Country report the Netherlands – February 2014


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I. Structure of Health care in the Netherlands

The Kingdom of the Netherlands, commonly known as the Netherlands, is a sovereign state and constitutional monarchy in Western Europe and (with four small parts) the Caribbean. It is a small and densely populated nation, with about 17 million inhabitants on 42,525 km2, and thus almost 400 inhabitants per square kilometre. The Netherlands is a representative parliamentary democracy organised as a unitary state. Its administration consists of the Monarch and the Council of Ministers, headed by a Prime Minister. The people are represented by the States-General of the Netherlands (a House of Representatives and a Senate). The Netherlands is divided into 12 provinces.

The country currently hosts about 90 hospitals and 900 cardiologists. Percutaneous coronary interventions (PCI's) and surgical procedure take place in all 8 university medical centres and six large hospitals. Recently, off-site PCI's have been initiated in about 15 smaller hospitals (under the condition of at least 600 procedures per year). Therefore, acute cardiac care with PCI facility is readily available throughout the whole country: in fact, the wisdom of allowing so many centres to have the option of doing PCI's is currently under debate.

The Dutch healthcare system has undergone radical change in the last few years. It is now mandatory for everyone to purchase at least a base level of insurance. However, one is free to choose their own health insurer and change companies once per year. The insurance covers basic medical costs such as visits to the general practitioner, costs for hospitalization, medications and most medical treatments. Dental care is excluded. Expenditure on health care equals about 9.5% of gross domestic product (GDP) (about € 5 000 per inhabitant per year).

The Dutch health care system is further characterised by:

- Emphasis on robust primary care (almost 10.000 general practitioners) with a strong role in gate keeping and care coordination.
- Growing influence and almost dominance of health insurance companies in their role to engage and contract with health care providers at their discretion, but in principle based on cost and quality of care.
- The comings years will see decentralization of health care from central (governmental) to local (municipalities) organization. We are currently amidst this process: the question is whether local authorities have the knowledge, expertise and means to fulfil this role in a reliable and efficient manner.

II. Risk factor statistics

Health status

CVD mortality and morbidity

Despite the aging of the population and the high CVD prevalence, both the absolute and relative numbers of Dutch persons dying from cardiovascular diseases have been declining. Cardiovascular conditions are no longer the leading cause of death in the Netherlands. Currently, 27% of all deaths result from CVD, and cancer has overtaken CVD as the main cause of death in the Netherlands in both women and men (source: Statistics Netherlands - CBS). Despite considerable risk factor burden, cardiovascular mortality in the Netherlands is low in international comparisons. The current Dutch age-standardised mortality from circulatory disease is 147 per 100,000 and, according to WHO data, only Spain and France have lower cardiovascular mortality rates.

However, substantial morbidity persists: with estimates of 730,000 patients with coronary heart disease, of 120,000 persons with heart failure, and of 260,000 men and women with atrial fibrillation, the total count of Dutch individuals with some manifestation of heart disease could be as high as one million. The estimated prevalence of coronary heart disease in women is 3% in women and 5% in men. As in most other countries, women develop CHD disease approximately 10 years later than men. Still, the number of cardiac procedures in the Netherlands, in particular that of PCI and coronary artery bypass surgery (CABG), is below the Organization for Economic Cooperation and Development (OECD) average. As in most other European countries, the rate of PCI versus CABG is in the order of 2.5.

Demographic trends suggest an increase in the number of patients with heart disease and other forms of CVD in the future, and high morbidity - and high prevalence - but relatively low mortality from CVD remains the most plausible scenario for the foreseeable future in the Netherlands.

Myocardial infarction, heart failure and atrial fibrillation

In 2012, 3514 men and 2681 Dutch women died from myocardial infarction. Myocardial infarction (MI)-associated mortality declined by more than 70% over time in both men and women. Age-standardised mortality declined even more. The number of hospitalisations for MI in 2012 was 20,025 in men and 9,653 in women. The incidence of first MI has been declining by about 3 to 4% per year in the last decade, both in men and women.

Between 20% and 30% of the population develops some form of heart failure, usually over the age of 70 years. Its incidence rates increases steeply with age. Current Dutch lifetime risk of atrial fibrillation (AF) is also high, in the order of 20 to 25% and, as with heart failure; atrial fibrillation strongly increases with age. The incidence of AF below 60 years of age is less than 1 per 1000 person-years, but rises to almost 20 per 1000 person-years in persons over 85 years of age. An estimated 260,000 Dutch individuals are currently affected by AF.

