

Country report Norway – December 2016



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Acknowledgement

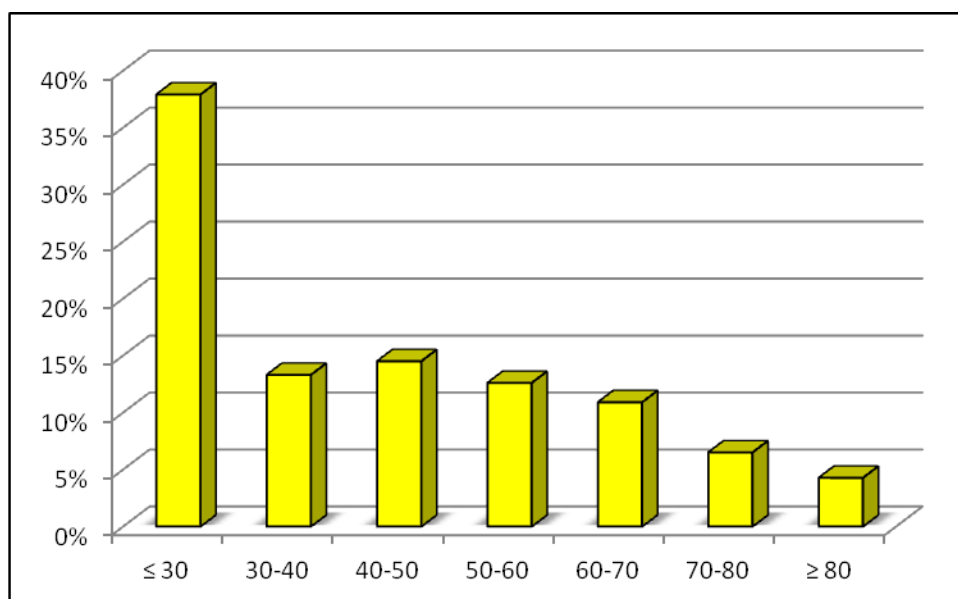
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I. Structure of Health care in Norway

Structure

The population in Norway in 2015 was 5.165.802 people, with a male/female ratio 50.3 vs. 49.7 (Statistic Norway: <https://www.ssb.no/en>). This is the age distribution in the year 2015:



Source: Statistic Norway (<https://www.ssb.no/en>)

All inhabitants in Norway have access to a taxpayer-funded public healthcare system.

Norway's population has good health status; life expectancy of 81.53 years is above the EU average of 80.14, and the gap between overall life expectancy and healthy life years is around half the of EU average.

(http://www.euro.who.int/_data/assets/pdf_file/0018/237204/HiT-Norway.pdf).

The health care system is partly decentralised. The responsibility for specialist care (somatic including specialised rehabilitation and psychiatry lies within the state; administered by four Regional Health Authorities), while the more than 400 different municipalities are responsible for primary care (general practicing physicians, physiotherapists, nursing homes, community based rehabilitation and home care) (http://www.helsetilsynet.no/upload/Publikasjoner/artikler/2014/rudi_hm_helsetjenesten_helseforvaltningen_undervisning_med_stud.pdf [in Norwegian only]).

There were 77 cardiologists per million inhabitants in 2016 ([http://legeforeningen.no - legestatistikk](http://legeforeningen.no-legestatistikk) - 'physician statistic' [in Norwegian only]).

Finances

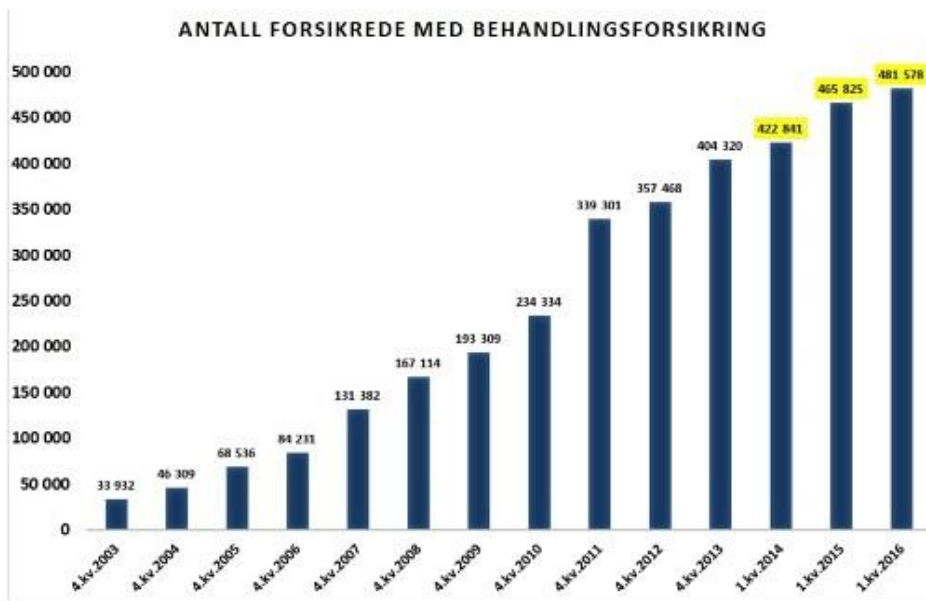
In 2011, health care expenditure accounted for approximately 9.4% of Norway's gross domestic product (GDP), placing it on the 16th place in the WHO European region in terms of the share of GDP spent on health. However, Norway has one of the highest values of GDP per capita in the world (85% higher than the EU27 average) and health expenditure is higher per capita than in nearly all other countries. Public healthcare sources account for over 85% of the total health expenditure, mostly financing from the central and local governments and from the National Insurance Scheme (NIS) (around 12% of total health expenditure).

(http://www.euro.who.int/_data/assets/pdf_file/0018/237204/HiT-Norway.pdf)

Inpatient care in public hospitals is free of cost for the patients, but there is a smaller part of patient's costs for outpatient care in hospitals, for consultations by a private physician and in some private rehabilitation centres.

There is a growing private health service in Norway, much because of the increasing numbers of people with private health insurances. It is now almost half a million people with a private health insurance, which is guaranteed to get health service within few days to a couple of weeks. The employers pay most of these insurances.

The increasing numbers with a health insurance in Norway from 2003 to 2016.



Source: <https://www.finansnorge.no>

However, still approximately only 14% of the total health costs were spent in the private health market in 2013 (Statistic Norway: <https://www.ssb.no/en>).

The Regional Health Authorities pay for preventive activities in hospitals, while there are costs for patients for all consultations by private cardiologists and general practitioners.

II. Risk factor statistics

CVD Mortality

People in Norway are living longer (Figure 1), and cardiovascular disease (CVD) still is the main cause of death, with cancer on the second place (Figure 2) (<http://www.healthdata.org/Norway>).

Figure 1
How long do people live?

