

## THE CASE FOR EARLY DETECTION OF STRUCTURAL HEART DISEASE: WHAT NEEDS TO HAPPEN TO IMPLEMENT SHD SCREENING PROGRAMS IN EUROPE

### Executive summary

- **Structural heart disease (SHD)** is a set of cardiovascular conditions that affect the structure of the valves, atria, ventricles, and blood vessels in the heart. Though some forms of SHD are congenital, the majority are degenerative, primarily affecting older people. It's estimated that 14 million people in Europe were living with SHD in 2020, and that by 2050, this will increase to 23 million.
- A degenerative disease that **can generally not be prevented**, SHD needs to be **detected early** to allow patients to benefit from treatments that will reduce mortality, improve quality of life, and reduce healthcare costs.
- **No screening program for SHD exist in Europe today**, meaning that many people may suffer from the condition without knowing it, especially as SHD symptoms are not specific, and awareness of the disease is poor both in patients and health care professionals.
- Detection can simply be put in place with a **heart check using a stethoscope**. If the general practitioner detects an abnormal heart murmur, the patient is referred to a cardiologist for further examination using echocardiography.
- Unfortunately, **heart checks are not routine**: a third of respondents to a 2019 European survey of people aged over 60 said their primary care physician checked their heart with a stethoscope "occasionally"; only 28% had their heart checked at every visit. Therefore, there is **massive number of undiagnosed SHD cases**, associated with a latent public health and economic burden.
- The development of SHD screening programs can **learn and benefit from the experience and organization already in place for other screening programs such as cancer**, as these programs have shown to save lives and improve quality of life. **Early detection of SHD could also be integrated into broader cardiovascular disease (CVD) screening** in primary care, at certain age or events in older life.
- The **implementation of effective screening program for SHD** will require the **definition and development of specific features** to facilitate its implementation by the Health Authorities of the EU Member States:
  - Definition of the **target population** and **SHD detection guidelines**,
  - Program of awareness, **training and incentivization** of General Practitioners to perform heart checks,
  - Development of **awareness campaigns** to maximize adherence of the target population, with the involvement of healthcare professionals to improve awareness and adhesion to the program,
  - Evaluation of the use of **new techniques for SHD detection** (e.g., digital stethoscope, blood testing, use of echocardiography as first line screening tool).
- The EU **must take steps to encourage the development of screening programs for CVD and SHD**, by including it in the Healthier Together **EU Non-Communicable Disease Initiative**, set minimum screening targets, and invest sufficient funding towards improving early detection, notably through the forthcoming **EU4Health Joint Action on CVD**. This will stimulate the exchange of best practices, data and knowledge across Member States, and enhance the development of guidelines and policy, ultimately **improving health of elderly** citizens in the EU.
- EU countries should then leverage this EU policy and funding to **implement targeted screening programs for SHD** to improve health and resilience of their citizens.

## 1. Structural heart disease: Only preventable through early detection. Still, there are many contributing factors that hinder early detection of SHD in primary care

Structural heart disease (SHD) is a set of cardiovascular conditions that affect the structure of the valves, atria, ventricles, and blood vessels in the heart. The majority of SHD is degenerative, affecting older people. Prevalence of the condition increases with age: 5% of 65–69-year-olds are estimated to have some form of SHD, and up to 30% of those aged over 85.<sup>1</sup>

Unlike some other cardiovascular diseases, SHD can generally not be prevented by a healthy lifestyle. People with SHD are often unaware they have it, dismissing symptoms (such as fatigue, chest pain, shortness of breath, difficulty exercising) as due to aging. There also is a low awareness among health care professionals. SHD can shorten someone's life as well as leaving them with debilitating symptoms which impact on their quality of life and autonomy. In some cases, people are left bedbound.

Such situations could be avoided with early detection: SHD can be detected through simple heart checks by a General Practitioner (GP) using a stethoscope. When a heart murmur is identified during the consultation, the patient is referred to a cardiologist for confirmation of the diagnosis using echocardiography.

