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IMPLEMENTATION OF ESC GUIDELINES ON CARDIOVASCULAR DISEASE PREVENTION IN CLINICAL PRACTICE ACROSS 13 EUROPEAN COUNTRIES: CHANGES BETWEEN 2011 AND 2021

Report coordinated by A Salzwedel and N Kränkel and produced on behalf of the European Association of Preventive Cardiology (EAPC)

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Implementation of ESC Guidelines on Cardiovascular Disease Prevention in Clinical Practice across 13 European countries: Changes between 2011 and 2021

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Introduction

The ESC Prevention of CVD Programme has been initiated in order to promote effective secondary prevention in patients with high cardiovascular risk. The aim of the programme was to raise awareness for the need of implementing prevention measures and knowledge on cardiovascular risk factors and preventive measures among healthcare professionals.

New guidelines on various aspects of cardiovascular prevention have been published in the recent years,[1–4] based on a growing body of evidence on the cardiovascular benefits of individual prevention measures. Still, a guideline is only as effective as its implementation. Ten years ago, the writing group led by Hannah McGee, reported on the Implementation of the 4th Joint Task Force's Guidelines on Cardiovascular Disease[5] (from here onwards referred to as "*2011 benchmark study*"). The report focused on barriers to implementation (e.g., within the political agendas or within beliefs within the population), pointed out implementation strategies (e.g. tying of refund of expenses to guideline application, set up of multiprofessional teams) and featured national programmes in place. It was based on structured interviews with National CVD Prevention Coordinators and country representatives.

Now, ten years later, we aimed to follow up to what extent the envisaged structural measures have been pursued in these countries, which programmes were successful, and which gaps remain. On one hand, we were interested in official national stakeholder's strategies to reduce the burden of cardiovascular risk factors. On the other hand, we wanted to chart the course of selected cardiovascular risk factors over the years. We followed the parameters mentioned in the *2011 benchmark study* but omitted "nutrition" because of the heterogeneous operationalization in the different sources (see discussion section). Moreover, we chose "sedentarism" instead of the previously used "physical activity" as it consists a risky behaviour in itself and can be represented as % of the population – similar to the other risk factors. Of note, a "sedentary lifestyle" is not the opposite of "physical activity". We intended to use generally accessible sources including the EAPC country of the month reports, national government reports and statistics, as well as laws and orders.

This report summarizes prevention measures implemented in the countries between 2011 and 2021, compares them to the status quo in 2011, and discusses remaining and newly perceived issues. Direct comparison between countries needs to be done with great caution due to differences in the society, health care and political systems, and predominant risk factors. Most importantly, it became clear that the quality of available data and the availability of robust data need to be improved in a concerted effort.

Methodology

This follow up initiative is based on the *2011 benchmark study*[5] documenting the implementation status regarding the 4th JTF Guidelines on the Prevention of Cardiovascular Disease in Clinical Practice in 13 European countries (Estonia, France, Germany, Ireland, Italy, The Netherlands, Norway, Poland, Romania, Russian Federation, Spain, Sweden, United Kingdom). For these countries, we searched for developments after the publication of the previous report regarding guideline implementation in two key areas, namely guideline implementation strategies on the one hand and development of cardiovascular risk factors on the other.

Guideline implementation strategies

First, the country summaries in the *2011 benchmark study*[5] were searched for statements on guideline implementation strategies, policies and health system-related issues. Findings were assigned to the key issues "Status quo 2011: Main factors leading to non-implementation of guidelines / targets for implementation in the first report" and "Plans and actions initiated in/before 2011 to improve guideline implementation".
For status quo 2021, these findings were contrasted with statements on problem solutions or goal achievement in the further course driven by the key questions "Were measures implemented?", "Were they successful?" and "Which problems remain in 2021?".

Prevalence of cardiovascular risk factors

In addition to these qualitative (and at least partially subjective) comments, we extracted country specific prevalence of the cardiovascular risk factors blood pressure, cholesterol, obesity, Diabetes mellitus, smoking behaviour, alcohol misuse, and sedentarism. We compared the prevalence rates in the *2011 benchmark study*[5] with data from 2015 and later as positive changes may indicate a progress in the implementation of CVD prevention guidelines.

