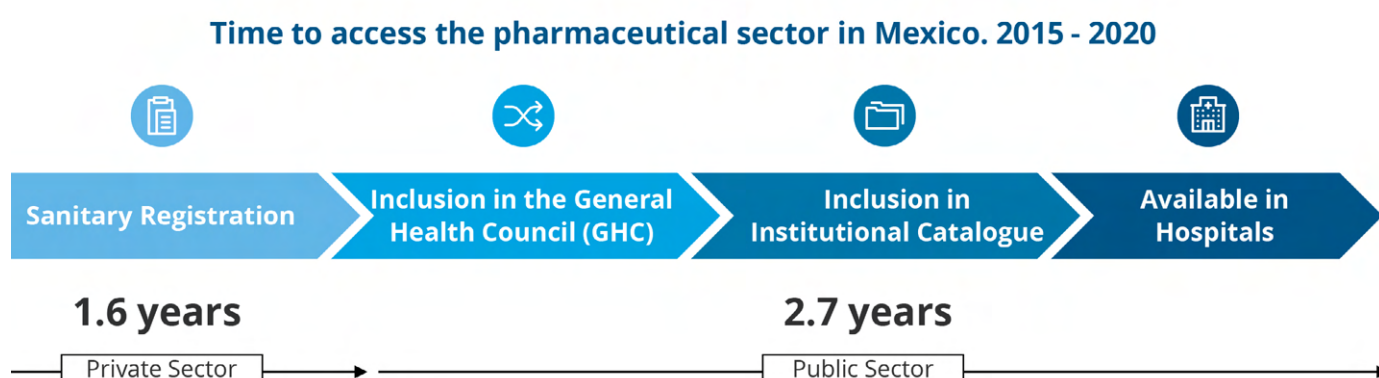
It is estimated that a cardiovascular event occurs every four seconds and a cerebrovascular event every five seconds in Mexico. Hypertension and ASCVD are the most frequent risk factors for these conditions. Strengthening patient adherence to treatment is undoubtedly a critical requirement to reducing premature mortality, other CVD co-morbidities, and reducing the burden on the healthcare system resources¹¹⁵.

Several medical reports have shown that proper adherence to treatment in patients with cardiovascular diseases can reduce the risk of stroke by 30 to 43% and of myocardial infarction by 15%; moreover, the cost of the disease can also be significantly reduced. One example is in the United States, where non-adherence to treatment generates unnecessary costs of between 396 and 792 million dollars per year¹¹⁶.

Constraints within the healthcare system

According to IQVIA's review, on average, Market Authorization approval in Mexico takes about 4.3 years, which compares to about one year in the United Kingdom or Canada, in countries such as Germany, the United States and France it subsequently takes 1.0, 1.1 and 1.8 years to fully approve a drug¹¹⁷.

Figure 6: Time to access the pharmaceutical sector in Mexico 2015-2020



Based on the research in this paper, we were able to point out that access to data and information within the healthcare system still has a great opportunity for growth that could facilitate data-driven decision making for the prevention and treatment of CVD and healthcare system.

In 2012, the government introduced **NOM-024-SSA3-2012 (Electronic Health Record Information Systems: Health Information Exchange)**, to generate, process, preserve, interpret, and ensure the exchange of information between Electronic Health Record Information Systems, including Electronic Health Record systems¹¹⁸.

Progress with digital system interoperability and data exchange depends on initiatives by healthcare providers to implement standards such as those promoted by Health Level 7 (HL7). For example, **Health Gorilla** and the **Angeles Group** are working on a partnership to enable interoperability of data systems for their 24 hospitals, bringing together data from their IT systems for electronic records, laboratories, and pharmacies¹¹⁹.

The General Health Law does not yet include telemedicine. However, the use of telemedicine has been increasing, and according to the Ministry of Health there are at least 4,300 professionals working in the social security system who are trained in the use of telemedicine¹²⁰.

IMPROVING HEALTHCARE AND PATIENT OUTCOMES



There are key steps that can be taken to improve the response of the healthcare system to CVD, in both the short term and longer term.

A response to CVD **in the short term** should begin with a review and updating of current government policies that have a major role in developing general and more specific goals for reducing the incidence of CVD and the risk factors that lead to CVD.