If found early enough, the condition can often be treated, improving outcomes - including mortality- and decreasing costs. Treatment of SHD can improve people's life expectancy and quality of life as well as removing the need for care. Treating SHD returns survival rates back to normal and prevents symptoms from worsening, removing need for care. On the other hand, if left untreated, one in two people with a severe form of SHD (severe symptomatic aortic stenosis) will die within two years, with a further three in ten dying within five years.<sup>2</sup>

Successful treatment of SHD requires early detection of the condition. Yet people do not have their heart checked at routine consultations: recent data shows that in Europe 1 out of 3 people above 60 had their heart checked only occasionally when they visit the GP. Only 28% had their heart checked at every visit.<sup>3</sup> The consequence is a major burden of undiagnosed SHD.<sup>1</sup>

There are many **contributing factors that hinder early detection of SHD in primary care:**

- Most people are **unaware of the symptoms** of SHD and may dismiss them as the usual signs of aging.
- There are **no guidelines** instructing primary healthcare professionals to check the heart for SHD in the elderly population, as well as **no financial incentives**.

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<sup>1</sup> d'Arcy 2016

<sup>2</sup> Daniel H. Steinberg, Stephan Staubach, Jennifer Franke, Horst Sievert, Defining structural heart disease in the adult patient: current scope, inherent challenges and future directions, European Heart Journal Supplements, Volume 12, Issue suppl\_E, 1 September 2010, Pages E2–E9, <https://doi.org/10.1093/eurheartj/suq012>

<sup>3</sup> European Health Survey 2019. Gaede 2020. Survey included a total of 12 832 people aged 60+ in 11 European Countries

- Awareness of the condition among healthcare professionals is low, and General Practitioners **lack time to perform a heart check during the consultation**. In addition, **access to the cardiologist** can be difficult in some Member States due to capacity issues.
- There are **no specific screening programmes for SHD**, and **even broader age-related CVD screening initiatives are lacking**.

The older population in Europe is about to experience rapid growth in upcoming years, with people aged 65 or over comprising a third of the entire population (150 million) by 2050.<sup>4</sup> By 2050, SHD in the EU is expected to affect up to 23 million individuals among the 65 and older population.

It is time to improve early detection of SHD through screening programmes across Europe.

## 2. SHD screening: learning from cancer screening programmes in Europe

Screening programmes for early detection of disease are an established part of health systems across the EU, helping to identify diseases before people notice symptoms and when treatment is likely to lead to better outcomes. Although various screening programmes exist across the EU for cancers such as breast, colorectal and cervical cancer, there are no organised screening programmes for cardiovascular diseases (CVD) in the EU, despite CVD being the biggest killer.<sup>5</sup>

Whatever the disease, screening programmes tend to follow a 4-step process: **Identification** of the target population, **Invitation** of patients, **Check** of the disease, **Referral** if needed.

Step	Key elements of cancer screening programmes (breast, colorectal, cervical)
<b>1. Identify</b>	<ul style="list-style-type: none"> <li>• Agreement on target population</li> <li>• Administrative databases used to identify and invite participants</li> <li>• Awareness campaigns run to encourage people to attend screening</li> </ul>
<b>2. Invite</b>	<ul style="list-style-type: none"> <li>• Invitations sent on a regular basis by agreed authority (national or regional health body or insurer) to the target population</li> <li>• Reminders sent if invitation not taken up</li> </ul>
<b>3. Check</b>	<ul style="list-style-type: none"> <li>• Tests take place in certified centres</li> <li>• Communication of outcome to the patient or to healthcare practitioner</li> </ul>
<b>4. Refer</b>	<ul style="list-style-type: none"> <li>• Referral systems in place where people have a positive result</li> <li>• Appointments arranged swiftly</li> <li>• Patients follow up on referral</li> </ul>

Every step requires consensus by the relevant medical societies. A wide range of public stakeholders contribute to screening programmes: the national institutes of Health for the development of

<sup>4</sup> Eurostat (2017) People in the EU – population projections, [http://ec.europa.eu/eurostat/statistics-explained/index.php?title=People\\_in\\_the\\_EU\\_-\\_population\\_projections](http://ec.europa.eu/eurostat/statistics-explained/index.php?title=People_in_the_EU_-_population_projections)

<sup>5</sup> Screening programmes can be either systematic, including all individuals within a defined population, or opportunistic, including only higher risk individuals. In EU countries, systematic programmes benefit from processes put in place by health services to define, identify and invite the individuals to be screened, run the health checks and refer patients for further examination or treatment if needed.

screening protocols and the programme evaluation, the regional or local health authorities for the programme coordination, the health insurances for the programme funding.

**Screening programmes for other diseases have been shown to save lives, improve awareness of symptoms and disease, and improve the quality of life of people with these conditions.** For example, cancer detection programmes have delivered in some countries a reduction in mortality of 25-30% for breast cancer, 50-70% for cervical cancer and 21% for prostate cancer.<sup>6 7 8</sup>

### 3. What need the happen to design and implement SHD screening programmes in Europe

Learning from existing cancer screening programmes, the EU SHD coalition has identified the **4 key steps and features of SHD screening programmes**, as well as the **components (success factors) that have the potential to improve the effectiveness of such programme** (see table below).