Interventions

The total number of cardiac surgical procedures, including paediatric surgery, has gradually increased to 17,293 operations in 2012, performed in 16 surgical centres. About two-thirds of the 16,262 operations in adults in 2012 involved CABG (source: Supervisory Committee for Cardiac Interventions in the Netherlands (BHN)). As a result

of varying availability of donor hearts, the number of yearly heart transplants varies. On average, about 40 to 50 transplants are being carried out each year in three academic medical centres.
While the number of surgical procedures has only risen gradually, this has not been the case with the percutaneous interventions (PCIs). Their number has risen very quickly in recent years and, in 2012, 45,305 PCIs took place in 30 centres, and this number represents more than a doubling of these procedures in a time frame of 10 years. There has also been a substantial increase in the number of implantable cardioverter-defibrillator (ICD) implants in the last 10 years. Currently, their number is in the order of about 5000 new implants per year. Biventricular systems now account for almost 40% of all procedures. Based on the Dutch ICD and Pacemaker Registry (DIPR), over 10,000 pacemakers are implanted each year.

Cigarette smoking
The percentage of smokers continues to decline. The Continuous Survey of Smoking Habits by the Dutch Expert Centre for Tobacco Control (Stivoro, www.stivoro.nl) reported that 25% of all persons over the age of 15 years were current smokers in 2011, down from 28% in 2009. The decline in smokers is most pronounced among subjects with higher levels of education. Although 25% of the Dutch population smokes, less than 20% is a daily smoker. Still, this amounts to over 3 million smokers who consume about 14 cigarettes a day. Men continue to smoke more often than women, but the difference between the sexes is becoming smaller, currently about 3%. Annually, about a quarter of smokers make an attempt to quit smoking. The population attributable risk of smoking for coronary heart disease is about 20%.

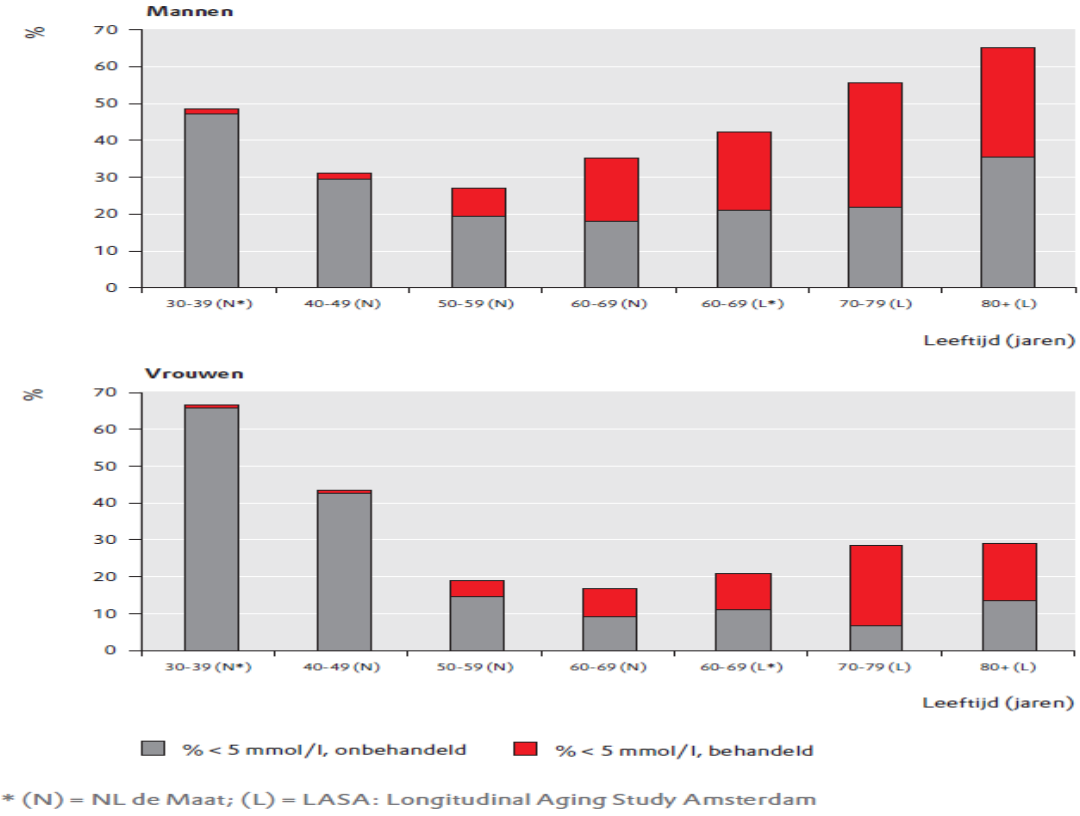
Food and salt intake
Current data indicate that the consumption of fruits and vegetables is low, in particular in the young. The consumption of fruits is higher in women than in men, and the intake of vegetables in women has increased in the last decade. The use of saturated fat, on average in the order of almost 13%, is too high in almost 90% of the population. Fortunately, trans-fatty acids have disappeared from the food chain.
Over 85% of Dutch children and adults have a salt intake above the recommended maximum intake of 6 gram per day. The average consumption of salt in men is 9.9 gram, in women 7.5 gram per day. The average salt intake in boys is 8.3 gram, in girls 6.8 gram per day. About 80% of the salt is derived from purchased foods, while twenty percent of the salt consumption comes from discretionary salt.

