

SYSTEMIC UNDER-RECOGNITION AND MISMANAGEMENT OF CARDIOVASCULAR DISEASES IN WOMEN IN SWITZERLAND

A SYSTEMS-THINKING APPROACH TO UNEQUAL
CARDIOVASCULAR TREATMENT AND HEALTH OUTCOMES FACED
BY WOMEN IN SWITZERLAND.

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Disclaimer

We recognize that sex and gender are distinct concepts, and that using them interchangeably may be perceived as inaccurate or offensive. In this report, however, some overlap in terminology can remain because the literature and data sources we rely on do not always distinguish consistently between the two. This reflects a limitation of the available material, not an intention to exclude or misrepresent diverse identities and experiences.

CASE PRESENTATION & PROBLEM STATEMENT

Let us begin with the story of Alice.

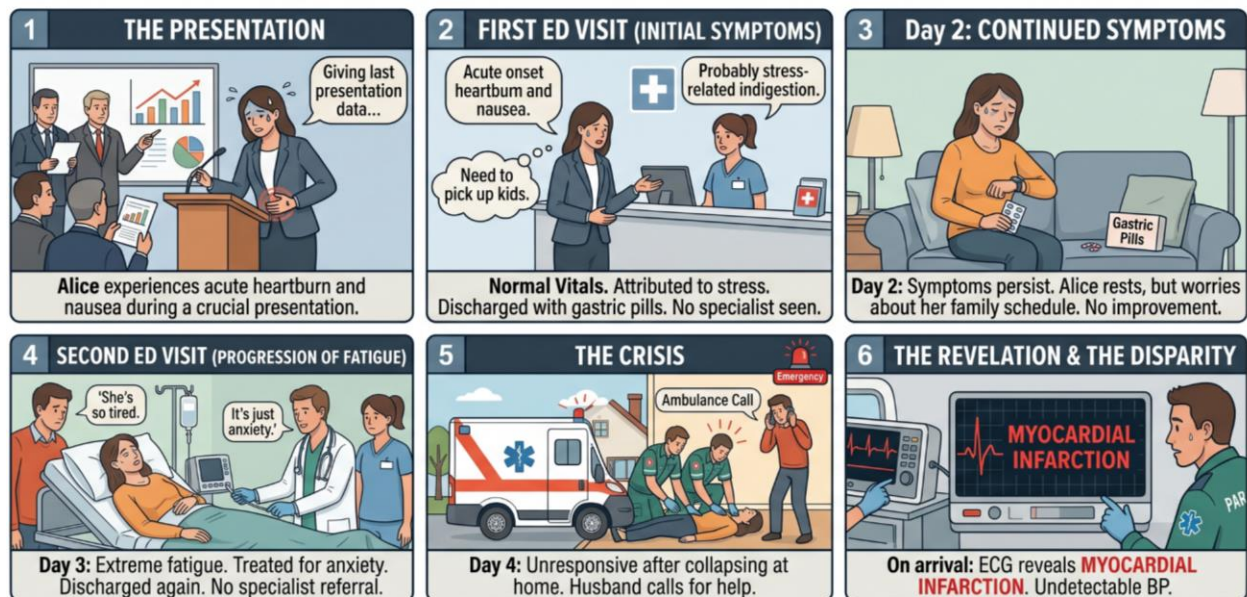


Figure 1. Situation comics of our persona

Although Alice is a fictional character we designed to illustrate our case study, her experience is reflected in real life. It represents how differences in symptom presentation, cognitive bias, gender norms, and health system design, can lead to delayed diagnosis and worse outcomes in cardiovascular disease (CVD) for women in Switzerland.

An interesting paradox is at the heart of CVD:

“Why do women experience worse outcomes, including higher mortality and poorer prognosis following acute events, if based on biological risk factors, men have a higher prevalence of CVD?”