- Updating and implementing current policies on cardiovascular disease plays an important role in achieving general and specific objectives of reducing the incidence of cardiovascular disease and controlling the prevalence of risk factors in the population.
- Define and implement a government-driven policy, with the support of other stakeholders, including guidelines on the treatment pathway (screening, diagnosis, risk factor stratification, prevention, pharmacological and non-pharmacological treatments, and follow-up).
- Measuring the effectiveness of policies, setting targets and benchmarking, allows us to see the reduction in mortality rates, the reduction in cardiovascular risks, the increase in adherence to treatment and the success factor between these and the reduction in mortality rates.
- Once the treatment pathway has been defined, in collaboration with other stakeholders in the health system, there should be a pilot campaign (in digital media, podcasts and social media as well as newspapers, billboards and TV) to disseminate information about it to both healthcare professionals and the population in general. For example, the campaigns that have been developed in recent years on breast cancer have had an impact on awareness and prevention among Mexican women

In the med-term, there are also opportunities to make greater use of telemedicine to monitor the disease and develop engagement between healthcare professionals in patient care. Healthcare professions can use telemedicine to obtain real-time data for prevention and detection, such as monitoring blood pressure, glucose, and LDL, and to encourage adherence by patients to treatment.

Measures can be taken to increase the numbers of healthcare professionals per capita, by extending the number of places for medical residencies for physicians and to upgrade the skills for other health professionals such as nurses.

Given the very high mortality rates due to chronic diseases such as ASCVD and other cardiovascular diseases, an increase in investment in health care systems is proposed, which could also be considered an investment in relation to the very high productivity costs of these diseases.

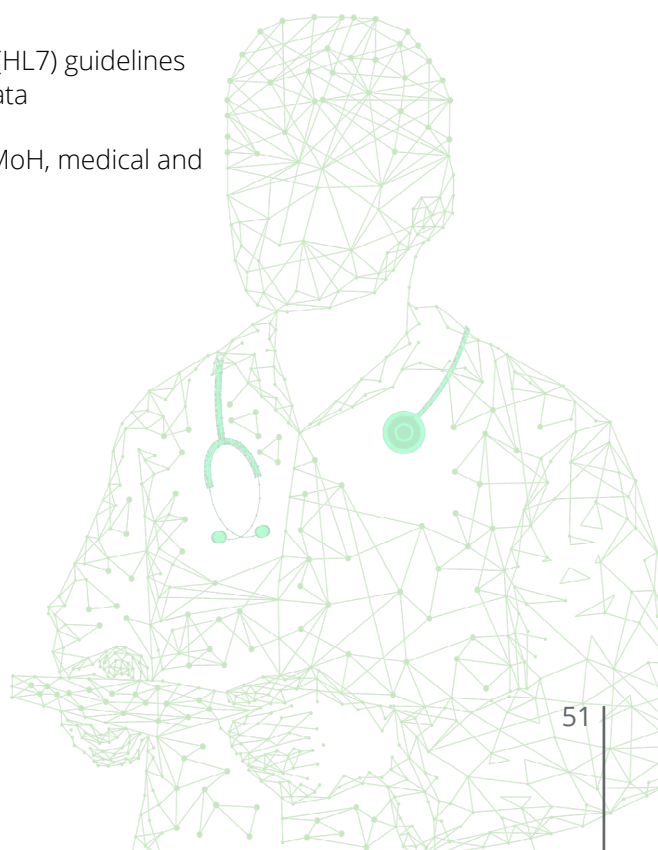
Initiatives should also aim at improving collaboration within the health system, for example by:

- Supporting integrated clinics to consider the full patient journey, through the “one-stop-shop” concept, where the patients are followed up according to their risk level, in a determined time of 90 minutes maximum per visit. By gathering all the medical specialties required to properly diagnose, monitor, and treat CVD, this pathway could enhance the adherence of treatment in Mexican population.
- Creating partnerships between public and private institutions to reinforce primary care for CVD and strengthen the capacity of the healthcare system.

An existing example of public-private partnerships is the agreement in the UK between Novartis and the NHS, who will collaboratively address elevated LDL-C in eligible patients with ASCVD across England. This alliance will promote the use of inclisiran in primary care for the treatment of adult patients within its licensed indication who also have persistently elevated levels.

- Creating a centralized IT system for interoperability and the exchange of public and private sector data, to provide practitioners with better (more complete) patient histories.
- Encouraging the wider implementation of the Health Level Seven (HL7) guidelines in order to improve the interoperability and exchange of health data

Key stakeholders to collaborate with: IMSS, Patients, physicians, MoH, medical and patient associations, pharmaceuticals



