Early recognition of cardiovascular disease: The Dutch CardioVascular Alliance initiative

November 22, 2017
Cardiovascular diseases are on the rise

Source: CBS (hospitalization last three years had a different calculation method resulting in a significant jump in the figures – figures have been normalized to the old calculation method); Hartstichting cijferboek 2016 – Hoofdstuk 6; RIVM Cost of Illness database 2013
The Dutch CardioVascular Alliance is a movement of the cardiovascular community in the Netherlands

Movement of …

… to

Mobilize EUR 1 billion …

… for early recognition of cardiovascular diseases …

… thanks to excellent science in the Netherlands …

… that is rapidly translated into health solutions, lowering the cardiovascular disease burden by 25%
With CVON, Hartstichting, NFU, KNAW, ZonMw and TTW (STW) invested EUR ~220 m in cardiovascular research over ~5 years.
CVON has been successful in building national cardiovascular research communities around priority subjects in CVD

The number of consortia the research institute participates in
1) Not official CVON consortium, but strong connection exists
We are proud of the achievements, but believe much more impact can be achieved

Excellent position to build upon ...

- Excellent scientific community brought together through the CVON initiative in research communities

... because more impact is possible

- Research consortia often designed around scientific potential, and less geared towards achieving social and economic impact
- Research is often inter-university, while valorization support, talent development and data infrastructure is organized per university and sub-critical
- Potential for increased public and private co-financing to scale up CVD research and innovation

The DCVA builds on existing assets and improves the innovation infrastructure
DCVA to invest in an excellent and sustained environment for CVD breakthroughs

**Dutch CardioVascular Alliance**

**Science**
- Breakthrough science by leading scientists who cooperate in a long-term programmatic research agenda

**Valorization & implementation**
- Fast-tracks from project to company, lab to patient, driven by offering inspiration, expertise and funding

**Talent**
- Excellent talent development opportunities, and continuous exchange of talent between communities

**Communities**
- Sustained and focused public-private communities that work together on solutions with patients

**Research infrastructure**
- Shared, national research infrastructures that provide the best facilities and associated expertise to researchers
DCVA initiates five actions, getting shape in the coming period

1. Focus on the solution
2. Manage portfolio for impact
3. Create fast-tracks
4. Extend talent programs
5. Establish data infrastructure
Innovation by the CVD community has saved many lives, but has created many chronic patients in turn.

Achievement: many lives saved by reducing damage, but creation of large number of chronic patients.
In the Netherlands, millions are taking medication to lower their CVD risk, and 25 k people with myocardial infarction survive each year.
DCVA aims to counter the growth of CVD prevalence and costs by taking action before real damage has occurred.

CVD in 2030

- **Healthy**
- **At risk**
- **First symptoms**
- **Critical episode**
- **Chronic condition**
- **Recurrence/advanced disease**

**Prevent critical episode**

- 50% reduction of at-risk treatments,
- Personalized Primary Prevention

- From a 6-minute to a minus "two-week zone", leading to 25% reduction of patients in the critical episode

**Prevent recurrence/advanced disease**

- 25% reduction of patients that move from chronic to advanced disease

- 5 new measures for personalized, secondary prevention that prevent recurrence/advanced disease

- 5 new measures for personalized, primary prevention that prevent a critical episode
Technological progress is providing tools for developing and implementing early detection and associated intervention

Early detection facilitators

**Medical big data**
The use of a growing amount of data (digitized patient records, lifestyle data) to better understand risk factors and disease patterns to better predict CVD onset and development

**High resolution imaging**
Increasing spatial and molecular accuracy enables the identification of onset of a disease in a very early stage

**Molecular diagnostics**
The use of biomarker analysis of the genome and proteome to diagnose and monitor disease, detect risk and choose the most effective treatment for the individual (personalized medicine)

**Domotics and sensoring**
The use of more and more sensors in daily life facilitates healthy aging and allows continuous and extramural monitoring and immediate intervention when data shows indicators of CVD
Co-creating a Research Agenda

Donors, Volunteers & Dutch society

Patients and their families

Scientists

Health care professionals
Co-creating the Research Agenda for Cardiovascular Diseases

Advisory committee

- focus groups
- focus groups
- online questionnaire

Research Agenda:
1. Earlier recognition of cardiovascular diseases
2. Cardiovascular disease in women
3. Better treatment of heart failure and arrhythmias
4. Acute treatment of strokes
5. New ways to keep up a healthy lifestyle

aim and strategy by theme

implementing the Research Agenda

Together with scientists, doctors, patients
1. Earlier recognition of cardiovascular disease
2. Cardiovascular disease in women
3. Better treatment of heart failure and arrhythmias
4. Acute treatment of strokes
5. New ways to keep up a healthy lifestyle
With its focus on early detection, the DCVA executes two of the NWA routes …

NWA routes executed by DCVA

Route: **Personalized medicine**

- Exactly the right amount and type of care for every individual patient, at minimal cost, close to home
- To make this possible for the growing number of patients with a chronic disease, a healthcare revolution is needed
- It demands large investments in data infrastructures and technological and methodological developments, and new cooperations