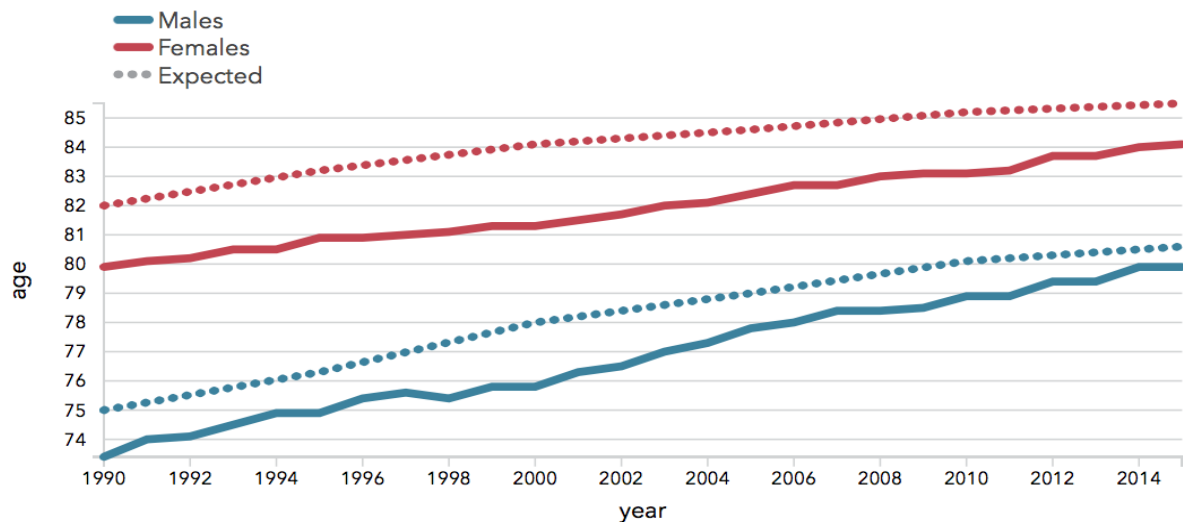
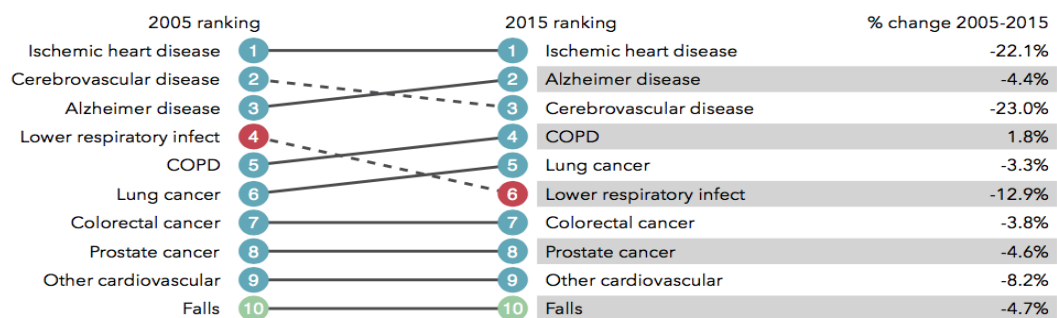


Figure 2
What causes the most deaths?



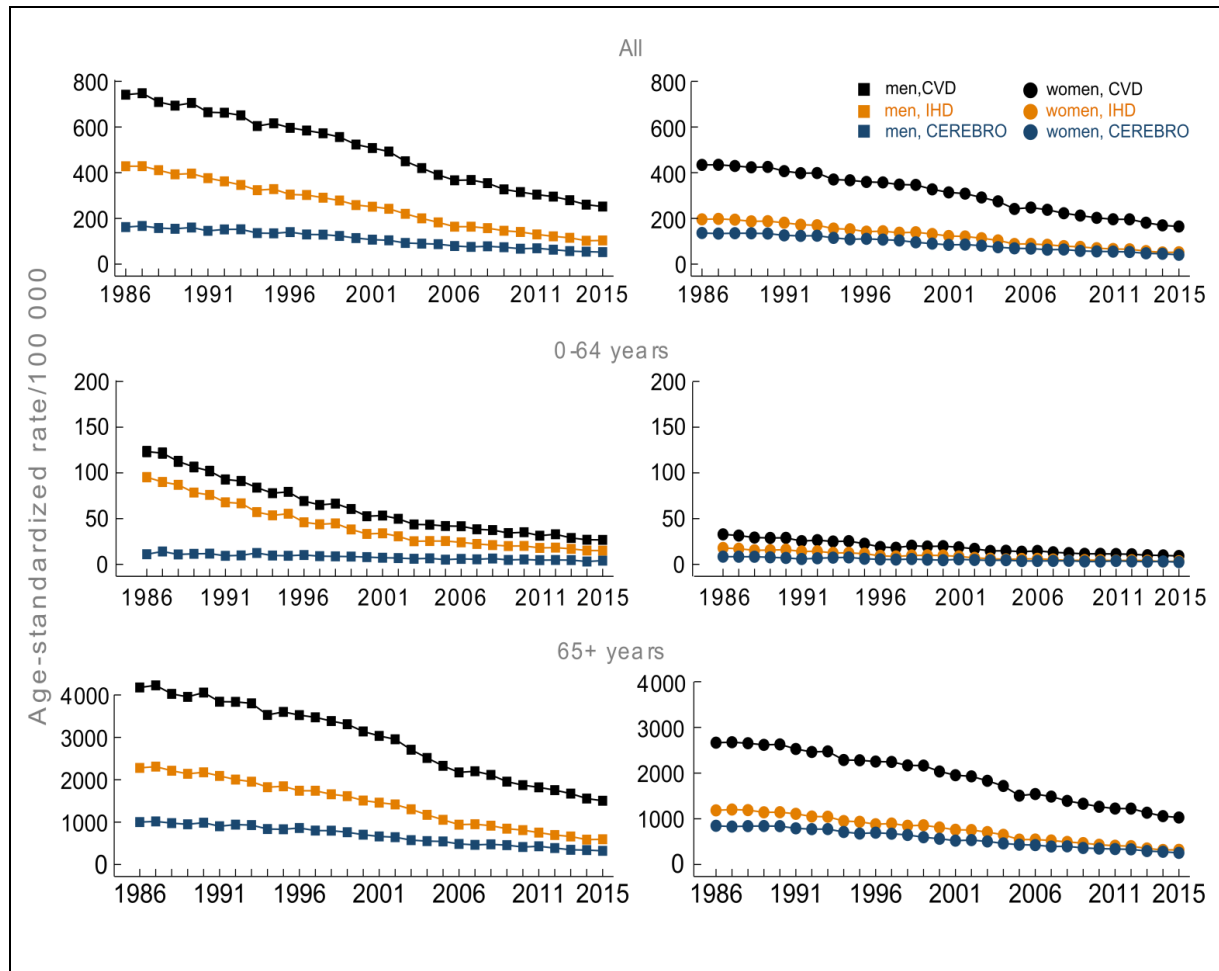
Top 10 causes of death by rate in 2015 and percent change, 2005-2015

Source Figure 1 & 2: <http://www.healthdata.org/Norway>

In Norway, as in many other countries in Western Europe, it has been a dramatic reduction in numbers of deaths from ischemic heart disease from 1970 until today. The number of men and women between 35-74 years old dying from an acute cardiac infarction have been reduced by 80 % from 4133 deaths in 1970 to 754 deaths in 2012 (Klemsdal TO. Established and new risk factors. Ch.9 in Textbook in Cardiology. Clinical

recommendations. Forfang K, Istad H, Wiseth R. (red.) Gyldendal Akademisk. Oslo 2015).

Figure 3: Age-standardised mortality rates due to cardiovascular disease (CVD), ischemic heart disease (IHD) and cerebrovascular diseases (CEREBRO) in Norway during 1986-2015.