Obesity and physical exercise
According to the health examination survey 'Measuring the Netherlands', carried out during 2009-2010 in a national sample of over 4500 men and women, more than half of the Dutch population is overweight: 60% of men aged 30-70 years is too heavy (body mass index (BMI) over 25 kg/m2), including 13 percent who are obese (BMI over 30 kg/m2). In Dutch women of the same age, 44% is too heavy, including 14% who are obese.
About 60% of the Dutch (59% of men and 58% of women of at least 12 years of age) exercises regularly enough according to the Dutch standard "Healthy Moving" in 2011. The percentage of women and men exercising regularly is rising.

Cholesterol levels

About 34% of men and women aged 30-70 years have a "desirable" total cholesterol concentration, i.e. cholesterol level below 5.0 mmol/l. In about 6%, this value has been reached by the use of cholesterol lowering therapy. In women aged 30-70 years, 37% has a cholesterol concentration < 5.0 mmol/l, in 3% by use of drugs. About 8% (10% of the men and 6% of the women) of the population actually uses cholesterol lowering medication. In 25% of the population, the cholesterol level is either above 6.5 mol/l or cholesterol lowering medication is being used (figure 1). The mean cholesterol value, both in men and women aged 30-70 years, is currently 5.4 mmol/l. The use of cholesterol medication in primary prevention, i.e. in subjects without (known) previous atherosclerotic disease, is – understandably – highest in the age group of 60-70 years, but is currently still less than 20% in both men and women.
Since 1994, the Netherlands have employed an unique, countrywide apparatus to screen for the presence of familial hypercholesterolemia (FH) (1). So far, almost 30.000 Dutch subjects with FH have been identified, mostly using cascade screening. A recent finding from this screening program indicates that FH may be present more often than previously thought and, on the basis of current estimates, a prevalence of 1 in 250 or 300 for FH seems likely. This implies that about 65.000 Dutch citizens may suffer from this serious genetic abnormality, and that further screening is necessary.

Figure 1. Percentage of men ("mannen", upper panel) and women ("vrouwen", lower panel) with total cholesterol value < 5 mol/l as well as their percentage on cholesterol lowering therapy (in red) in different age groups ("leeftijd, jaren")



* (N) = NL de Maat; (L) = LASA: Longitudinal Aging Study Amsterdam

Source: Blokstra A, van Dis I, Verschuren WMM. Prevalentie en trends van cholesterol, bloeddruk en gewicht in de Nederlandse bevolking. Chapter in: Koopman C, van Dis I, Visseren FLJ, Vaartjes I, Bots ML. Hart- en vaatziekten in Nederland 2012, cijfers over risicofactoren, ziekte en sterfte. Den Haag: Hartstichting, 2012.

http://www.nationaalkompas.nl/gezondheidsdeterminanten/persoonsgebonden/bloeddruk/hoeveel-mensen-hebben-een-verhoogde-bloeddruk/

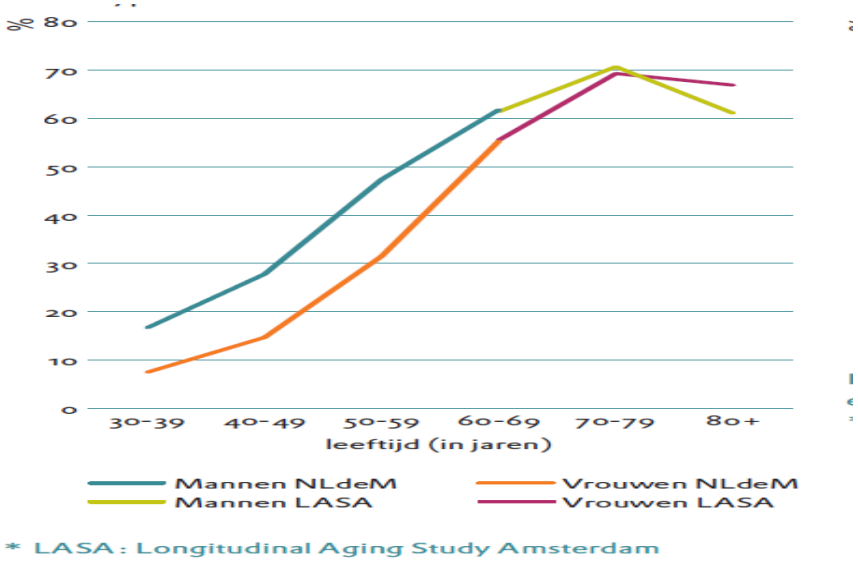
Diabetes

According to data obtained in the general population (based upon actual glucose measurement), the point prevalence of diabetes is 7.0% in men and 5.5% in women. In 25% of the persons investigated, a diagnosis of diabetes was established for the first time. In the age group of 60-70 years, 14% of the men and 11% of the women has diabetes. The incidence of diabetes rises until the age of 75 years.