**DCVA:**

- Takes a personalized approach in early detection, understanding the exact risk factors of an individual for developing a critical episode or the advancing of a disease
- Invests in data infrastructure to build the basis for understanding disease risks factors and progression based on genotypes and phenotypes
- Brings together a range of public and private parties to jointly innovate and improve healthcare

Route: **Healthcare research, prevention and treatment**

- Healthcare faces major challenges and focuses on prevention, early diagnosis and effective, minimally invasive, treatment of chronic diseases
- The big challenge is to keep healthcare affordable, accessible and of high quality. Sustainable healthcare demands a multidisciplinary approach with all stakeholders, supported by technological advances and sharing of data and results

**DCVA:**

- Targets one of the major chronic diseases that threaten health and sustainable healthcare (cardiovascular diseases) through early recognition, providing the tools for prevention, early diagnosis and effective, minimally invasive, treatment
- Develops breakthrough technologies to achieve this, and does this in a consortium effort that enables the collection and use of data and results to drive breakthrough research, and as a multidisciplinary cooperation
The DCVA is a flagship project within the topsector Life Sciences & Health and integral part of its agenda's

Within the Regiegroep of the topsector Life Sciences & Health, the DCVA has been identified as one of a few Flagship projects of the topsector
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Backup slides
Portfolio management will be guided by measuring and evaluating societal, valorization, implementation and scientific impact.

Performance indicators

**SOCIETAL IMPACT**
- **Promise** of end goal: # patients, impact per patient, and impact on affordability of healthcare
- **Feasibility** of end goal: ability (quality) to achieve end goal, risks, distance towards end goal (years)
- **Progress** made towards end goal; milestones of the roadmap achieved and years towards end goal lowered
- # projects in **implementation fast-track**

**ECONOMIC IMPACT**
- **Private funding** acquired
- # of **spin-off** companies
- # of projects in **valorization fast-track**
- # of **clinical trials**

**SCIENTIFIC IMPACT**
- # of **publications**
- **Impact** of publications (e.g. citations per article / # articles in top 10% journals)
- **Public funding** acquired
Focus on large-scale prevention for at-risk groups has prevented many diseases, but has led to a medicalized society.

Achievements of the CVD community in recent decades (2/2)

**PRESENT (prevention)**

Achievement: saved many lives through large-scale prevention for at-risk groups using medicines like statins

This achievement has two consequences:
- Saving lives by preventing patients from reaching critical episode
- Treatment of large groups of patients (medicalization) and associated costs
In the Netherlands, millions are taking medication to lower their CVD risk, and 25 k people with myocardial infarction survive each year.
Early detection can counter the growth of CVD prevalence and costs by taking action before real damage has occurred.

Early detection

Focus on early detection of critical episodes and advanced disease in a personalized approach, reducing the number of chronic patients and recurrence by detecting disease (progression) before irreversible damage has occurred, and take corresponding action, returning the individual to a "healthy state"
DCVA catalyzes the realization of priority solutions for CVD, saving and improving millions of lives

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- **50% reduction** of at-risk treatments
- From a 6-minute to a minus "two-week zone", leading to **25% reduction** of patients in the critical episode
- **5 new measures for personalized, primary prevention** that prevent a critical episode
- **25% reduction** of patients that move from chronic to advanced disease
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DCVA will mobilize investments in the research of the consortia and establish an active portfolio management that steers on impact.

Illustrates a CVON consortium with projects (blue dots)
DCVA will set up a valorization fast-track, bridging the gap from research results at universities to marketed products of companies.

**From research result at a university**

1. **Inspiration**
   DCVA inspires with SWAT teams, example figures, and sharing business success.

2. **Expertise**
   DCVA organizes expert support incl. a thematic technology transfer team.

3. **Funding**
   DCVA mobilizes funding opportunities incl. newly established Succesfonds.

**To marketed CVD product of a company**
4. Extend talent programs

Existing talent programs will be effectuated and additional programs designed

Strengthen existing programs

1. Rejuvenate **NL-HI/ICIN endowed chairs**, combine with **Dekker established** grants and scale to 10 DCVA professors

2. Pool **CVON talent budget** for post-doc projects and establish **post-doc mobility** plan, allowing talents to move between partners and consortia

Develop new programs

3. Create **sabbatical** program in annual CVD theme, attracting experts from abroad to work with Dutch talents

4. Provide **valorization education**, supporting entrepreneurial skills and opportunities for talents

5. Actively involve young talents in **critical decision making and leadership positions** in the DCVA
Three data infrastructure opportunities will be developed in close collaboration with the Health RI initiative

1. Community of data donors
   - Access to data from people’s daily lives for research
   - In return, donors get feedback about their health status

2. Clinical trial network
   - Access to harmonized data from clinical routine of cardiovascular patients for research

3. Netherlands Heart Bank
   - Cardiovascular samples from donor organs for research

Cumulative data

Clinical data

Data from home

Time

Link
Organization of the DCVA needs to get shape in the coming period