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This is also seen in broader epidemiological trends. While men tend to develop CVD earlier, women are more likely to be under-diagnosed/treated, and experience delays across the care pathway: from symptom onset to long-term management ². But does this pattern also apply to Switzerland, a high-income country with a well-developed healthcare system? Official mortality statistics suggest that Switzerland performs comparatively well overall. Although the absolute number of deaths is higher among women (10626 against 9403), men have a higher mortality rate (114.6 against 78.8) ³, a difference that may partly reflect Switzerland’s demographic structure. However, a recent official report and a cross sectional study highlights persistent gender inequalities in cardiovascular care: women are less likely to receive intensive treatment, face a higher probability of treatment-related complications (adjusted odds ratio 1.10 v 1.14 for acute coronary syndrome), and, among women under the age of 65, have a higher risk of death ^{4,5}.

To understand this contradiction, our study adopts a system-thinking approach to examine how multiple interacting components, ranging from individual behaviours to institutional structures, create and sustains gender inequalities in CVD.

By combining insights from literature, stakeholder perspectives, and primary qualitative data, our study aims to go beyond describing disparities, to explain how and why they persist, and to identify leverage points for meaningful system-level changes. Figure 2 illustrates the layers and complexity of this problem.

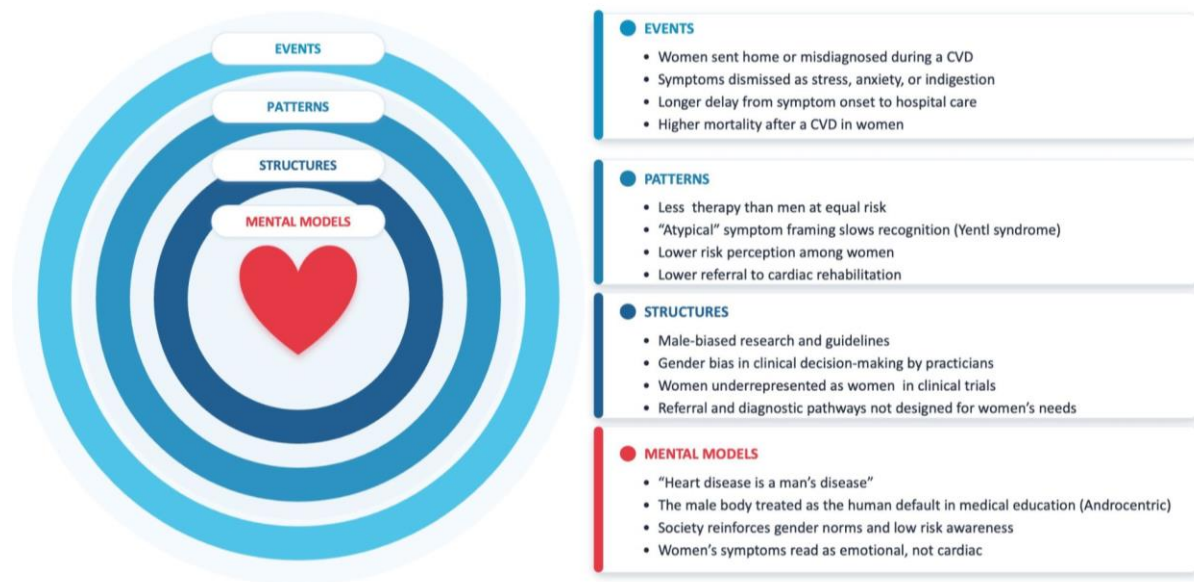


Figure 2. Iceberg model of the gender gap in CVD

SYSTEMS THINKING APPROACH

To understand the complexity and big-picture of sex-specific inequalities in CVD, we adopt an interdisciplinary and qualitative systems mapping approach. Our diverse and complementary team (medicine, nutrition, neuroscience, political science) integrated biological, behavioural, psychological, sociocultural and policy perspectives. Additionally, to adopt multiple viewpoints, we combined primary data (22 interviews, Annex Table 1) and secondary sources (existing academic literature from epidemiological studies, systematic reviews, and clinical research) as well as government reports, to understand this complex problem.

The scope of our system ranges from symptom recognition to long-term management of CVD among women in Switzerland. Outside this boundary, other determinants such as immigration background, socioeconomic inequalities, are acknowledged but not directly mapped. We identified key stakeholders within this system and mapped them in Figure 3. On the Top Left, key stakeholders with high power and influence are less involved in this problem, compared to those in the Bottom Right, who are more engaged or impacted, have low power to influence this system. After recognition of key players, we proposed levers of change to this issue.