**SHD screening could leverage the structures put in place for cancer screening**, in particular the patient databases and the coordination structures in place.

SHD screening could also rely on the **existing network of healthcare practitioners in primary care** (GPs and cardiologists) who have the relevant skills and equipment (stethoscope, echocardiogram) for heart checks.

Finally, **such screening programmes** could either **primarily be for SHD**, or be part of cardiovascular disease (**CVD**) **screening programmes** or be included in **another health care interaction** (prevention visit at specific age, Covid or influenza vaccination).

The table below summarises the key components for SHD screening programme:

Steps	Key features	Success factors to improve the effectiveness of an SHD screening programme
<b>1. Identification</b>	SHD screening programme should be <b>aged-based</b> in order to ease implementation, as demonstrated in cancer screening	<ul style="list-style-type: none"> <li>● <b>Population target</b> (age) and <b>screening approach</b> (i.e. frequency, methodology) should be defined by <b>medical societies</b> and <b>Health Authorities</b></li> </ul>
<b>2. Invite</b>	Invitations for SHD screening can be sent through <b>similar channels to cancer screening programs</b> (e.g., by regional health authorities, insurers)	<ul style="list-style-type: none"> <li>● The use of remote <b>digital pre-screening tools</b> (e.g., online standardized questionnaire) could trigger more targeted invitations to heart auscultation when positive</li> <li>● Providing HCPs (e.g., GPs, pharmacists) and target patients with <b>SHD knowledge and education materials</b> would increase invitation conversion rates</li> </ul>
<b>3. Check</b>	<b>Heart check is performed by GP or cardiologist</b> in dedicated consultations	<ul style="list-style-type: none"> <li>● Integration within <b>broader CVD detection program</b> (incl. Atrial Fibrillation and Cardiac Heart Failure) might ease implementation of SHD screening</li> <li>● <b>Standardization of screening sequence</b> (key questions to ask, best practices for auscultation, etc.) will increase sensitivity and specificity</li> </ul>

<sup>6</sup> Schopper 2009

<sup>7</sup> Mayor 2016 & Mahik 1994

<sup>8</sup> Ilic 2018

		<ul style="list-style-type: none"> <li>● Use of <b>echocardiography as a first line screening tool</b> would increase screening programme performance and impact, especially in populations with the highest SHD prevalence</li> <li>● Innovative tools such as <b>digital stethoscope</b> and/or <b>blood testing</b> (e.g., NT-pro BNP) could increase screening performance</li> </ul>
<p><b>3. Refer</b></p>	<p><b>If the heart check performed by GP, the patients are referred to the cardiologist</b> for SHD diagnosis confirmation with echocardiography</p>	<ul style="list-style-type: none"> <li>● Providing <b>referral decision tool</b> to GPs and development of <b>standardized referral pathway</b> might increase patient referral</li> </ul>

#### 4. The EU should lead the development of screening programmes for SHD

To tackle SHD, there needs to be action across the EU and within specific countries. No EU country has yet introduced a programme for early detection of SHD.

- The EU should develop an **EU wide target** for early detection of CVD including SHD, similar to cancer screening targets.<sup>9</sup> **No EU citizen should be left behind because of lack of access to a heart check.**
- EU policy - such as the Healthier Together EU NCD Initiative - and funding instruments – such as the EU4Health 2022 EU Joint Action on CVD - should facilitate and invest in more systematic screening of CVDs and SHDs through:
  - **Improving health literacy** of older citizens aimed at increasing awareness on SHDs, symptoms, and the importance of early detection
  - **Development of guidelines on early detection**, including a consensus on age range
  - **Training and education** of healthcare professionals in primary care to ensure that checking for SHD is a priority
  - **Testing new innovative practices** to facilitate early detection such as digital tools for heart checks and echocardiography, or blood markers.