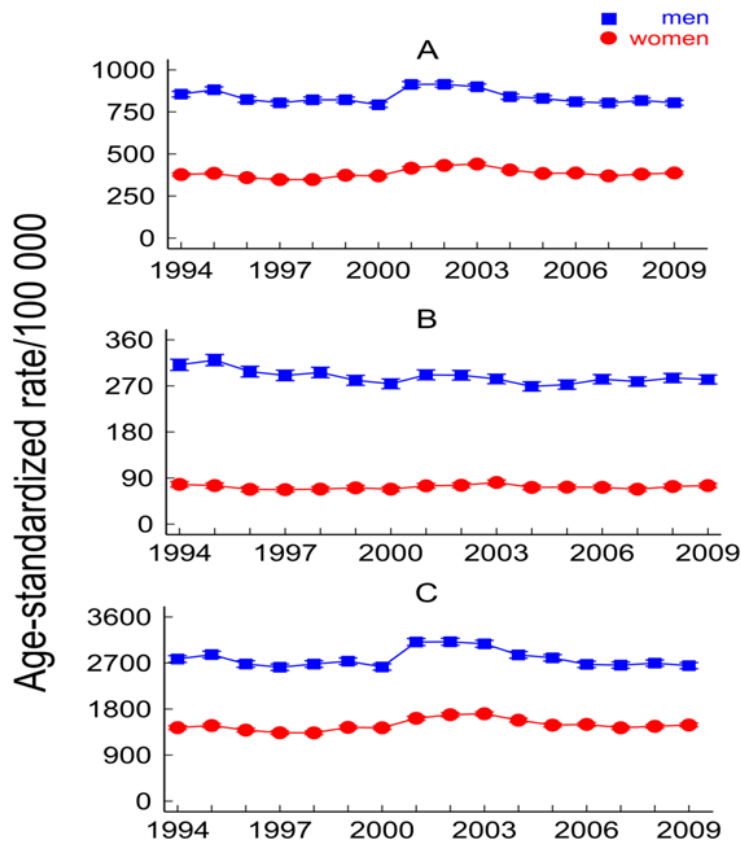


Source: Data from the Norwegian Cause of Death Registry

Cardiovascular disease, ischemic heart disease and cerebrovascular disease:

Age-standardised CVD mortality rates declined for both men and women and for all age groups, but the decline was less among the youngest.

Figure 4: Age-standardised acute myocardial infarction (AMI) event rates in Norway during 1994-2009. A: All; B: 25-64 years; C: 65+ years.



Source: Sulo G *et al.*, *Am J Cardiol.* 2014; 113(11):1777-81. Reprinted with permission.

Overall, AMI rates were stable during 1994 to 2002 and declined during 2002-2009 (annual percentage change (APC) = -2.0; 95% CI -3.1, -0.9 in men and APC = -2.1; 95% CI -3.8, -0.5 in women).

In the younger age group, rates declined during the whole study period in men (APC= -0.6; 95% CI -1.0, -0.3) but not in women.

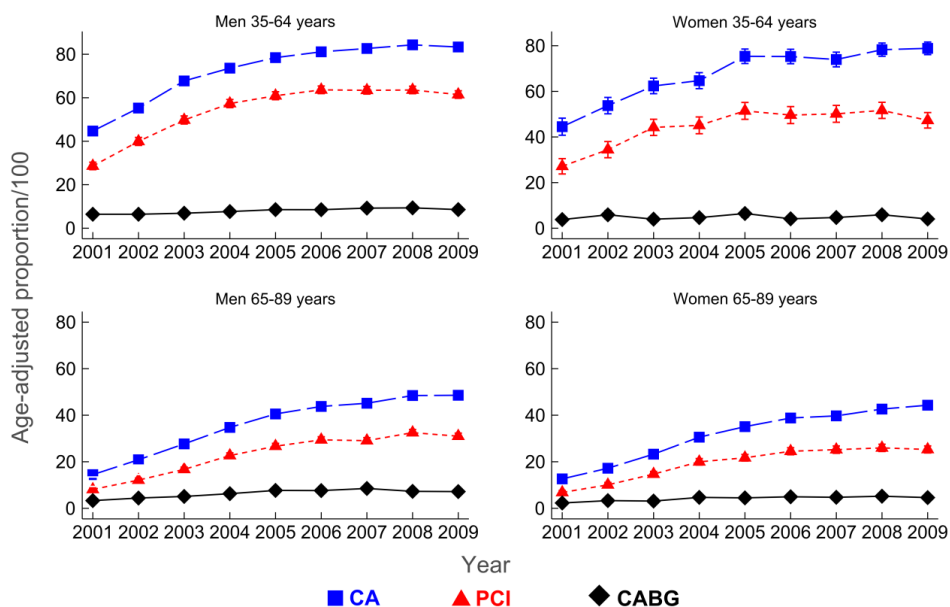
In older patients, no changes were observed from 1994 to 2002, while rates declined during 2002-2009 (APC= -2.6; 95% CI -3.8, -1.4 in men; APC= -2.4; 95% CI -4.0, -0.7 in women) (Sulo G *et al.* *Am J Cardiol.* 2014).

PCI resources

Percutaneous coronary intervention (PCI) was performed at 8 hospitals at the end of 2014, and now from 2016 there are all together 9 centres with 5 in Health Region South East, two in Health Region Western Norway, one in Health Region Middle Norway and one in Health Region Northern Norway. They performed in 2015 all together 26231 coronary angiographies without PCI and 11298 with PCI. Coronary artery bypass grafting (CABG) was performed at 6 departments in Norway (one private and 2 at Oslo University Hospital and one each at the three other Health Regions). The numbers of CABG procedures are still declining every year, from almost 2000 in 2013 to 1724 in 2014.

Time trends in coronary angiography, PCI and CABG among all patients with a first AMI in Norway during 2001 to 2009 are displayed in Figure 5 (reference: Sulo et al.).

Figure 5: Age-adjusted proportions of diagnostic and revascularisation procedures among patients hospitalised for a first acute myocardial infarction (AMI) in Norway during 2001 - 2009: a CVDNOR project



Source: Sulo E. *et al.*, *Int J Cardiol* 2016; 212:122-8. Reprinted with permission.

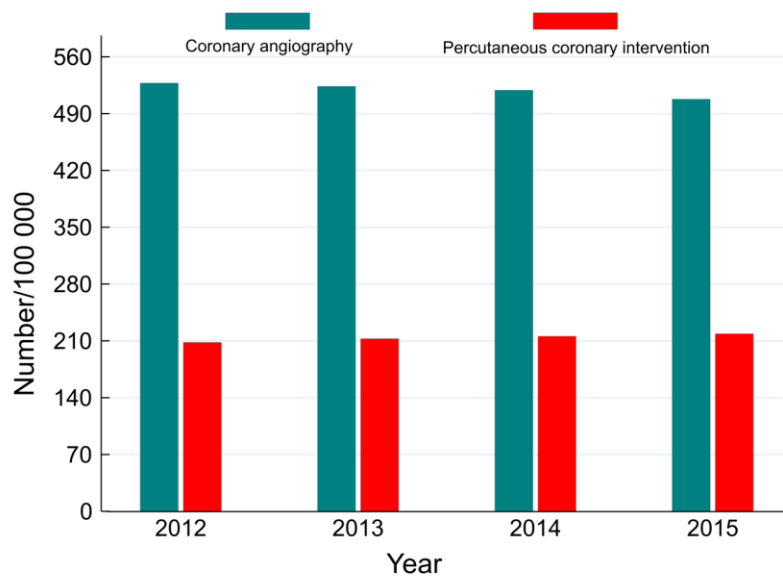
A total of 104 836 patients with acute myocardial infarction (37.3% women) were included in the study. In younger patients (35-64 years), the proportion undergoing coronary angiography increased annually by 7.8% (95% CI: 6.3; 9.4) among men and 6.5% (95% CI: 1.5; 10.9) among women. The proportion of patients undergoing coronary angiography also increased in older men (65-89 years) by 16.4% (95% CI: 13.9; 18.9) and by 17.4% (95% CI: 15.5; 19.4) among older women.