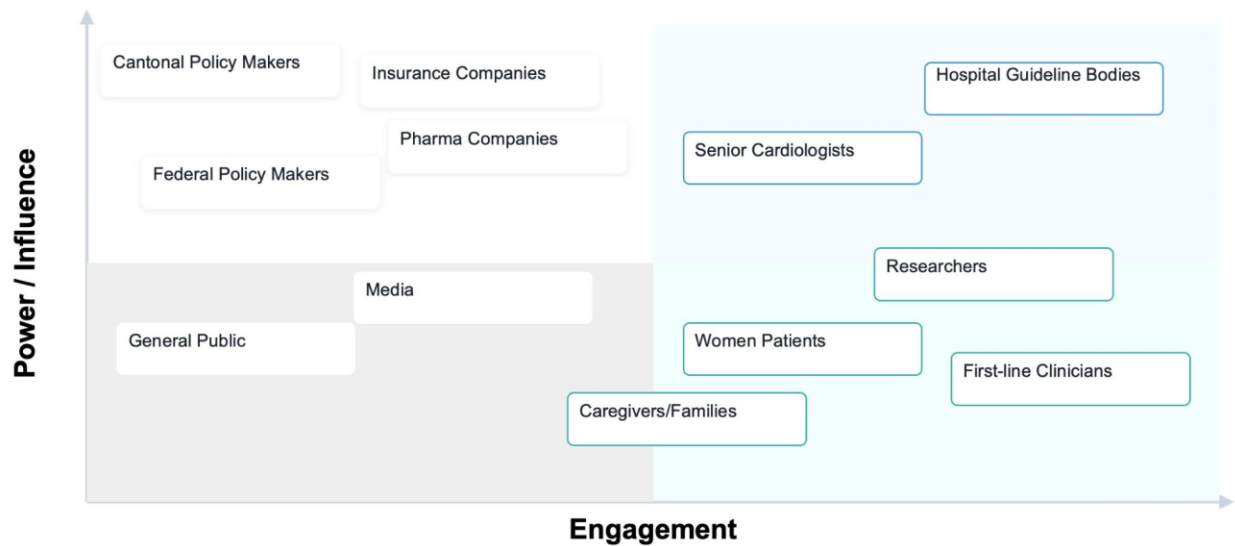


Figure 3. Stakeholder Map of the actors engaged in the gender gap in CVD

SYSTEMS DESCRIPTION

The importance of health disparities among genders in Switzerland is highlighted by a recent press release by the federal council in which it was noted that

“[...] in addition to factors related to biological sex, the gender roles assigned to men and women in society also affect their health and reinforce social inequalities”⁶

In our interview with a doctoral researcher working on this field we found that gender and cardiovascular disease follow a systems approach.

“Men are at higher risk of developing CVD earlier than women. One reason is that women are protected by oestrogen, which improves vascular function and helps mitigate inflammation. However, once women reach menopause, this protective effect is reduced, and women often have higher mortality rates due to CVD. In some conditions, such as lower extremity peripheral artery disease, women are often diagnosed later than men because they may present with normal values, be asymptomatic, or have atypical symptoms, making proper diagnosis difficult. Unfortunately, even in preclinical research, studies are still often conducted only in male mice or rats.”

(Dr. Shun, stakeholder interview)

Importantly, our primary data from survey responses suggests that systemic disparities exist among genders in CVD. In our survey (n = 22), a majority reported that the healthcare system treats men and women differently in terms of diagnosis, treatment, and communication. This perception of inequality suggests that

disparities are not only clinically present but socially visible. It is highlighted in the following quote by an interviewee:

“Women's pain is often minimized, compared to men's.”

These insights are also seen in the literature and secondary research sources, that these disparities are also perceived and experienced at the patient level and align with empirical evidence showing systematic dismissal of women's symptoms ⁷.

Respondents also acknowledged gender differences in health-seeking behaviours. Participants noted that men are less likely to seek care, while women have more regular contact with healthcare systems:

“Men tend to skip medical appointments more than women, thinking ‘it's fine’.”