Data sources

Generally, the *2011 benchmark study*[5] was used to extract baseline data for both the qualitative statements regarding guideline implementation strategies and cardiovascular risk factor prevalence. It should be noted that the cited report serves as a secondary data source. It includes data from several primary sources with different time frames and elicitation methods (e.g., federal statistics, national surveys, epidemiological studies, cohort observations, model estimates). To ensure a minimum comparability, the follow up data were taken from methodically identic sources if available (for example governmental

statistical data). To identify both risk factor prevalence data sources and statements regarding guideline implementation strategies, we used predominantly the most recent country reports within the framework of the European Association of Preventive Cardiology (EAPC) "Prevention in your country" initiative[6] and World Health Organization (WHO) provided data. After data extraction, the findings were presented to the National Coordinators for review and revision. In principle, a review of at least three authors was carried out for each country.

Data presentation

In this report, the data are presented comparatively. Differentiated country summaries are included in the appendix. Each one consists of a thematic text on strategies to reduce the burden of cardiovascular risk factors. In a second part, selected risk factors are contrasted in bar charts for the periods before 2011 and 2015-2020. These summaries also include a list of the data sources used for each country.

Results

Structural and legislative actions

Countries differed in their governmental approach to prevention strategies. A number of countries had already implemented National Programmes before 2011, including Estonia, France and Romania. The Netherlands, France, Poland and Spain introduced National Strategies or Programmes on (cardiovascular) prevention in or after 2011. Other countries did not enact national strategies, but rather passed individual laws, e.g. banning smoking in public places and tobacco advertising. These legal means are implemented at various levels, spanning from relatively weak control mechanisms in Germany, where billboard advertising of tobacco products was still possible until the end of 2021, to the UK where smoking in a car with children present is illegal.[7,8] Cardiovascular public health issues other than smoking which is being targeted by legislative means is the consumption of sugar-sweetened beverages. Norway has a "Sugar Tax" since 1981, temporarily overlapping with a specific tax on chocolate and sweets (1922-2021). Finland, Estonia, France, Ireland, the United Kingdom, Spain and Poland followed between 2011 and 2021.[9–15]

Russia and Italy implemented health care system structures and screening procedures on governmental level. Major obstacles in the national parliaments are the need for the taxes coming from tobacco and alcohol sales and a much more "motivated" lobbying by tobacco/alcohol/food industries than by health care experts or patient organisations. A lacking political will to implement necessary legal and structural measures to effectively implement prevention measures as recommended by the guidelines has already been

stated in the *2011 benchmark study*. As pointed out in the 2011 report, the activities of a few well- connected individuals, including the national coordinator, are crucial to initiate and push implementation measures with policy makers as well as professional societies and increase public awareness, much more so through social media in recent years.
In a number of countries, stakeholders (e.g., regional or central government, ministries of health) invested in health care structure, including the establishment of prevention units or centres (Spain, Norway, Estonia) and screening infrastructure (Estonia, Ireland, Norway, Romania, Russian Federation). Cardiac rehabilitation services are supported by new programmes in Poland and Ireland, including reimbursement of costs. Stronger collaboration across sectors is encouraged by specific programmes in Spain and Norway.
First analyses of the measures implemented before or around 2011 have led to the development of new concepts to improve effectivity of measures performing below expectations (e.g., screening, exercise prescription and smoking cessation in Norway). Inequality issues of access to health care represent an ongoing problem. While some countries (Estonia, Italy) have initiated programmes to diminish access equalities – mainly in rural areas – those are only discussed in the UK and other countries so far. Health literacy also shows inequalities in most countries, especially in rural areas versus cities and in migrant communities.