<sup>9</sup> EU Cancer Plan stipulates that a new EU cancer screening scheme should ensure that 90% of the target population is offered breast, cervical and colorectal cancer screening by 2025. [ec\\_rtd\\_sam-cancer-screening-opinion-executive-summary.pdf \(europa.eu\)](https://ec.europa.eu/health/eu4health/eu4health-2022-joint-action-on-cvd_en)

## **APPENDIX**

HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN FRANCE

HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN GERMANY

HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN ITALY

HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN SPAIN

## HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN FRANCE

Systematic screening programmes exist for breast, cervical and colorectal cancer in France.<sup>10</sup> There are currently initiatives for screening for other cancers, such as lung and skin cancer<sup>11 12</sup>, as well as cardiovascular Disease (CVD) or age-related diseases, such as atrial fibrillation and osteoporosis.<sup>13 14</sup>

Considering how the screening programmes operate in France, the EU SHD coalition has identified how an SHD screening programme could be integrated into the French healthcare system.

### Key pillars for SHD detection in France

The main principle for SHD screening could be based on the invitation of elderly people by the National Health Insurance to benefit of a heart check by the General Practitioner (auscultation).

If SHD is suspected (including if a heart murmur is picked up), the patient should be referred to a general cardiologist for further investigation using echocardiography.

As a complement to the screening approach, pharmacists could play a key role in raising awareness and run pre-screening with questionnaires for people after 65 years', and for non-adherent individuals targeted by the screening programme.

### Building blocks to make SHD screening programme happen in France:

- **Consensus** is needed on the target population criteria (including age) for those people who should be screened for SHD.
- **Awareness raising** among this group and GPs should be carried out to improve adherence to screening.
- The National Health Insurance should **identify** the individuals who fit the SHD screening criteria and should **issue invitations** instructing them to visit their GP for a heart check.
- The National Health Insurance will also need to **issue reminders** and **re-invitations** to those individuals who do not attend screening.

### To set up a SHD screening programme for success, following elements should be considered:

- A first step towards improving SHD screening would therefore be to **integrate SHD screening into larger programs of cardiovascular disease screening**, along with the detection of diseases such as heart failure or atrial fibrillation, simply by adding the heart check to the routine in a synergistic approach to screening,
- To account for the increasing duties and responsibilities of GPs, the role of **pharmacists** should be leveraged as a complementary yet critical building block for SHD screening.

<sup>10</sup> Arrêté du 29 septembre 2006 relatif aux programmes de dépistage des cancers, NCI, updated as of 2022

<sup>11</sup> Dépistage du cancer du poumon : la HAS recommande l'engagement d'un programme pilote, HAS 2022

<sup>12</sup> Lamort-Bouché 2020

<sup>13</sup> Chevreul 2014

<sup>14</sup> Roux 2021

## HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN GERMANY

In Germany, systematic screening programmes exist for breast, cervical and colorectal cancer.<sup>15 16 17</sup> Opportunistic screening initiatives or pilots exist for some other cancers such as skin cancer, as well as other disease such as abdominal aortic aneurysm, atrial fibrillation, or osteoporosis.<sup>18 19 20</sup>

Considering how such screening programmes operate in Germany, the EU SHD coalition has identified how an SHD screening programme could be integrated into the German healthcare system.

### Key pillars for SHD detection in Germany

Sickness funds would send an invitation to the targeted population in the peak prevalence age group. The invitation would be for a once-in-a-lifetime heart check by a GP. Echocardiography could also be considered as a 1<sup>st</sup> line screening.

If SHD is suspected by the General Practitioner (including if a heart murmur is picked up), the patient should be invited for further examination by a general cardiology.

As a complement, for people above 65 years, sickness funds could consider sending an invite to fill a standardized questionnaire every 2 years until the defined peak prevalence age, in order to help identify SHD potential symptoms and trigger consultation for heart check.

### Building blocks to make SHD screening programme happen in Germany

- Consensus will need to be reached on the target population criteria for those people who should be screened for SHD (peak prevalence age group).
- Sickness Funds should identify the individuals who fit the SHD screening criteria based on their member database and should issue invitations instructing them to visit their GP for a heart check via their dedicated websites or mail.
- Sickness Funds will also need to issue reminders and re-invitations to those individuals who do not attend screening.
- Awareness raising should be carried out so the need for screening is understood.

### To set up a SHD screening programme for success, following elements should be considered:

- As regular auscultation and echocardiography for all 65+ individuals would be highly resource intensive and waiting lists for echocardiography are typically long, the SHD screening programme should leverage sensitive and specific enough screening tools. The utilisation of innovative tools, such as biomarkers (NT-proBNP), could be evaluated in this objective.
- Effective auscultation requires a trained ear; Less experienced GPs should be offered relevant training.