However, this does not translate into better outcomes for women, as is evident from the federal statistics we mentioned earlier.

Fundamentally, sex and gender do not operate in the same direction. While biological sex may confer lower baseline risk in women at younger ages, gendered structures- like social norms, biases, and institutional practices, can amplify risk and worsen outcomes over time ⁸, leading to a situation where biological advantage is overridden by systemic disadvantage. Taken altogether, these findings show that CVD is not solely a biomedical issue, but more a complex system shaped by interactions between biological, behavioural, psychological, sociocultural, and institutional (health system and political) factors.

Based on these insights, we divide our system into the following domains:

BIOLOGICAL FACTORS

Historically, it is common knowledge among clinicians that men are at higher risk due to several factors such as higher blood pressure and cholesterol levels and abdominal fat ⁹. Therefore, clinical guidelines and the medical textbooks have explicitly highlighted men as a risk factor, and any classical symptom related to it is often immediately treated. Furthermore, oestrogen, one of the main hormones predominantly in women, has several cardiovascular protective effects in perimenopausal women. Nevertheless, their levels decline sharply following menopause, increasing the CVD risk dramatically in elderly women, although the overall risk is higher in men.

In contrast, a growing body of recent literature highlighted women-specific CVD risks including pregnancy and gynaecological diseases related cardiovascular risk in women ¹⁰. Moreover, traditional literature shows that women in general have smaller coronary artery size which accounts for higher incidence of coronary spasm, temporary narrowing or squeezing of the arteries supplying the heart, contributing to damaging the heart, a mechanism known as ischaemia. Additionally, in women, use of oral contraceptive pills, and hormone replacement therapy have pro-thrombotic effects which increases the risk of venous thromboembolism, leading to CVD events such as ischaemic stroke and myocardial ischaemia. Despite the growing evidence, there is still no sex-specific treatment to date.

BEHAVIOURAL/PSYCHOLOGICAL FACTORS

Behavioural and psychological factors act as a critical interface between biological differences and gendered social norms, shaping exposure to CVD risk, preventive behaviours, healthcare utilisation, and disease outcomes across the care continuum. Women are generally more engaged in preventive healthcare, but both genders delay help-seeking, for different reasons i.e. women often normalise symptoms or prioritise caregiving responsibilities, while men face stigma surrounding vulnerability ⁸.

Behavioural risk profiles also differ, men exhibit higher prevalence of smoking, alcohol consumption ³, and unhealthy dietary patterns, contributing to earlier onset of CVD. However, men are more likely to engage in structured physical activity ⁸, and although women often report healthier lifestyles, this leads to false reassurance that they are safe. Mental health contributes to these disparities: depression and anxiety, more prevalent in women, are strongly associated with poorer cardiovascular outcomes via biological pathways and behavioural mechanisms ¹¹. Gendered stress responses also differ, with women more likely to internalise stress, while men prefer to externalise stress through risk-taking behaviours ⁸. Similarly, symptom perception and health beliefs significantly affect care pathways: women are more likely to experience atypical symptoms and misattribute or normalise them, leading to underestimation of vulnerability ². Overall, the key pattern is not only behavioural and lifestyle differences, but gendered social norms influence behavioural/psychological pathways, leading to delayed diagnosis, sub-optimal management, and adverse outcomes in women.

SOCIOCULTURAL FACTORS

Beyond biological sex differences, the gender gap in CVD must also be understood through sociocultural mechanisms shaping knowledge production, healthcare institutions, and patient care. Patriarchy is a system in which men dominate public and private spheres, while women occupy a secondary position and lack comparable power, authority, and resources ¹². In cardiovascular medicine, this structure operates through gender roles, gender identity, gender relations, institutionalized gender ⁸, and androcentrism: the tendency to treat the male body as medicine's implicit norm ⁵. These mechanisms are visible across the entire chain of care. Firstly, women remain underrepresented as researchers and senior practitioners, reflecting a persistent glass ceiling that limits their influence over research agendas and clinical leadership ^{2,5}. Secondly, women are underrepresented in cardiovascular trials, contributing to an evidence base historically centred on male symptom patterns ^{2,13,14}. Additionally, gendered social roles expose women to mental load, caregiving responsibilities, constrained lifestyle choices, that can shape cardiovascular risk, while potentially reducing engagement in long-term care ^{8,11}.