Blood pressure and prevalence of hypertension

The prevalence of hypertension increases with age until the age of 80 years. The prevalence of hypertension rises in men from 17% in the age group of 30-39 years to 71% in those 70-80 years: the figures in women of the same age are 8% and 69%, respectively. The use of blood pressure lowering medication also increases with age. In young men, only 1% is on BP lowering therapy (2% in women). These numbers increase to 28% in men and women in the age group 60-70 years, and to 40% in men between 70 and 80 years of age and to 48% in women of that age. Almost 40% of the subjects over the age of 80 years is on blood pressure lowering therapy. Compared to 1987-1997, the mean systolic blood pressure has gradually increased to the current levels.

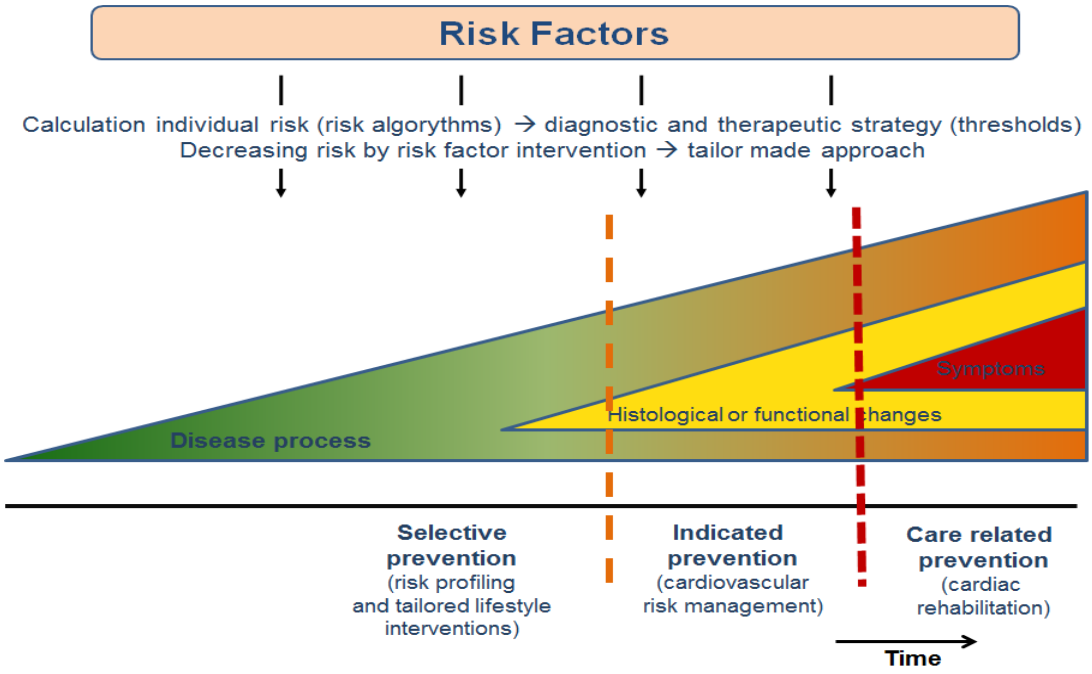
Figure 2. Prevalence of hypertension (≥ 140/90 mmHg and/or use BP lowering medication) in men and women of different age.



Source: Blokstra A, van Dis I, Verschuren WMM. Prevalentie en trends van cholesterol, bloeddruk en gewicht in de Nederlandse bevolking. Chapter in: Koopman C, van Dis I, Visseren FLJ, Vaartjes I, Bots ML. Hart- en vaatziekten in Nederland 2012, cijfers over risicofactoren, ziekte en sterfte. Den Haag: Hartstichting, 2012. http://www.nationaalkompas.nl/gezondheidsdeterminanten/persoonsgebonden/bloeddruk/hoeveel-mensen-hebben-een-verhoogde-bloeddruk/

III. Prevention methods

Chronic diseases often have multifactorial causes, long term exposure to risk factors and typically an extended preclinical phase. This is true for majority of cardiovascular diseases, especially ischemic heart disease, and fits in the schematic picture below where symptoms merely represent the latter stage of the chronic underlying atherosclerotic disease process, which is strongly influenced by the presence and level of specific risk factors.



Source: R. Kraaijenhagen, NIPED

According to the classical definitions of prevention, e.g. primary, secondary and tertiary prevention, secondary prevention starts when symptoms occur and disease has been diagnosed. The fact that atherosclerotic cardiovascular disease is in fact a slow and chronic disease process makes it difficult to define when disease actually starts and when a person is to be called diseased or afflicted. A clear separation between prevention and medical treatment - covered by basic health insurance - is thus difficult. For these reasons, a new model has recently been introduced in the Netherlands that categorizes measures to prevent disease from occurring into the following four stages:

Universal prevention: aimed at the general population, with the goal to promote health by reducing the burden of risk factors and the development of disease.