Financial measures/reimbursement

Cardiac rehabilitation and personal prevention measures, including smoking cessation courses/nicotine replacement therapy and membership in sports club as well as screening visits, are reimbursed in most countries – to the patient and/or to the physician. Only few countries, including Romania, do still not refinance cardiac rehabilitation. Exercise prescription has been introduced long before the 2011 report in a number of European countries, including the UK, Sweden, Norway, The Netherlands, Germany and Spain. However, programmes differ in terms of patient eligibility, refund (only to the patient or also to the physician, often only partial refund, number of sessions refunded). Hence, development of acceptance varies between countries, linked to accessibility and refund.[16–18]

Medical education

Specialization courses in Preventive Cardiology are offered in Germany and Italy. Prevention of cardiovascular diseases and cardiac rehabilitation are part of cardiology training, but it is not universally included in medical students' curricula in the countries we assessed. Virtually all national cardiac societies provide sessions or courses on

cardiovascular prevention during their national, or specialty conferences. Guidelines have been either translated or National Prevention Guidelines have been created and are disseminated at national congresses or sent directly to physicians in most countries, including Germany, Italy, Norway, Poland, Romania, the Russian Federation and Spain.
Public information campaigns are used widely, addressing mainly smoking cessation, but also physical activity and nutrition. In most countries, campaigns are conducted by national cardiac societies and other societies with health focus, but also by health ministries (Romania, Russian Federation), cities/regions (Germany, Italy) and sportswear industry or health insurance companies (Germany).

Development of risk factors

Implementation of large-scale measures such as smoking bans has shown effects with decreasing smoking rates[19] and smoking-associated deaths and hospitalisations.
Prevalence of high blood pressure has seen a reduction within the last 5-10 years in almost all countries with available data, potentially due to better compliance with guidelines in the prescription of anti-hypertensive medication. Lack of available data on total cholesterol or more precise lipid measures preclude any interpretation.
Obesity rates increase across Europe and the world, thus representing a change of the risk factor profile and call for adjusted prevention implementation strategies. Despite decades of information campaigns, sedentary behaviour and “Western” diet are still perceived as private lifestyle concept in large parts of the society, not as a society-wide threat. In addition, evolutionary conserved behavioural patterns to avoid negative calorie balance at all costs and even aim for calorie surplus whenever possible are hard to break by the individual. Effects of the “Sugar Tax” implemented in some countries in some form, are yet unclear. Short time spans since implementation are often claimed. Another reason might lie in the complexity of nutritional patterns, with sugar-sweetened beverages, usually the product actually taxed, only constituting one type of high-caloric foodstuffs among many. In addition, the effects of replacement sweeteners, such as fructose, also increase obesity and the development of metabolic syndrome.[20,21] Prescription schemes for physical activity have existed? for decades in most countries, albeit in very heterogeneous form and with less-than-optimal success, as discussed above.[22,23] The WHO has issued strong recommendations towards national governments to “make the promotion of physical activity the norm” and to integrate referral as early as possible, preferentially at the primary care level, into standard practice.[24]
It needs to be pointed out that combating sedentarism is confronted with different obstacles than increasing physical activity in people who are already physically active and

is challenged by the same ingrained behavioural trait to conserve energy balance. Concerted efforts of multi-sectoral alliances, including public education, policymaking (incl. public transport), employers and general practitioners, together with patient organisations and public media are required. It is to be assumed that countries who have already initiated such alliances in other contexts will be better equipped to apply them on the "sedentarism" problem.

Table 1: Changes in prevalence of individual cardiovascular risk factors between the 2011 report and follow up data [2015-2020]

	BP	Cholesterol	Obesity	Diabetes	Smoking	Sedentarism	Alcohol
Estonia	n/a	n/a	↗	n/a	↘ (M) = (F)	n/a	n/a
France	↘	n/a	= (M) (↘) (F)	n/a	↘	n/a	n/a
Germany	↘	n/a	↗ (M) (↗) (F)	n/a	↘ (M) (↘) (F)	n/a	n/a
Ireland	↘	n/a	(↗)	↗ (M) (↗) (F)	↘	(↗) (M) ↗ (F)	n/a
Italy	↘	n/a	↘	↘	↗ (M) = (F)	↗ (M) (↗) (F)	n/a
The Netherlands	↘	↘ (M) (↘) (F)	(↗) (M) ↗ (F)	n/a	↘	n/a	n/a
Norway	n/a	n/a	↗	n/a	↘	n/a	=
Poland	↘	n/a	↗	n/a	↘	n/a	n/a
Romania	(↘) (M) (↗) (F)	n/a	↗	n/a*	n/a*	n/a	n/a
Russian Federation	↗ (M) (↘) (F)	↘ (M) (↗) (F)	↗	n/a*	↘ (M) = (F)	n/a	n/a
Spain	↘	n/a	↗	↘ (M) (↘) (F)	↘ (M) (↗) (F)	n/a	n/a
Sweden	↗ (M) ↘ (F)	n/a	↗	n/a	↗ (M) = (F)	n/a	n/a
United Kingdom	(↘)	↘	↗	= (M) (↗) (F)	↘	n/a	n/a