These structural and cultural dynamics are also reflected in our primary data. A majority of respondents reported perceived differences in diagnosis and communication between men and women. Participants frequently noted that

“[...] women's pain is often minimized [...]”

and that symptoms are

“ [...] often labelled as stress or anxiety.”

Such perceptions align with evidence that women's symptoms are more often minimized, even by themselves, contributing to delayed diagnosis and less intensive management ^{2,5}. Gender roles may also discourage emergency help-seeking when women prioritize others' needs over their own ⁷. Finally, limited cardiovascular literacy among women and professionals reinforces under-diagnosis and delayed referral, while caregiving responsibilities and under-prescription may reduce women's participation in rehabilitation and long-term care ^{5,7,8}. Together, these gendered norms, institutions, and androcentric medical standards mutually reinforce cardiovascular inequalities beyond biology.

HEALTHCARE SYSTEM AND RESEARCH

Historically male-centric medical research has limited the evidence base for female-specific symptom profiles and treatment responses ^{8,13}. Women remain underrepresented in cardiovascular clinical trials, accounting for approximately 41% of participants in studies, despite comparable disease burden ². Importantly, the findings of our survey suggested that the sex of the physician or medical trainee, or non-medicine-related interviewee, influences the perception of CVD risk:

“Male interviewees perceived men as being at higher CVD risk, whereas their female counterparts perceived women to be at higher risk of misdiagnosis or mistreatment.”

Workforce and organizational dynamics also contribute. Although women represent a large proportion of the healthcare workforce, they are under-represented in leadership and decision-making positions, limiting the prioritization of gender-sensitive practices ².

Overall, these factors interact to form a positive feedback cycle: negative healthcare experiences reduce engagement leading to delayed care and poorer outcomes, which in turn reinforce disparities. This suggests that the healthcare system does not simply reflect inequalities but actively maintains them through interconnected structural and clinical processes.