The proportion of patients receiving PCI increased by 9.7% (95% CI: 7.2; 12.3) in younger men, 6.1% (95% CI: 1.5; 10.9) in younger women, 17.1% (95% CI: 13.5; 20.7) in older men and 18.4% (95% CI: 14.0; 23.0) in older women.

During the same period, CABG utilization increased among younger men by 4.8% (95% CI: 2.2; 7.4), older men 10.2% (95% CI: 5.4; 15.2) and older women 9.6% (95% CI: 2.1; 17.6)

(Sulo *et al.*, *International Journal of Cardiology* 2016)

Figure 6: Rates of coronary angiography and percutaneous coronary intervention in Norway during 2012 – 2015



Source: Registry of Cardiovascular Diseases, Norwegian Institute of Public Health

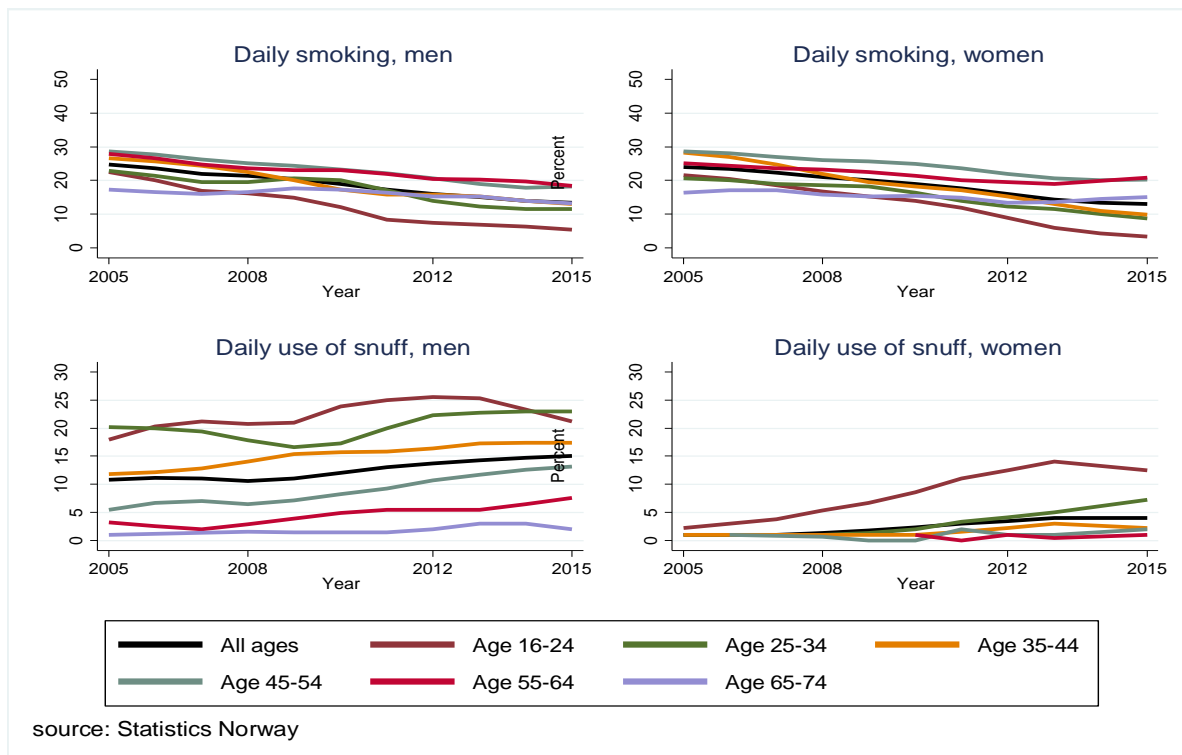
Main CVD risk factors

As many as 46 % of all deaths in Norway before the age of 70 years probably are due to life style factors, such as unhealthy diet, overweight, tobacco use, low physical activity, and alcohol- and drug abuse (<https://www.fhi.no/en/>). We now probably see the effects of the increase in the number of women who were smoking (in the years from 1970 to around 2000), and although lipid levels have decreased in Norway this is more so in some other countries (<https://www.fhi.no/en/>).

Smoking

In the middle of the 1970s 53 % and 30 % of Norwegian men and women smoked, respectively. From 2000 to 2015 the number of smokers has declined from 30 % to 14 %. Only 5 % of Norwegian women are now smoking during pregnancy, compared to 25 % in 1999 (<https://www.fhi.no/en/>).

Figure 7: Prevalence of daily smoking and daily use of snuff in Norway according to gender and age group. Data from a representative sample of approximately 8000 individuals per year, which participated in a yearly telephone survey carried out by Statistics Norway (<https://www.ssb.no/en>).



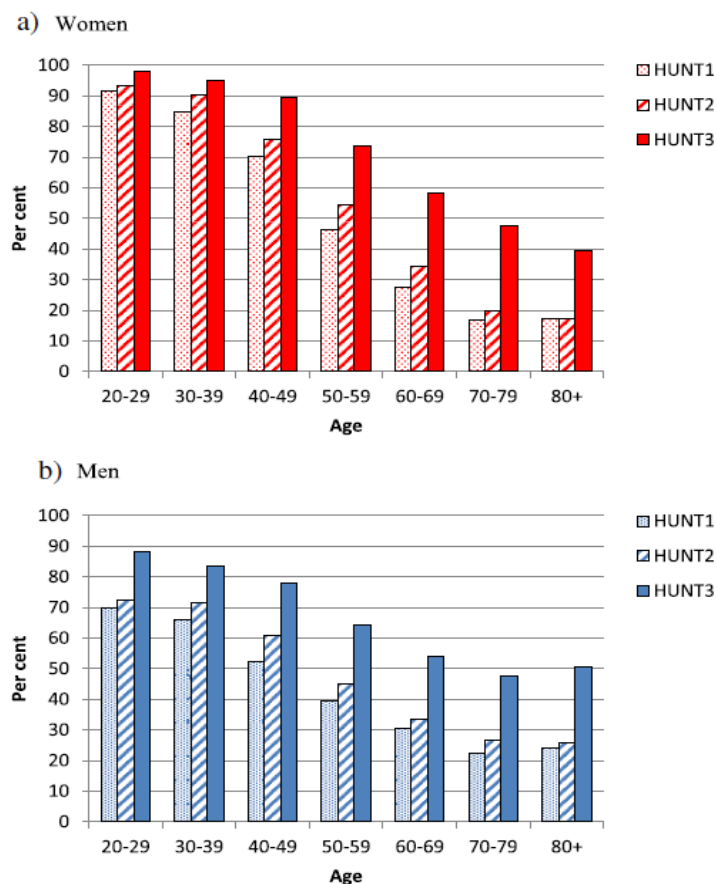
The estimates of smoking prevalence in Figure 7 are from a yearly telephone survey carried out by Statistics Norway. The sample size is approximately 8000 per year and sampling weights are used to correct for non-participation. The prevalence of smoking has decreased during 2005-2015 in all age groups. During the same time period there has been an increase in the use of snuff, especially among younger women. The smoking prevalence from the telephone survey corresponds well with prevalence estimates from population-based surveys during the same time period. In HUNT3 (2006-08) the prevalence of daily smokers was 17.4% among 49 378 respondents aged 20-100. In Tromsø 6 (2007-2008) the age-standardised prevalence of daily smoking was 22% among 9569 participants aged 40-79.