M – male; F – female; n/a – not applicable (no comparable data sources for both baseline and follow up data were available). Arrows in brackets – differences 1-3%-points; = – differences <1%. Data sources are cited and listed in the appended country summaries. *No gender-specific data available for both time points. Comparability of pre/post-data sources presented in cells shaded in orange – unlikely; yellow – not clear; green – high.

Limitations and considerations

Data availability, comparability and quality

A number of limitations underlie the interpretations presented in this report, foremost the availability, accessibility and quality of data on risk factor development which allow comparison to the 2011 report, as well as between countries. We included source data from official national sources, such as government statistical offices or national surveys. If those were not available or accessible, we used WHO data. As a third option, we included further representative data like national surveys or epidemiological studies.

In order to improve comparability, we preferred the same data source/programme as was used in the 2011 report, if available for the time period 2015-2021. With this approach, a lack of continuous data over time became evident. Some countries did have nationwide registries before 2015 (e.g. the WOBAZS programme in Poland), which have been discontinued.

Often, original data are older than is apparent from the publication or database (as for BP data in Germany "before 2011" which were published in an official report from 2006 but are actually from the 1998), covering a lack of robust data for many risk factors. Robust and comparable data for cholesterol were available in only three and for diabetes in only four of the countries covered in this report.

Finally, data are rarely comparable between countries as data acquisition was not concerted and did not follow standards agreed upon between countries.

The availability of robust and timely data is paramount to informed decision making by policy makers and expert groups. Several countries provide population data via accessible databases provided their ministry of health or statistical offices (e.g., The Netherlands, Norway, Germany). Upon closer examination, however, in some cases, these data are re-cited from older sources, and it is difficult or not possible anymore to access the original database. Especially when aiming to investigate the impact of policies upon health trends in a time-dependent manner, even data from official sources therefore need to be critically examined.

The World Health Organisation provides a wealth of information. However, those data are also limited to the data the WHO receives from the individual countries and underlie the same limitations as described above. Data are not necessarily directly comparable between countries. In some cases, WHO data are estimates, not actually assessed data. This problem aggravates, as methods for data collection are often not described in detail on the WHO website together with the data and can only be found with considerable enquiry effort. These data can therefore not be considered primary data and caution applicable to

secondary data sources needs to be applied when interpreting them. The same applies for data obtained from "ESC cardiovascular realities".

While initiatives such as the EURObservational Research Programme (EORP) and EuroASPIRE help to fill individual gaps, concerted efforts of multinational expert groups are required to improve data quality and comparability. Of particular importance are international registries that systematically document relevant cardiovascular risk factors as well as treatment strategies according to a predefined methodology. Such databases would also ensure timely updating based on the respective evidence base.

Individual parameters

We have provided a synopsis of changes in individual cardiovascular risk factor in graphical form for each country (Annex). In addition, we provide a summary table of changes (Table 1). In contrast to the 2011 report, we have decided to omit comparisons regarding dietary behaviour, which cannot be reflected in a single, comparable parameter, and we have exchanged "physical activity" with "sedentary behaviour" as this reflects an adverse behaviour represented in a single factor associated with increased cardiovascular risk.

During the time frame covered by this report, guideline changes[4] and new scientific information regarding cardiovascular risk associated e.g. with individual nutritional parameters or individual plasma lipids have affected the interpretation of data. As data on sedentary behaviour have not been collected for long, no reference data for 2011 are available. There is a strong association of sedentary behaviour with cardiovascular risk[25] together with the difficulty of obtaining robust and comprehensive data defining "physical activity" as a continuum. There is a gap for persons physically active, but below target values recommended by the guidelines. Those people are not "sedentary", but physically active on a lower-than-recommended level.