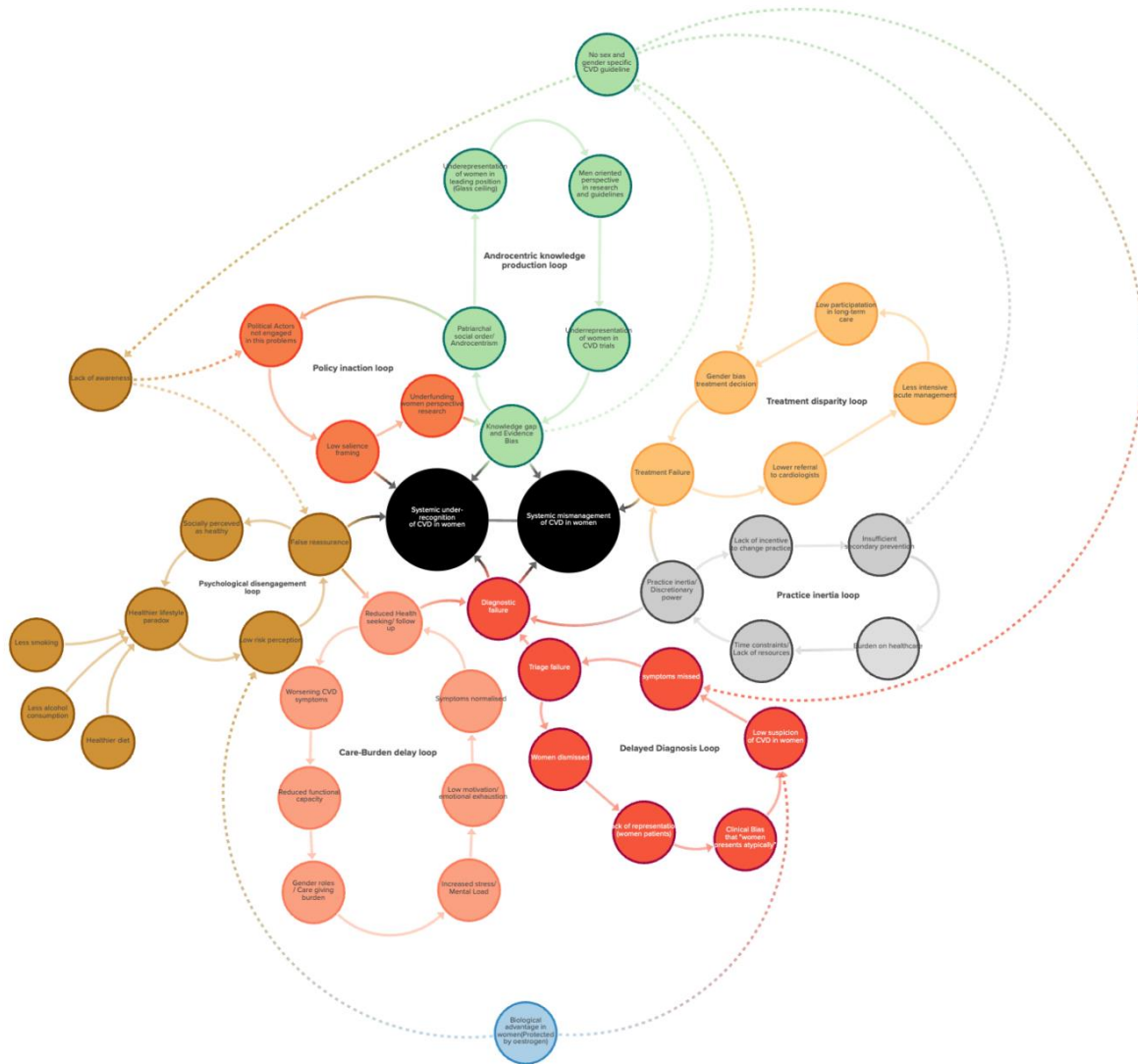
POLITICAL

One important prerequisite for policy action is that an issue be framed and recognized as a public problem warranting state intervention ¹⁵. In Switzerland, however, this issue appears to have attracted only limited attention from political actors, until quite recently. This is illustrated by the fact that the first substantial federal report on gender equality in the medical field, explicitly acknowledging the gender gap in CVD, was not published until May 2024 ⁵, despite a first postulate being submitted in 2019. While some measures have since been introduced, particularly through the allocation of research funding, political recognition of the problem remains comparatively recent.

INTERCONNECTIONS & FEEDBACK LOOPS

We conceptualized CVD inequalities in care for women as two main, interconnected **Systemic** outcomes: **under-recognition** and **mismanagement**. These are reinforced by interacting feedback loops operating across three domains: **knowledge** (evidence gaps and underrepresentation of women in research), **perceptions** (false reassurance and low risk perception), and **clinical practice** (diagnostic delays and treatment disparities). The map highlights the influence of multiple stakeholders, including women and the public, clinicians, and policymakers. Improving both public and clinicians' awareness of sex- and gender-specific manifestations of CVD could interrupt these feedback loops that perpetuate diagnostic delays and treatment disparities. At higher levels of influence, policymakers have the greatest potential to drive system-wide improvements through research prioritization, stronger governance, and effective policy implementation.

Several reinforcing feedback loops were identified as central mechanisms for sustaining gender disparities in CVD. This is reflected in the following map below:



Legend

- Core Systemic Issues
- Biological / Clinical Domain
- Behavioural & Psychological Domain
- Healthcare System: Diagnosis & Outcomes
- Healthcare System: Treatment
- Policy, Governance & Sociocultural
- Practice Inertia / Institutional Barriers
- Direct causal relationship
- > Indirect or cross-system influence