Blood pressure

Hypertension is still one of the main health problems in Norway. It is assumed that approximately 15 % of the Norwegian people have elevated blood pressure that should have been treated. As many as between 7-800.000 people are today treated with medication because of hypertension. However, reduction in blood pressure in the general population over decades has been one of the main factors for the decrease in CVD together with smoking cessation and decline in cholesterol levels.

(<http://www.ntnu.edu/hunt>)

Figure 8: Percentage of participants with SBP <140 mmHg and DBP<90 mmHg in HUNT1 (1984-86), HUNT2 (1995-97) and HUNT3 (2006-08) by age in women (a) and in men (b)



Source: Holmen *et al.* BMC Cardiovascular disorders. 2016;16:94.

The proportion of participants with normal blood pressure (SBP <140 mmHg and DBP<90 mmHg) increased in all age groups from HUNT2 (1995-97) to HUNT3 (2006-07). Decreasing systolic and diastolic blood pressure was also observed in the Tromsø study, which covers the same time period (Hopstock *et al.* Hypertension. 2015;66:496-501).

Lipids and hypercholesterolemia

Mid 1970 the average total cholesterol in men and woman was just below 7 mmol/l. Among people 40 to 45 years of age the total cholesterol level has since then decreased to 5.7 mmol/l for men and 5.4 mmol/l for woman, accordingly to a survey from 2000-2003 (<https://www.fhi.no/en/>). Both the introduction of widespread use of cholesterol-lowering medications with statins and healthier eating habits have contributed to this decline (Tromsø Study). These numbers show that there is still a way to go as long as 70% of men and 60% of woman have cholesterol levels higher than the recommended 5 mmol/l (<https://www.fhi.no/en/>). The Norwegian Prescription Database shows that 530 000 persons used cholesterol-lowering agents in 2015, which is more than 10% of the population. In the age group 45 to 64 years old 39% are treated with statins (<https://www.fhi.no/en/>).

Trends in lipid measurements from the population based Tromsø Study are shown in **Table 1**. The prevalence of hyperlipidemia (Total cholesterol/HDL cholesterol ratio >5)

decreased from 31% in 1994-95 to 18% in 2007-2008 (Mannsverk *et al.*, *Circulation*. 2016).

The trends correspond well with trends in the HUNT study from the same time period. In HUNT3 (2006-08) the age-standardised prevalence of high total cholesterol (≥ 5 mmol/L) varied between 70% and 75%, depending on level of education, with the highest prevalence among those with only primary education. The prevalence had decreased compared to HUNT 2 (1995-97) for all levels of education (Erntsen *et al.* *BMC Public Health*. 2012;12:256).

Table 1: Trends in total cholesterol, HDL cholesterol and hyperlipidemia from the Tromsø Study*

	1994-1995 (n=15718)	2001-2002 (n=6436)	2007-2008 (n=9569)	P-trend
Total cholesterol, mmol/L^{< **}	6.51	6.11	5.61	<0.001
HDL cholesterol, mmol/L^{**}	1.55	1.45	1.52	<0.001
Hyperlipidemia, %^{***}	31	30	18	<0.001

*From Mannsverk *et al.*, *Circulation*.2016;133:74-81.

**Age and sex- adjusted means

***Total cholesterol/HDL ratio >5

Diet

The Norwegian Directorate of Health is responsible for monitoring and evaluating developments in the Norwegian diet of the population, providing advice on diet and collaborates with other sectors of society with the goal of promoting public health. The latest National dietary guideline is from 2011 and is based on the report Dietary advice to promote public health and prevent chronic diseases. The report is based on systematic knowledge, nationally and internationally and also relies on summaries of knowledge from other international expert groups (WHO, EFSA, WCRF).

(<https://helsedirektoratet.no/Lists/Publikasjoner/Attachments/400/Kostrad-for-a-fremme-folkehelsen-og-forebygge-kroniske-sykdommer-metodologi-og-vitenskapelig-kunnskapsgrunnlag-IS-1881.pdf> [in Norwegian only])

The National dietary guideline is based on the following advices:

1. The recommended diet is primarily plant-based and contains a lot of vegetables, fruits, berries, whole grains and fish, and limited amounts of red meat, salt, added sugar and energy-rich foods.
2. It is recommended to maintain the balance between energy intake and energy expenditure.
3. Eat at least 5 servings of vegetables, fruits and berries every day.
4. Eat at least 4 servings of whole grain products each day.
5. Eat fish corresponding to 2-3 servings a week.
6. It is recommended that low-fat dairy products are included in the daily diet.

7. It is recommended that you choose lean meats and low-fat meat and limit your intake of red meat and processed meat.
8. It is recommended that you choose cooking oils, liquid margarine or soft margarine.
9. Water is recommended as a beverage.
10. Limit your intake of added sugars.
11. Limit your intake of salt.
12. Supplements may be necessary to ensure nutrient intake for some population groups.

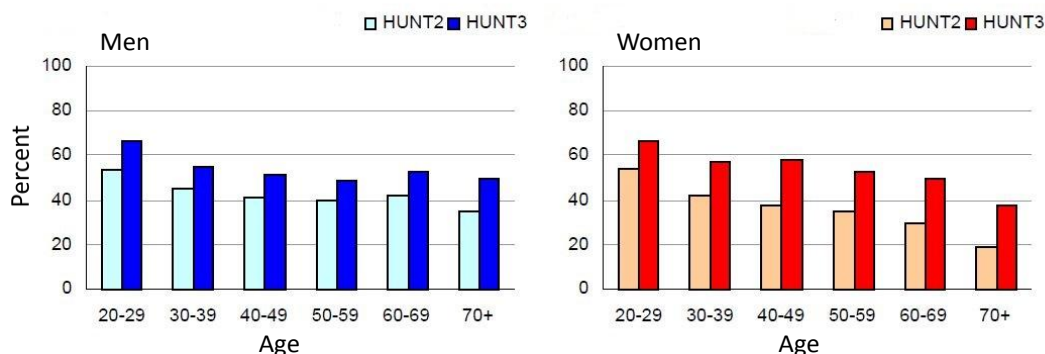
The Norwegian Directorate of Health's **last report on developments in the Norwegian diet** is from 2015 and shows a positive trend in the Norwegian diet (<https://helsedirektoratet.no/Lists/Publikasjoner/Attachments/1021/Utviklingen-i-norsk-kosthold-2015-IS-2382.pdf> [in Norwegian only]). Consumption of fruits and vegetables has increased significantly over time, and the consumption of sugar has fallen in the past decade. From the mid 1970s to early 1990s, the diet's fat content down. Broom fatty acid composition changed in the desired direction by the content of saturated fatty acids and trans-fatty acids decreased. In recent years, however, the decline in our diet content of saturated fatty acids stopped and increased again. Despite several positive trends in food consumption in recent years, diet has for much of the population still clear nutritional weaknesses that contribute to the development of cardiovascular disease, cancer, obesity, type 2 diabetes, constipation, tooth decay and iron deficiency.