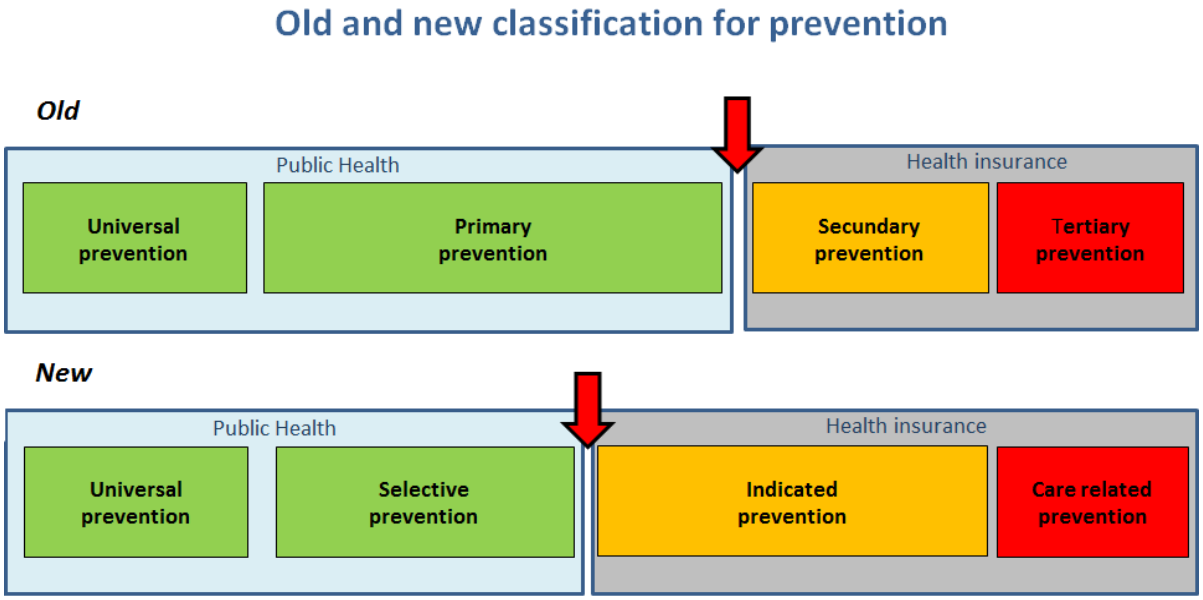
Selective prevention: identification of groups (of subjects) at high risk and provision of targeted and tailored preventive measures to all individuals with risk factors.

Indicated prevention: aimed at high risk individuals to prevent further development of the disease process and its clinical sequallae. Examples: treatment of hypertension and/or elevated cholesterol level. Lifestyle interventions in subjects at high risk are also included within this prevention category. In the Netherlands coverage by health

insurance starts from here since the introduction of this more risk based categorisation. Before that coverage by health insurance started from secondary prevention after disease had been diagnosed.

Care related prevention: aimed at patients / persons with health related problems with the aim to limit the burden of disease, to avoid further complications, and to promote and stimulate their independence and self-autonomy.

The Dutch Ministry of health and health insurance companies have embraced these new risk based definitions of prevention, and this allowed high risk management to be embedded within the domain of 'cure', covered and included by basic health insurance as depicted below.



Source: R. Kraaijenhagen, NIPED and the Dutch Healthcare Insurance Board (CVZ) report in 2007 'van preventie verzekerd'

In the following section, the most relevant strategies / approaches and parties involved in the four 'stages of prevention' are shortly described.

Universal – and selective prevention
Very recently (at the end of 2013) a boost was given to a structured prevention approach by the so called National Prevention Plan.

This Prevention Plan binds national and local government, industry and societal organisations to a common agenda with three important topics:

- To promote health and prevent diseases in the environment in which people live, work and learn.
- To give prevention a prominent place in health care.
- To retain adequate health protection.

The Prevention Plan promotes a municipality and community based approach for universal - and selective prevention, including lifestyle management. Relevant topics are early detection of relevant diseases for which effective treatment options are available,

structured risk factor management, prevention of absenteeism and promotion of (social and occupational) participation. This plan aims at resolving some of the various problems in the delivery of preventive care that were identified by a multidisciplinary task force on cardiovascular risk management in the Netherlands. Issues included the absence of reimbursement by health insurance, lack of an organized strategy, health professionals' limited time and knowledge, the need for a more client-centered approach, and underestimation of the benefits of individualized health profiling and interventions to reduce lifestyle risk factors (Platform Vital Vessels, 2009).