INITIATIVES AND SOLUTIONS LANDSCAPE

Level	Initiative	Description	Potential benefits	Main limitations
International	ESC Gender Policy and Gender Task Force (ESC, n.d.)	European Society of Cardiology (ESC) initiative promoting women representation in cardiovascular education, research and leadership.	Addresses the glass ceiling and push for a more gender-sensitive approach	Voluntary professional initiative; limited direct authority over the National healthcare system.
National	SNSF National Research Programme 83: Gender Medicine and Health (Swiss National Science Foundation, 2023)	National research programme funding projects on sex- and gender-related differences in health, medicine, and public health.	Strengthens the Swiss evidence base.	Does not itself guarantee implementation in cardiovascular practice.
National	Swiss Heart Foundation women-focused information resources (Fondation Suisse de Cardiologie, 2024)	The Foundation provides public information on women's heart attack symptoms, and cardiovascular risk	Addresses low health literacy and the tendency to underestimate symptoms.	Not a dedicated women's CVD program and its impact on the literacy for the general population is low
National	Women in Cardiology Switzerland IG-WIC (IG-WIC, n.d.)	National professional network offering mentoring, visibility, training, and career support for women in cardiology.	Addresses the glass ceiling and may increase women's representation in research and clinical leadership.	Focuses mainly on professionals does not directly change patient access or care pathways. Website only in German

Cantonal / institutional	Women's Heart Health Program, University Hospital Zurich (University Hospital Zürich, 2026)	Dedicated women's cardiology appointment offering gender-sensitive diagnosis, and treatment	Improves the care and treatment of female patients	Based in one institution
Cantonal / institutional	Women's Cardiovascular Health Centre, HUG Geneva (Oehrli, 2026)	Center focused on prevention, diagnosis, and treatment of female-specific cardiovascular conditions.	Combines clinical care, prevention, and education in one dedicated institution	Recently established and limited to one institution

Table 1. Select solutions implemented at all levels for CVD in women

LEVERS OF CHANGE

Building on our own analysis, we propose solutions through an inductive approach. Three main insights emerge from our mapping.

- First, to the best of our knowledge, most existing initiatives are very recent. Their effects on the healthcare system are difficult to assess currently. In the future, however, these initiatives may help transform the mechanisms identified in our system map.
- Second, there appear to be relatively few bottom-up, citizen-led initiatives or organizations led by women (patients). Supporting such initiatives could strengthen women's engagement with this issue, increase political pressure for reform, and provide clinicians with new perspectives. More importantly, it could foster the co-production of knowledge between women (patients), healthcare professionals, researchers, and policymakers, and make care more responsive to women lived experiences.
- Third, the current landscape of solutions is highly fragmented, largely because healthcare remains primarily a cantonal competency in Switzerland, except in a limited number of areas ¹⁶. As a result, initiatives often depend on local priorities and resources, leading to unequal implementation across the country. Greater political engagement at the federal level could help address these disparities. Recognizing gender inequalities in cardiovascular health as a national public problem and introducing federal legislative measures could promote more coordinated and equitable action.