Physical activity

Changes in physical activity according to age and gender between HUNT2 (1995-97) to HUNT3 (2006-08) are shown in **Figure 9**. The proportion of participants reporting more than two hours of physical activity per week increased in all age groups for both men and women.

Data from the Tromsø study also showed an increase in strenuous physical activity ≥ 1 h/week from 22% in 1995-95 to 38% in 2007-2008 (Mannsverk *et al.*, *Circulation* 2016;133:74-81).

Figure 9: Percentage of male and female participants who reported more than 2 hours of light or hard physical activity per week in HUNT2 (1995-97) and HUNT3 (2006-08).



Source: Data from the report "Public Health development, the HUNT study, Norway". (<https://www.ntnu.no/hunt/rapporter>)

According to a yearly survey carried out by Statistics Norway, three out of 10 adults complied with the recommendations of at least 150 minutes of moderate or 75 minutes of high intensity physical activity weekly in 2012. For groups with recommendation of 300 minutes of moderate or 150 minutes of high intensity physical activity per week (diabetes and/or obesity), only 10 % achieve these recommendations. In total 26 % of the population between 16 to 79 years old were inactive, with less than one hour of physical activity per week (<http://www.norgeshelsa.no/norgeshelsa/>). The number of inactive adolescents was 13 %. (www.helsedirektoratet.no/Lists/Publikasjoner: Nordic Nutrition Recommendations 2012 - Integrating nutrition and physical activity. Nord 2014:002, Nordic Council of Ministers, Copenhagen 2014).

Overweight/obesity

A report on 188 countries (Murray) from 2014 showed that 53 % of the people in Norway were overweight (BMI > 25 kg/m²), with 28 % with BMI > 27.

(<https://www.ssb.no/en/helse/statistikker/helseforhold>)

Table 2: Trends in BMI, waist-to-hip ratio, overweight and obesity in the HUNT study *

	Men			Women		
	HUNT2 (1995-97)	HUNT3 (2006-08)	p- change	HUNT2 (1995-97)	HUNT3 (2006-08)	p- change
n	29646	22658		32996	27171	
BMI, mean (sd)	26.5 (3.5)	27.5 (3.8)	<0.05	26.2 (4.6)	26.9	<0.05
Waist-to-hip-ratio, mean (sd)	0.9 (0.05)	0.9 (0.07)	<0.05	0.8 (0.06)	0.9 (0.07)	<0.05
Overweight (BMI 25-29.9), %	50.5	52.4	<0.05	37.1	37.7	>0.05
Obesity (BMI ≥30), %	14.4	22.1	<0.05	18.3	23.1	<0.05
Abdominal overweight**	25.9	31.9	<0.05	24.5	23.7	<0.05
Abdominal obesity**	13.7	26.9	<0.05	26.9	55.9	<0.05

* From "Trends in overweight and obesity over 22 years in a large adult population: the HUNT Study, Norway." Midthjell K *et al.* *Clin Obes.* 2013 Feb;3(1-2):12-20.PMID: 23935708 Free PMC Article

** Waist circumference 94-101.9 cm among men and 80-87.9 cm among women

*** Waist circumference ≥102 cm among men and ≥88 cm among women

The prevalence of BMI-defined overweight increased significantly from 50.5% in 1995-97 to 52.4% in 2006-2008 in men. There was no significant increase among women. In men, BMI-based obesity increased from 14.4% in 1984-86 to 22.1% in 2006-08 and in women from 18.3 to 23.1%. The prevalence of abdominal overweight in men (WC 94–101.9 cm) increased from 25.9% in 1995-97 to 31.9% in 2006-2008. The prevalence of abdominal obesity in women (WC ≥ 88 cm) increased from 26.9 % in 1995-97 to 55.9 % in 2006-2008.

An increase in BMI-defined obesity was also found in the Tromsø Study where the age-adjusted prevalence of obesity increased from 9.8% to 20.5% among men and from

11.8% to 18.5% among women from 1994-95 to 2007-2008 (Jacobsen *et al.*, BMJ Open 2015;5:e007859.)

Diabetes

Approximately 230.000 people live with known diabetes in Norway, from whom 200.000 with type 2 diabetes (<http://diabetes.no/english/>). The real number of persons with diabetes is probably substantially higher because many patients with type 2 diabetes still are not diagnosed with their disease. The incidence is increasing, both because a growing elderly population and increasing numbers with overweight (Jensen T. Diabetes mellitus as risk factor. Ch. 10 in Textbook of Cardiology. Forfang K, Istad H, Wiseth R (red). Gyldendal Norsk Forlag AS. Oslo 2015. ISBN 978-82-05-48458-0). According to data from the Norwegian Prescription Database 2.1% of the population <65 years of age and 9.8% of the population ≥65 had at least one dispense of glucose-lowering drugs or insulin in 2015 (<http://www.norpd.no/>). These numbers do not include persons with diet-regulated Type II Diabetes and persons with undiagnosed diabetes.

Table 3: Prevalence of diabetes in Norway according to difference sources and calendar years

	The Norwegian Prescription Database*		The HUNT 3 study (2008)**			The Tromsø study (1994-2008)***		
	Total population prevalence in 2015		Age-standardized prevalence among men/women aged 40-59			Age-standardized prevalence among participants aged 40-79		
	Age ≥65	Age <65	Primary education	Secondary education	Tertiary education	1994-95	2001-02	2007-08
N at risk	0.87 mill	4.3 mill	1744	4814	3002	15718	6436	9569
Prevalence, %	9.8	2.1	4.1/2.2	3.3/2.5	2.6/1.8	2.2	2.8	4.0

* From <http://reseptregisteret.no/Prevalens.aspx>

** From Erntsen *et al.*, BMC Public Health.2012;12:266

*** From Mannsverk *et al.*, Circulation. 2016;133:74-81

In two population-based health surveys (The HUNT 3 study and three rounds of the Tromsø study) during 1994-2008 the age-standardised prevalence varied between 2.2% and 4.1% depending on year, sex and level of education.

III. Main actors and Prevention methods

Public health level

The main superior actors are the central government through the Ministry of Health and the Norwegian Directorate of Health. The Norwegian Directorate of Health has published many national recommendations about primary and secondary prevention in life-style related diseases. They give easy recommendations and practical guidelines to the population through brochures, books and e-learning programmes (helsenorge.no). An important legislation was the "ban smoking law" July 1, 2004. Smoking in Norway is banned fully in the general workplace, enclosed public places, restaurants, bars, education facilities, healthcare facilities and public transport. Norway was the second country in the world after Ireland to ban smoking in a law.

Community level

The health authorities in each municipality have the responsibility for the preventive health activities for their population at the local level. The primary actors at this level are general practitioners, nurses in for example health stations and schools, physiotherapists, dieticians and nurses in the community health service or in primary health care centres.

Specialised level

There are departments for preventive cardiology in many hospitals in Norway, and most of them are mostly concerned about familial hypercholesterolemia and other lipid disorders. There are four clinics, one in each Health Region (<http://nktforfh.no/>). The Department of Preventive Cardiology at Oslo University Hospital is the only department in cardiology that is only dealing with preventive cardiology. However, preventive cardiology is part of many departments in cardiology throughout the country. The public and private actors in rehabilitation have mostly programmes for secondary cardiovascular prevention and only to a smaller part for primary prevention (mostly programmes for obesity). The Norwegian Society of Cardiology has two annual meetings for cardiologist and others, which includes topics about preventive cardiology. In 2016 a Working Group of Preventive Cardiology, Cardiac Rehabilitation and Sports Cardiology under the Norwegian Society of Cardiology was established.