For selective prevention, already in 2005, the Netherlands Institute for Prevention and Early Diagnostics (NIPED) has forged an alliance of physicians, scientists, social investors, corporate partners and government agencies to develop and launch a Personalised Integrated Health Management Support (PIHMS) service with an underlying patented evidence-based knowledge and decision support system for integrated risk profiling and individually tailored health management (2,3). Guiding conceptual frameworks include stepped care and the Chronic Care Model. Stepped care refers to the practice of treatment with low-intensity methods wherever possible (e.g. self-management or health-related lifestyle changes such as smoking cessation or increased physical activity), thereby avoiding undue escalation to more costly or intense interventions (e.g. medical treatments). The Chronic Care Model is developed by Wagner and endorsed by the WHO. It refers to a client-centered, integrated approach to chronic disease care based on four essential components:

1. Empowerment of the individual to manage his or her own health;
2. Organisation of healthcare to ensure planned, structured intervention delivery and adequate follow-up;
3. IT-based decision support to optimize compliance and personalized stepped care; and
4. Information systems to facilitate secured data handling and scientific evaluation in support of dynamic guideline development.

In line with stepped care principles and the Chronic Care Model, a central goal of this selective prevention service is to change how people think and behave: it aims to raise awareness, and to educate, motivate, and empower individual users to take steps to promote their own health. It offers users an individually tailored health management plan, which may include the advice to visit a health professional for further diagnostic testing or evaluation, to change health-related lifestyle behavior(s), and/or to maintain present healthful behaviors. The approach, called '[the Prevention Compass]', was first implemented and evaluated in the occupational health field where it has shown to be feasible and to stimulate individuals to undertake health promoting action resulting in an overall healthier lifestyle, a decreased cardiovascular risk profile and a reduction in absenteeism by 20%.(4-15)

In line with this approach, a guideline/standard for selective prevention of cardiometabolic diseases was developed in 2010 by the Dutch Societies of General Practioners (NHG and LHV), the Dutch Association for Occupational Health, the Dutch Heart Foundation, the Diabetes Federation, the Kidney Foundation ('the Prevention Consult'). In collaboration with NIPED a web-based health risk assessment with tailored feedback regarding cardiometabolic risk and lifestyle management has been made for implementation in general practice (www.testuwrisico.nl and www.testuwleefstijl.nl). At this moment, a large scale feasibility and cost-effectiveness study is being performed in primary care.

IV. Main Prevention activities and actors

A. Universal prevention: we would like to highlight the following relevant preventive activities and alliances:

'**Healthy weight'**, in Dutch "Gezond Gewicht"
Aims:

- To reverse current trends in the development of overweight and obesity in Dutch children and adults.
- To raise awareness and to increase knowledge of the Dutch population of the health dangers associated with being overweight and obese.
- To provide information on effective measures that contributes to the prevention and treatment of overweight and obesity.
- To continue to emphasize the negative impact of overweight and obesety on the national level and to increase awareness of effective measures to combat these conditions.

Main actors:

- Public private cooperation including the National Institute for Public Health and Environment (RIVM)
- Schools and local communities
- Municipalities, local health organisations
- Schools with the vignette "Healthy School"
- The Netherlands Heart Foundation
- The Lung Foundation
- The Cancer Federation
- The national Olympic Committee

'**Young People with Healthy Weight'**, in Dutch: JOGG, "Jongeren Op Gezond Gewicht"
Aim: to reach 75 JOGG-municipalities in the year 2015.
Situation as per December 2013: 35 Dutch JOGG municipalities.
Main actors:

- Ministry of Health
- Local business communities and municipalities
- Social organisations including the Netherlands Heart Foundation

'**Healthy School'**, in Dutch: Gezonde school
Aim: All schools (n=7000) healthy as per 2013.
Situation as per December 2013: 65 Dutch schools with vignette.
Main actors:

- Municipalities
- Schools
- Local health organisations

Alliance Smokefree Netherlands ("Nederland Rookvrij!")**:**
The ratification of the Framework Convention of Tobacco Control-Agreement in 2005 constitutes the basis for current ant-smoking policy. Tekst FCTC (pdf)
Aims:

- Effective anti-smoking policy and measures
- To increase the numbers of non-smokers

- To create more smoke free space

Current status: Smoking is no longer allowed in restaurants (100% smoke free).There is a substantial increase in tobacco taxation. Basic health coverage now (again) includes and covers programs on "Quitting of Smoking". The the European Guideline on Tobacco, leading to neutral cigarette packaging and the outlawing of taste enhancers have been adopted and a "Smoke-free month" will be introduced in 2014.
Main actors: the alliance is an expanding network, and includes various public-private partners with the aim of creating a smoke-free Netherlands.

B. **Selective prevention:** here we would like to highlight as main actors:

- The 'Prevention Consult alliance', including the Dutch Societies of General Practioners ('Landelijke Huisartsen Vereniging (LHV)' and 'Nederlands Huisartsen Genootschap (NHG)'), the Dutch Association for Occupational Health, the Netherlands Heart Foundation, the Diabetes Federation, the Kidney Foundation and NIPED.
- Platform Personalised Prevention
- HealthNL

Aims:

- broad implementation of a selective prevention approach for personalised prevention (i.e. Prevention Compass / Prevention Consult as described above), based on individual risk profiling and intervention matching in public-private partnership.