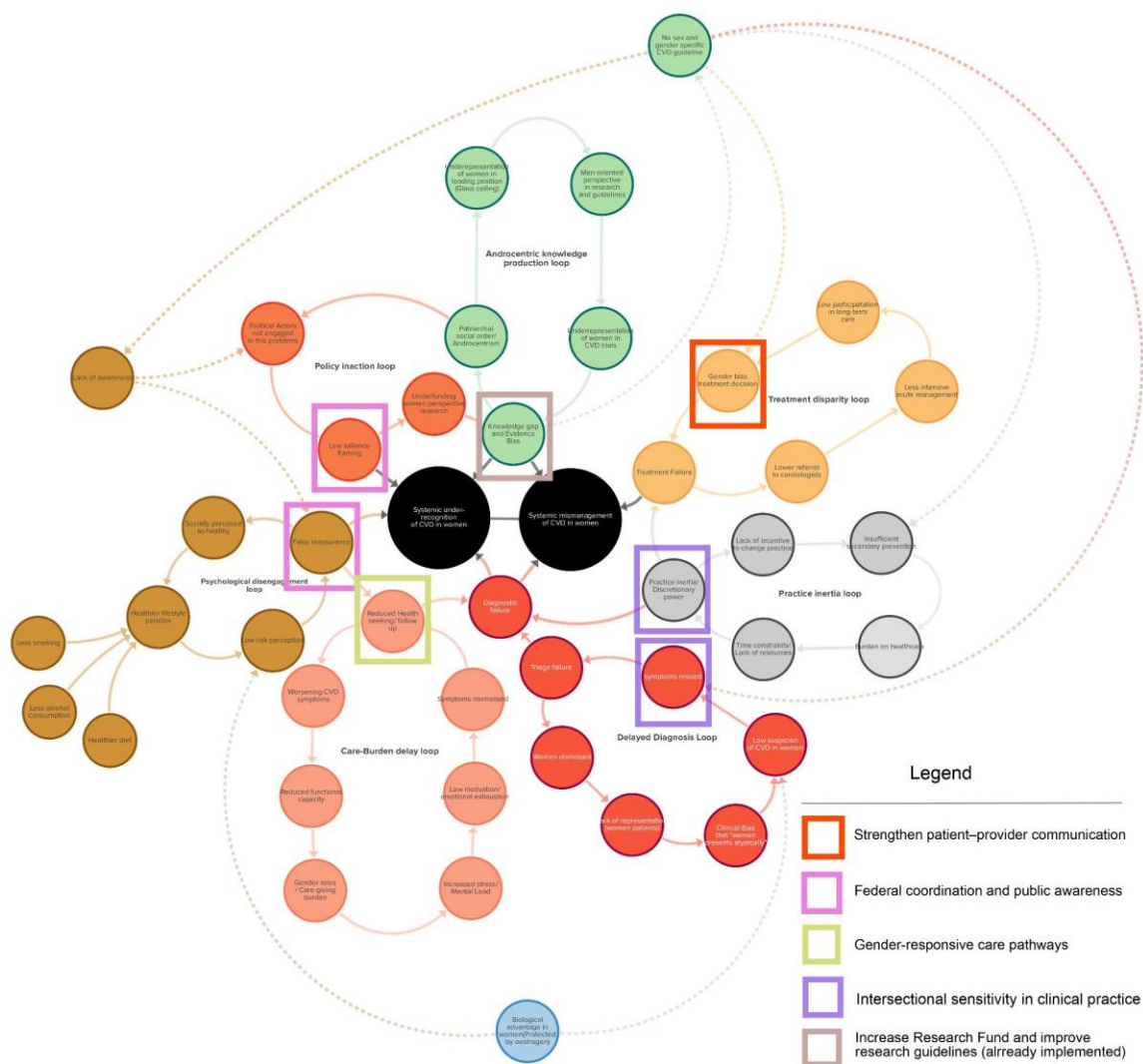


Figure 4. Where our lever of change will have an impact based on our system map

LEVERAGE POINTS



Figure 5. Levers of change to close the gender gap in cardiovascular care, ordered along a spectrum from clinical reforms (easier to start) to normative change (harder to achieve and sustain).

We positioned our levers for change along an axis reflecting the level of resources required to generate an impact. Interventions that address the root causes of the problem may require greater investment, but substantial and lasting effects.

In our view, implementation should begin with Solution 2: supporting women patients' associations and creating focus groups in which women can share their lived experiences directly with clinicians. This approach has the potential to generate meaningful long-term change by strengthening patient-provider communication and enabling the co-production of knowledge.

However, to ensure that this solution has an impact beyond a single hospital, it should be developed as a broader program with clear evaluation and follow-up mechanisms. This is where Solution 3 becomes essential: by improving coordination, it can support the implementation, monitoring, and scaling of Solution 2 across healthcare institutions.

KEY INSIGHT

This investigation shows that gender disparities in CVD arise from interconnected: biological, clinical, sociocultural, and political factors, not isolated clinical failures. Our multidisciplinary team allowed us to have a broader perspective, and value to better understand complex health inequalities. Systems thinking enabled us to identify several feedback loops and recognize how androcentric knowledge, clinician perceptions, and policy inertia reinforces under-recognition and mismanagement of CVD in women in Switzerland. Essentially, we come to question the traditional framing of women's symptom presentation as atypical, partly due to underrepresentation of women in cardiovascular research and continuation of androcentric male-pattern clinical presentation. An important insight was acknowledging that disparities can persist even when stakeholders act in good faith, as system structures, historical assumptions, and incentives shape behaviour in ways that un-intentionally reproduce inequalities. Sustainable change needs coordinated efforts to reshape norms, strengthen accountability, and to embed gender-specific approaches across research, clinical practice, and health policy.