Private level

LHL (Norwegian Association of Heart and Lung Patients) with 48.0000 members have hospitals, clinics and/or rehabilitation centres in every Health Region in Norway. In addition they have many local unions dealing with long-term cardiac secondary prevention (mostly group based physical activity) in addition to courses in secondary prevention for the members. There are many specialised private rehabilitation centres with cardiac rehabilitation programmes (see part V).

Guidance

The Norwegian Directorate of Health has published national recommendations on diabetes, cardiovascular disease, stroke, physical activity, smoking cessation, dietary guidelines, overweight among adolescents and children, and overweight among adults (<https://helsedirektoratet.no/English>). The guidance in "individual primary prevention in cardio-vascular diseases" from 2009 is now being prepared for a new edition in March

2017 including secondary prevention (<https://helsedirektoratet.no/English>). Today there are neither Norwegian guidelines nor recommendations in cardiac rehabilitation.

LHL has a lot of patient information about prevention of cardiovascular diseases, including stroke, cardiac rehabilitation, dietary changes and many other preventing topics on their website (<https://www.lhl.no/>). The same has the Resource Centre for Cardiac Rehabilitation in Health Region South-East (www.hjerterehab.no).

It is assumed that many cardiologists and health professionals in primary and secondary preventive cardiology include European guidelines in their daily practice, and now especially the two updated versions on "[Management of Dyslipidaemias](#)" and "[European Guidelines on CVD Prevention in Clinical Practice](#)", respectively. Guidelines are regularly presented at the two annual meetings of the Norwegian Society of Cardiology and in their journal "Hjerteforum", which is published four times annually. (<http://legeforeningen.no/Fagmed/Norsk-cardiologisk-selskap/Hjerteforum1/>).

Quality control

Quality control is strongly connected to data registries. There are now many registries in cardiovascular diseases. Today there is no registry for primary cardiovascular prevention nor for cardiac rehabilitation. There is a Hospital Health Registry and Registry for Heart and Vascular diseases (including Norwegian Myocardial Infarction Registry). The registry is a national person-identifiable health registry that does not require the consent of the registered individual. It has its own regulations that became applicable from 1st January 2012. Information in the registry may be used for health surveillance, prevention, quality improvement and health research, and will constitute a basis for management and planning of health services aimed at people with cardiovascular diseases (<https://www.fhi.no/>; <https://www.kvalitetsregistre.no/>).

The Norwegian Myocardial Infarction Register (NORMI) is one of the disease or treatment specific medical quality registries organised within the framework of the Norwegian Cardiovascular Disease Registry (including PCI-registry NORIC) and Heart Surgery registry. In accordance there is a pacemaker and implantable cardioverter-defibrillator (ICD) registry. NORMI has a web-based data entry form with more than 100 variables about the patient's medical history, symptoms, clinical findings, diagnostic procedures, and treatments during hospitalisation, and drug prescriptions after hospitalisation (<https://www.kvalitetsregistre.no/>).

IV. Main Prevention activities

Campaigns

Smoking

Even if the numbers of smokers are reduced, the numbers of sniffers are increasing, as shown in part II of this report. In 2016 there were campaigns to reduce sniffers among pregnant women. There were campaigns for smoking cessation in television and mass media in front of the "Cessation day" on October 24. The Norwegian Medical Association has proposed a change in the Norwegian smoking ban law. The proposal was that it should be forbidden to buy tobacco products for all born after the year 2000. However, there is no political majority for this change, so the association instead demands an age limit of 20 years to buy cigarettes and other tobacco products (Tidsskr Nor Legeforen 2016;20:1778).

Eating habits

The "Keyhole" is a symbol for healthier food and has been used as a common Nordic labelling scheme on food products in Norway, Denmark and Sweden since 2009 (<https://helsenorge.no/other-languages/english/keyhole-healthy-food>). The "Keyhole" is for people who wish a healthier diet and makes it easier to do a healthy food choice. The "Keyhole" is found on the packaging of the food products. All grocery stores in Norway sell products with the Keyhole; it is also found on some food products sold in shops such as kiosks and petrol stations. Compared to other foods of the same type, products with the "Keyhole" comply with one or more of these requirements: more dietary fibre, less saturated fat, less salt and less sugar.

Norway has joined the World Health Organization's global strategy on diet, physical activity and health, and participates actively in the implementation of the global action plan for the prevention and control of non-communicable diseases (NCDs). The objectives of the action plan are a 25% reduction of NCDs such as cancer, cardiovascular disease, type 2 diabetes and chronic obstructive pulmonary disease (COPD) by 2025.

Limiting the population's salt intake is a priority measure to reduce the burden of disease in the world. The Directorate of Health launched in 2014 the action plan salt 2014-18. As a key part of this work, a salt partnership was signed in 2015. The salt partnership is a historic collaboration between the food industry, research and development (R&D) institutions, trade organisations and health authorities. There is evidence for a link between salt intake, blood pressure and risk of cardiovascular disease. High blood pressure is one of the main risk factors for reduced public health, and cardiovascular disease is the most common cause of death in the population. A reduction in population's salt intake could therefore provide significant health benefits.

(<https://www.regjeringen.no/contentassets/638a0ab0f04a42ccb2e4c38e55ffb808/saltstrateqi.pdf?id=2290800> [in Norwegian only])

The Norwegian Scientific Committee for Food Safety is part of a Nordic initiative on maximum amount of sugar in food and drinks. New research supports that reduced intake of sugar has an effect on for example weight gain, development of type 2 diabetes and cardiovascular disease. Based on this new research, the Nordic initiative asks the

European Food Safety Authority to set a maximum limit of sugar amount in food and drinks. (<http://www.english.vkm.no/>)

"Fiskesprell" is a national diet program that aims to promote the consumption of fish and seafood among children and adolescents (<http://www.fiskesprell.no/> [Norwegian only]). All counties receive each year offers from the Directorate of Health to apply for grants for arranging courses for employees in kindergartens, SFO (arrangement for children to be under supervision at school after school hours) and any others who work with children and youth. Competent personnel, both in theory and practical cooking, have proved to be very important to get more seafood into the kindergarten.

The Norwegian Directorate of Health gives dietary advice for anyone needing inspiration and advice in order to take small, healthy steps in everyday life.

(<https://helsenorge.no/kosthold-og-ernaring/tips-til-hverdagsmaten/sma-grep-for-et-sunt-kosthold> [in Norwegian only])

A school food campaign from the Norwegian Health Directorate has the goal to get the students to eat a complete meal during the school day and to communicate directly with the students. (<http://mhfa.no/english/>)

The Directorate of Health gives also recommendations for food and beverage offerings at the workplace, in the canteens and during meetings.

(<https://helsedirektoratet.no/folkehelse/kosthold-og-ernaring/arbeidslivet-anbefalt-mat-og-drikketilbud> [in Norwegian only])

Trans-fatty acids

Legislation against trans-fatty acids was established in 2014 like in Denmark, Island and Austria. Since 2014 it is not allowed to have more than 2g of trans-fatty acids per 100g of fat, independently of what country the food came from.

(www.aftenposten.no/norge/Norge-forbyr-farlig-transfett-92307b.html [Norwegian only]).