C. Indicated prevention

Based on the rapport of the Health Care Insurance Board 'Van preventie verzekerd' (2007), indicated prevention is now being covered by basic health insurance. Furthermore, the government launched a new system of financing CardioVascular Risk Management (CVRM) in 2010, called 'integrated financing'. No longer are individual health care providers being paid for their performance, but instead reimbursement is given to organisations of health care professionals for providing an integrated approach for cardiovascular risk management, including paramedical lifestyle management, in medium to high risk individuals. The purpose of this new approach is to stimulate cooperation around the patient.

As guideline for clinical practice, a Dutch multidisciplinary guideline for CVRM is used, which is in essence conform the ESC guideline for CVRM including a Dutch version of the SCORE-table. In addition to the CVRM guideline, a care standard 'the health care standard CVRM' (2009, actualised in 2013) has been written. This standard describes how to actually implement the guideline CVRM in clinical practice, hereby taking the patient perspective as leading principle. The care standard is based on the Chronic Care Model as a framework. Core of the standard is a process of 'informed – and shared - decision making', i.e. the health care professional and the patients determine the concrete treatment strategy together, including lifestyle and risk management. This leads to a more involved and active patient who is more in charge of living his/her life. Patients and health care professionals together form a personalised 'individual care plan for

cardiovascular risk management' and make concrete arrangements and/or appointments as a result of this shared decision making process. What is the coordinating health care professional going to do, what are (if necessary) other health care professionals going to do and last but not least: what is the patient going to do? For instance, appointments are being made to stop smoking or to engage in more physical exercise.

Subsidized by the government, implementation of the health care standard CVRM started in nine regions in the Netherlands. These disease management programmes have shown good results for life style (stop smoking en physical exercise). Results on quality of life are being evaluated.

Main actors:
Platform Vital Vessels ("Platform Vitale Vaten"): a platform for health care professionals (cardiology, internal medicine, general practice, nursery, etc) and patients, working together on the implementation of CVRM in clinical practice. Amongst others, it coordinates the development of the health care standard CVRM. Till 2015 the Platform Vitale Vaten is financially supported by the Netherlands Heart Foundation. Furthermore, the affiliated organisations contribute financially.
The Hart- & Vessel Group ("Hart- & Vaatgroep"): the patient organisation for cardiovascular patients. Amongst others this organisation has made a quality label for the care of patients with arterial disease ('Vaatkeurmerk'), consisting also cardiovascular risk management.

D. Care related prevention

In 2008 the Health departments policy manuscript Programmatic Treatment of Chronic Diseases (2008) formed the basis for operationalisation of integrated and multi-disciplinary approaches of chronic diseases. This approach especially stimulates a central position of the patient, integration of prevention and cure, and a programmatic treatment approach with attention to quality monitoring. In these areas, an enormous drive has occurred in the past few years, but there is still a large variety in quality, and fragmentation.

V. Cardiac rehabilitation

Reimbursement for outpatient cardiac rehabilitation (CR) is provided by all insurance companies on the condition that a patient is referred by a cardiologist. Patients entering outpatient cardiac rehabilitation in the Netherlands are offered an individualised rehabilitation programme with a typical duration of 6–12 weeks, consisting of group-based therapies (exercise training, relaxation and stress management training, education therapy, and/or lifestyle change therapy) and, when indicated, of additional individual counselling (e.g. by a psychotherapist or dietician). There are 90 hospitals and 10 rehabilitation centres providing cardiac rehabilitation in the Netherlands.

Recently the effect of cardiac rehabilitation on survival was evaluated using a large health insurance claims database in the Netherlands. In the full cohort of a large Dutch health insurance firm (Achmea), covering approximately 22% of the Dutch population, patients receiving cardiac rehabilitation had a large and statistically significant survival benefit (hazard ratio (HR) = 0.65, 95%CI 0.56 – 0.77) compared to patients not receiving cardiac rehabilitation, over a 48 month follow-up period. For shorter follow-up periods the effect was larger (HR = 0.5, 95% CI 0.37-0.67). The effect of cardiac rehabilitation was present regardless of age category, type of intervention, type of diagnosis or follow-up period. The largest benefit was observed for patients who had CABG/valve surgery (HR = 0.55, 95% CI 0.42 – 0.74). These results are in line with international reports on the effect of cardiac rehabilitation.

Despite its documented efficacy, cardiac rehabilitation is still not optimally implemented in current clinical practice in the Netherlands. Based on insurance claims (form 2007-2010), cardiac rehabilitation uptake was assessed among patients with an acute coronary syndrome (ACS), patients that underwent coronary artery bypass graft surgery, percutaneous coronary intervention (PCI) or valvular surgery, and patients with stable angina pectoris (AP) or chronic heart failure (CHF) (16). In addition, we evaluated the relation between cardiac rehabilitation uptake and demographic, disease-related and geographic factors, for patients with an ACS and/or intervention. The cardiac rehabilitation uptake rate was 11.7%. The uptake rate among patients with an ACS and/or intervention was 28.5% as opposed to 3.0% among patients with CHF or stable angina. The highest cardiac rehabilitation uptake rate was observed in patients who had undergone cardiac surgery (58.7%). Factors associated with lower CR uptake were: female sex, older age, elective PCI (as compared to acute PCI), unstable angina pectoris (as compared to myocardial infarction), larger distance to the nearest provider of cardiac rehabilitation, and co-morbidity.