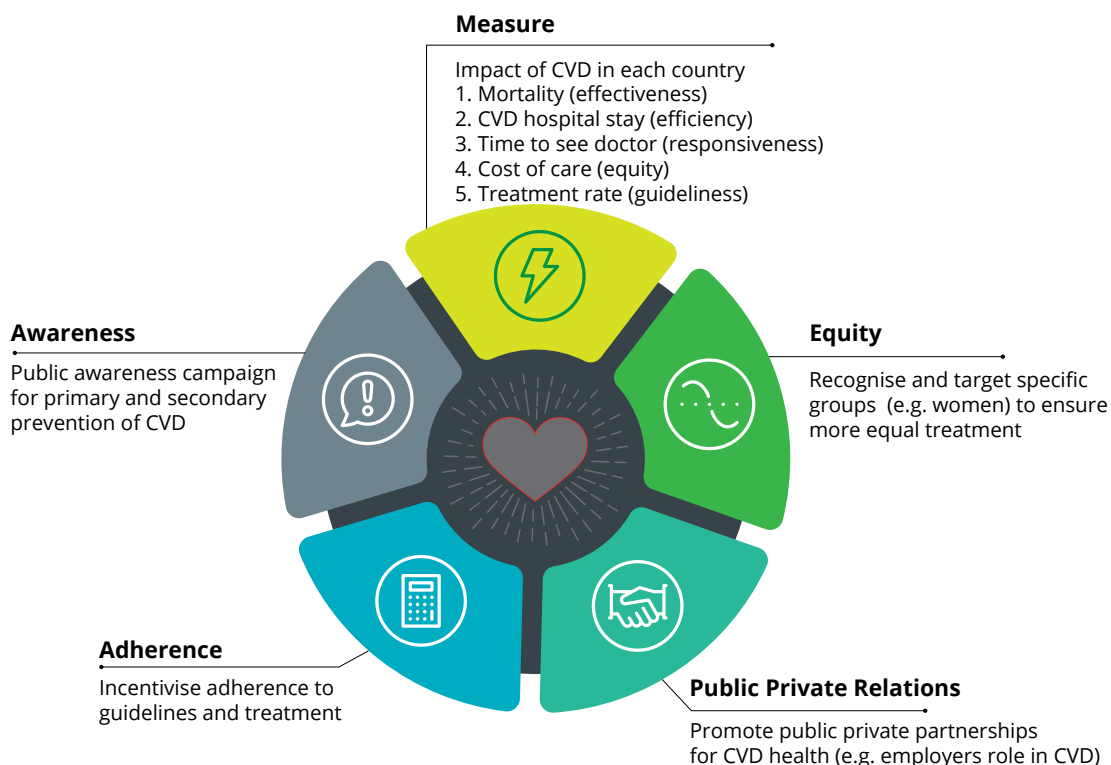
Conclusion

SOLUTIONS TO FOCUS ON IN THE NEAR TERM



Improving heart health is clearly a priority that is already being acted upon across the Latin American region. However, there is still a long way to go in changing the behaviours of the patients, healthcare providers, health policy and guideline executers and in implementing effective solutions that create a sustainable health care system to reduce CVD mortality and co-morbidity rates.

To summarise, below are the proposed short to medium term focus areas for key solutions that will both complement the ongoing work and initiate new actionable and impactful change, which will in turn help the countries achieve their heart health goals.



- **Measure and build the current understanding** of the **socio-economic impact of CVD** and the expanse of **patient population diagnosed with CVD**, in turn illustrating the impact of ASCVD on healthcare resources and on national productivity while also highlighting where the investments should be made to improve CVD related patient outcome across the population.

- Improve **equitable access to CVD preventive healthcare** across all types of health covers and especially amongst low-and-middle-income patients who reside in rural areas. **Prioritise health care research into how CVD and other diseases affects women** and accordingly customise the treatments to meet the needs of women, taking into consideration cultural and societal expectations placed on women. Awareness programs should also be built specifically addressing the prevalent misconceptions about the seriousness of the disease amongst women.
- Leverage **public and private health care partnerships to scale** preventive treatment solutions to sufficiently meet the needs of CVD patients that are currently being underestimated and undertreated.
- Implement the needed infrastructure to **collect, manage and store electronic patient records**, including **interoperability of existing systems**, to **improve diagnosis** of CVD and **accessibility to the most effective treatment** based on individual patient needs and circumstances. The data collected could also be analysed **for insight on how to sustainably support the health care system to better treat CVD** and potentially scale the solution to address the needs of other disease burdens on the country.
- Leverage digital solutions to encourage **adherence to treatment and awareness of CVD severity**. Re-purposing successful solutions from other disease areas or those developed to address the COVID pandemic are all potential options to accelerate implementation and drive impactful improvements in CVD patient outcomes in the short to medium term.
- **Measure the implementation of the CVD guidelines issued** and introduce suitable financial and non-financial incentives to encourage implementation and in turn contribute to the overall goal of reducing the burden of CVD in line with global, regional, and country specific health goals.
- **Build awareness** by prioritising discussions and emotive messaging **on the benefits of treating and caring for CVD patients to prevent premature mortality and co-morbidities**, at heart health & noncommunicable disease expert forums, community events, and on various media platforms, to induce behavioural change to act on CVD secondary prevention care in both HCPs and Patients.



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