Physical activity

In 2016 the National Board for Physical Activity has given proposals for new recommendations to the health authorities. These recommendations include more physical activity for children in school, possibility to get up from the chair from time to time at work (less long-time inactivity), better cooperation between the sports and activity organisations and the communities to improve participation in leisure time activities and establishment of public health centres in every municipality. Next the board suggests better educational training about the preventive effects of physical activity in primary and high school, and among health professionals in college and universities (<https://helsedirektoratet.no/folkehelse/fysisk-aktivitet/anbefalinger-fysisk-aktivitet> [Norwegian only]).

An on-going campaign from the Norwegian Directorate of Health started in 2014 and is still running. This is called "Dine 30" (Yours 30) and indicates that it is enough to train moderately 30 minutes each day to get health effects. A profile on Facebook has been created (www.facebook.com/DineTretti).

In April 2016 the "National Competence Centre Training as Medicine" was established in Trondheim as cooperation between CERG (Cardiac Exercise Research Group) and St. Olav University Hospital. This centre aims at promoting physical activity in Norway (<https://www.ntnu.edu/cerg>).

Stroke prevention

In October 2016 the Norwegian Directorate of Health and the organisation for patients with stroke have started a public campaign about signs of cerebral strokes. The aim of the campaign is to get people with symptoms as early as possible to hospitals for treatment to prevent short- and long-time disability.

LHL has also started a campaign in October 2016 to prevent stroke. This campaign is called "Know your pulse" and is a campaign to educate the population about the symptoms and signs of atrial fibrillation (<https://www.lhl.no/kjenn-pulsen/> [in Norwegian only]).

Projects

Applications for funding

Applications for funding for projects in cardiovascular epidemiology, primary / secondary prevention and rehabilitation are possible to many different actors. Some of the most known are:

- unikard.org
- nasjonalforeningen.no
- heartfailure.no
- extrastiftelsen.no
- nfr.no
- helse-sorost.no / helse-midt.no / helse-vest.no / helse-nord.no
- Erasmus
- Programme of the European Union and other EU funding

Education

Medical students have education in preventive cardiology in all of the universities in Norway. Medical doctors as trainees in internal medicine and cardiology have a course in preventive cardiology.

Medical doctors as trainees in physical medicine and rehabilitation have an obligatory course in rehabilitation in heart and lung diseases.

Physiotherapists may specialise in lung and heart physiotherapy.

Nurses educating for special nurse in cardiology have education both in preventive cardiology and cardiac rehabilitation.

V. Cardiac Rehabilitation (CR)

Cardiac rehabilitation after myocardial infarction has a long tradition in Norway since the late 1950s. In the last 30 years most hospitals in Norway have developed different models of mostly outpatient CR or short time education in heart schools. Many private rehabilitation institutions have inpatient CR programs lasting mostly for three to four weeks (Sæterhaug A. Rehabilitation of Cardiac Patients. Tidsskr Nor Laegeforen 2004; 124(6):806-808).

Usually, CR phase II starts 2-4 weeks after treatment with PCI (with or without an myocardial infarction [MI]) and 6-8 weeks after CABG. After the discharge from hospital, CR takes place in the same or most probably in another (local) hospital, out of hospital, in training facilities, or in private cardiac rehabilitation centers (included in the specialised health care and financed by the Health Authorities). It can be estimated that in 2014 approximately 30% of all patients with MI took part in CR. In addition some patients take part in "heart-schools" in hospitals after discharge; the educational programs last for 2-3 days; these programs are not classified as comprehensive CR. No data are available about adherence to CR or adherence to individual physical activity after the phase II CR. Some uncertain data (50% answers from the available CR centers) suggest that number of dropouts among outpatients varies between 5 to 50% and among inpatients from 0 to 12%, respectively. It is supposed that older people, women, lower economic status and minorities are underrepresented in CR, but no newer data are available (takeheartproject.eu - WP4). There are no data about long-term adherence to CR in the late phase IV (called phase III in Norway) (www.hjerterehab.no).

From the Take Heart Project (2015-2016) it was found that 39 CR facilities are available for phase II-IV in Norway; 14 are identifiable for inpatients and 35 for outpatients. Approximately 65% of the centers are public, and 80% are in the rural areas (mostly out-patient CR in hospitals). The personnel involved in the CR centers vary between in-patient and outpatient centers. The private in-patient centers (belonging to the specialised health service in Norway), financed by the four Health Regions, have to have more than 6 different health professions in their CR programs; the main actors among physicians are cardiologists, internal medicine specialists, sports medicine specialists, physical medicine and rehabilitation specialists together with the other professions as nurses, physiotherapists, occupational therapists, sport scientists, nutrition specialists, psychologists and ergo-therapists. In outpatient CR programs there are mostly part-time physiotherapists and nurses, together with part-time physicians (mostly cardiologists).

Individual referral practice is a long tradition in Norway, which means that it is a physician dependent referral to CR. The physician therefore has an important role to inform about CR, when the patient is discharged from hospital after an acute cardiac event (takeheartproject.eu - WP4).

There is neither a national program for CR nor CR guidelines/recommendations in Norway, but a regularly referred textbook in comprehensive CR (akademika.no/helhetlig-hjerterehabilitering/maeland). There is quite a strong influence of patients association involved in CR (<https://www.lhl.no/>). The Resource Centre for Cardiac Rehabilitation in Health Region South-East has a lot of information and education lectures on their home page both for heart patients and for health professionals (www.hjerterehab.no).

The CR topics are part of the Sport Science School Program and Special courses for nurses and physiotherapists. The major unmet needs in CR are both financial and cultural (referral, unmet need in some groups), and there is also the need for national scientific (best practice) guidelines in CR (including physical activity) in coronary heart disease, heart failure and other cardiac conditions (takeheartproject.eu - WP4).

In 2016 the Norwegian National Cardiac Society established an official "Working Group of Preventive Cardiology, Cardiac Rehabilitation and Sports Cardiology", which aims at improving the status and knowledge of these three topics among politicians, health decision makers, the public, physicians and other health professionals.

VI. The Future

Needs

The goal of the Norwegian Health Authorities (the Health Directorate) is that the life expectancy in Norway must be among the three best in the world. In their annual report from 2015 it is described that everybody should have the same health services, independent of place of residence, diagnosis, socio-economic status, sex and ethnicity. The goal is good health as many years as possible and reduced social health-differences in the population (www.helsedirektoratet.no - Publication: IS-1/2015).

Although there has been a great decline in the numbers of deaths from cardiovascular diseases because of the reduction in risk factors, there is now a concern about the increasing incidence of risk factors as type 2 diabetes, overweight and inactivity.

Possibilities

The Norwegian Coordination Reform between the primary and secondary health services, settled by the government, aims to strengthen the health service in all the communities, including rehabilitation, primary and secondary cardiac prevention. More of the responsibility for good health in the population is supposed to be transferred to the Norwegian communities.

Plans

The main goals in preventive cardiology are to reduce the future burden of increasing risk factors as type 2 diabetes, overweight and inactivity in the population. The Norwegian Medical Association, the Norwegian Association of Cardiology and the Working Group of Preventive Cardiology, Cardiac Rehabilitation and Sports Cardiology will work together with other actors to try to prevent a new increase in cardiovascular disease, because of the new risk factors. New recommendations for primary and secondary prevention will be published in March 2017. The next step has to be national guidelines and recommendations for cardiac rehabilitation together with a national registry in cardiac rehabilitation and secondary cardiac prevention, like they now have in Denmark, Sweden and for phase III in Austria; this will be of great importance to improve the preventive services for the patients.