<sup>15</sup> German Breast cancer screening program 2022

<sup>16</sup> new cervical cancer screening policy in Germany, Value in Health 2019

<sup>17</sup> Heisser 2020

<sup>18</sup> Ultrasound screening for abdominal aortic aneurysms: advantages for men, but not for women, IQWiG 2015;

<sup>19</sup> Schnabel 2012

<sup>20</sup> Valentinitich 2019



## HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN ITALY

In Italy, systematic screening programmes exist for breast<sup>21</sup>, cervical<sup>22</sup> and colorectal<sup>23</sup> cancer. Opportunistic programmes or screening initiatives exist for other diseases, such as lung cancer, atrial fibrillation, and Hypercholesterolemia.

Taking into account how these detection programmes operate in Italy, the EU SHD coalition has identified how an SHD detection programme could be integrated into the Italian healthcare system.

### Key pillars for SHD detection in Italy

The heart check should be carried out by the general practitioner (GP) in a general consultation. In addition, the local health authorities should invite elderly patients for a physical examination and echocardiography by a cardiologist every 5 years.

If the check is undertaken by a GP and SHD is suspected due a detected heart murmur, the patient should be referred to a cardiologist.

To optimise the examination by cardiologists, utilisation of screening planning and urgent referrals can shorten waiting times and optimise cardiology referrals.

### Building blocks to make SHD screening programme happen in Italy:

- Firstly, consensus will need to be reached on the target population criteria for those people who should be screened for SHD. This should be based on age and should be decided by medical societies, the public health experts and ultimately the Regions. Awareness raising should be carried out so the need for screening is understood.
- Local Health Authorities (ASL) should identify the individuals who fit the SHD screening criteria based on population registries and should issue invitations via letter informing them about the screening and highlighting that it is free of charge. Invitations can be combined with other existing invitations.
- At the level of the general practitioner, heart checks could be widened to consider broader cardiovascular disease conditions and not only SHD. GPs should be encouraged to use digital stethoscopes.
- The screening should be complemented by the utilisation of questionnaires by GPs whenever a person at risks visits them.
- Local Health Authorities could also organise outpatient clinics to detect CVD.

### To set up a SHD screening programme for success, following elements should be considered:

- Echocardiography is a resource-intensive screening and waiting time is important. Yet within a systematic detection this can be alleviated via scheduling in advance.
- Adoption of screening is a bottom-up process: a local pilot would contribute to test and build-up the detection program for further adoption at national level.

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21 Pelullo 2021

22 Cappelli 2018

23 Rossi 2015

## HOW A STRUCTURAL HEART DISEASE (SHD) SCREENING PROGRAMME COULD BE INTRODUCED IN SPAIN

In Spain, systematic screening programmes exist for breast and colorectal cancer.<sup>24 25</sup>

Opportunistic programmes or regional screening initiatives also exist for other diseases, such as such as osteoporosis, atrial fibrillation, and cervical cancer, which program is in transition period into systematic.<sup>26 27 28</sup>

Taking into account how other detection programmes operate in Spain, the EU SHD coalition has identified how an SHD detection programme could be integrated into the Spanish healthcare system.

### Key pillars for SHD detection in Spain

SHD screening should be organised regionally, with regional health authorities sending a regular invitation for a heart check by the general practitioner (GP) to a targeted population (peak prevalence age group to be defined).

The heart check would be carried out by the GP in a dedicated consultation or in screening centres when available. Heart checks could also be performed in screening buses as this is done frequently in some regions.

If a SHD murmur is detected, referral should be made to cardiologists who could confirm through echocardiography.

### Building blocks to make SHD screening programme happen in Spain

- Firstly, consensus will need to be reached on the target population criteria for those people who should be screened for SHD. This should be based on a national detection plan, or recommendations by regional medical societies.
- Regional authorities (eg regional health ministries) should identify the individuals who fit the SHD screening criteria. Regional health ministries or the managing directors of regional public health authorities should issue invitations via mail instructing them to visit their GP for a heart check.
- Reminders and re-invitations to those individuals who do not attend screening should be issued.

### To set up a SHD screening programme for success, following elements should be considered:

- Given that healthcare competencies are regional, introduction of SHD screening at regional level is more likely, and successful implementation of initiatives in pilot regions, supported by medical societies and evidence, could lead to adoption by other regions.

<sup>24</sup> Keys 2021

<sup>25</sup> Ascune 2010

<sup>26</sup> Puig-Tontoré 2008

<sup>27</sup> Blanco 2017

<sup>28</sup> Alacreu 2017