Beside uptake poverty, cardiac rehabilitation is still not optimally standardized in the Netherlands and does not follow the available scientific evidence in all settings. Although the clinical guidelines are regularly updated professional adherence to the guidelines is hindered by a variety of barriers related to professional knowledge and attitude, task delegation and collaboration in teams, and impracticabilities of the guidelines themselves. The overcome the last barriers, a patient information system with computerised decision support functionalities (CARDSS*) was developed to collect patient data and to guide users through the needs assessment procedure (17-21). A recent trial in 21 clinics showed that the system increases the adherence with the guideline-recommended therapeutic decisions (22). In addition to improve quality of cardiac

rehabilitation in the Netherlands, a national data registry is currently being set up. With use of this registry the quality of care and concordance to clinical practice guidelines of Dutch CR clinics can be assessed. Each three months participating clinics receive periodic feedback on quality indicators accompanied by an educational outreach visit.

* CARDSS is an acronym for Cardiac Rehabilitation Decision Support System

Main actors:

- The Committee on Cardiovasculair Prevention and Rehabiltation of the Dutch Cardiology Society (CCPH): special committee of the Netherlands Society of Cardiology for cardiovasculair prevention and rehabiltation.
- Dutch Multidisciplinairy Counsil for Cardiac Rehabilitation (LMDOH): multidisciplinary counsil of authorised representatives for the disciplins collaborating in cardiac rehabilitation, including cardiologists, physiotherapists, psychologists, dieticians, social workers, occupation health workers and the Hart- & Vessel Group as representative for patient.
- The *CARDSS projects and research group: CARDSS is an acronym for Cardiac Rehabilitation Decision Support System. CARDSS started as an academic research project in the Academic Medical Center of Amsterdam and it now evolves to a cornerstone quality institute for dynamic guideline development, decision support, data registry and quality assessment for cardiac rehabilitation in the Netherlands.

VI. Aims for the Future

Concomitant diseases: Nowadays, patients with cardiovascular diseases enjoy a longer life expectancy. Cardiovascular disease becomes more and more a chronic disease which demands other approaches and skills from both health care professionals and patients. Recently the Netherlands Heart Foundation and research institute NIVEL described that 63% of the cardiovascular patients have other (related) chronic diseases like diabetes and chronic obstructive pulmonary disease (COPD). This must be taking into account in health care policy. The largest disease burden in Europe (= 86% of the mortality and 77% of the morbidity) comes from non-communicable diseases: a group of conditions that includes cardiovascular disease, cancer, mental health problems, diabetes mellitus, chronic respiratory disease and musculoskeletal conditions. This broad group is linked by common risk factors, underlying determinants and opportunities for intervention. Almost 60% of the disease burden in Europe, as measured by DALYs, is accounted for by seven leading risk factors: high blood pressure (12.8%); tobacco (12.3%); alcohol (10.1%); high blood cholesterol (8.7%); overweight (7.8%); low fruit and vegetable intake (4.4%;) and physical inactivity (3.5%).

More focus on risk factor management: In the coming years, a structured implementation on a personalised prevention strategy based on individual risk profiling is foreseen in the Netherlands. In this strategy, a structured approach for 'selective prevention' is combined with adequate implementation of 'indicated prevention' (cardiovascular risk management) for high risk individuals and 'care related prevention' for patients which diagnosed cardiac diseases. Since selective prevention is not covered by the basic health insurance, public-private collaboration is needed to provide a structured approach for selective prevention, which not only selects high risk individuals but provide them with a demedicalizing support for a healthy lifestyle. In HealthNL (http://gezondnl.nl/), this public-private collaboration is the cornerstone of a regional 'health matching' approach. In this approach individual risk - and preference/motivation profiles (based on a structured health risk profiling assessment) are matched with regional intervention providers for follow-up. In this way, individuals are made aware of their risk (factors), receive a tailor made health management advice and are referred to participating best-practice healthcare and lifestyle providers in their neighbourhood.

Web-based decision and support models: With the acceptance and influence of internet in the daily life of many households, opportunities to facilitate self-management of care through information and communication technology (ICT) abound. Numerous studies indicate that ICT applications can play an important role in improving the quality of medical care by influencing the behavior of care professionals. Computerized decision support has been shown to be one of the most effective strategies to implement clinical guidelines and other professional standards in daily practice. In the Netherlands, decision support systems and web-based communication are increasingly being used to support professionals and also to empower individuals and increase self-management. Large scale implementation studies to evaluate the feasibility and cost-effectiveness have been started from selective prevention to cardiac rehabilitation.

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