The field of nutrition was included in the 2011 report. However, large studies in the recent years have underlined the complexity of "healthy" diet, precluding the assessment of just one single meaningful value representing "nutritional risk". Measures such as „g of meat per day" are largely unreliable predictors of CV risk.[26,27] Instead, several components of "nutrition" in combination account for increased cardiovascular risk.[28,29]

Alcohol consumption has been included due to cardiotoxic effects of alcohol. The units of measurement often differed. We used measures available in litres per year per person provided by the WHO, albeit no data are available for 2005-2011.

Conclusion

In conclusion, the strength of will on government level to tackle cardiovascular risk at a population level differs between countries and over time. Public awareness for cancers is often greater than for cardiovascular diseases. In some countries, cultural and society conditions support the implementation of guidelines. Elsewhere, setbacks were observed when policies and measures did not work well in their implemented form (e.g. “green prescription”) or when resources are lacking. Many countries struggle to balance financial interests of lobby groups with population health, and great efforts and long time frames were required e.g. for the implementation of smoking ban and sugar tax. Political discourse often softens down measures to lower effectiveness by the time they are enacted. Solid and timely data on cardiovascular risk factors and health behaviours, the basis of informed decision making, are often lacking. Data are fragmentary or outdated, or excellent programmes have been discontinued. Solid and timely data on cardiovascular risk factors and health behaviours, the basis of informed decision making, are often lacking. While cardiovascular risk factors that can be tackled pharmacologically, such as hypertension, have declined Europe-wide, obesity and sedentary behaviour remain a problem. This is aggravated by the recent COVID-19 pandemic and associated lockdowns. As already stated in the 2011 benchmark study, new concepts and activation of inter-sectoral cooperation will be required to tackle these problems, which require involvement of the society to a much greater degree than only “screening and prescription” approaches.

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Authorship - contributions

Manuscript concepting and drafting, critical data analysis: AS, NK. Data acquisition and country report drafting: Marc Abela (Italy, Spain), Abraham Babu (Norway, Estonia), Marwa Hemmat Gaber (Germany), Oksana Kopylova (Romania, Russian Federation), Martijn Scherrenberg (France, The Netherlands), Elad Shemesh (United Kingdom, Ireland), Daniel Sliz (Poland, Sweden). Manuscript revision and approval: all.

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Appendix: Country reports

The Appendix summarizes the main points of the *2011 benchmark study*: the status of guideline implementation and main obstacles for non-implementation, as well as actions initiated or planned at that time to improve guideline implementation. In a third chapter we analyse for each country whether the planned actions were realized or not, discuss reasons for non-enactment and report on results of actions taken. Developments of selected cardiovascular risk factors are charted in the second part of each country report. The extraordinary heterogeneity of the available sources (see methods section) should be mentioned here. Resulting, a systematic literature search was not feasible, so we make no claim to completeness of the information provided.

Estonia

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

The 2011 report summarized factors responsible for the non-implementation of guidelines as patient related factors, manpower related factors and healthcare level related factors. Patient factors were associated with low socioeconomic status, educational level and professional responsibility. Among the manpower related factors were the lack of awareness, limited availability of automatic referral systems, lack of incentives for the promotion of preventive interventions and a prohibitive reimbursement system for work in prevention. At the healthcare level, relevant factors included lack of a preventive culture and lack of availability of specialised centres for prevention. Poor reimbursement policies and lack of governance and legislation were also potential factors.[1]

Plans and actions initiated in/before 2011 to improve guideline implementation

The *2011 benchmark study* had found a gradual improvement in cardiovascular health through a coordinated effort from various Government departments resulting in the development of the heart health strategy.[1] This strategy was implemented to reduce cardiovascular risk and mortality for high risk individuals.[2] Additionally, cardiovascular prevention units have been set up that help high-risk individuals who are referred to trained staff at these centers.[1] The care for high-risk individuals has been supported by general physicians who have been a part of a bonus point program that has been established since 2006.[1]

The *2011 benchmark study* identified primary implementation targets focused on improving physical activity, Nutrition, Smoking and Health care.[1] In addition, they worked towards disseminating the information through various strategies while also aiming to develop multi-disciplinary alliances with the final goal to improve the average life expectancy. They are aimed to implement the 5th JTF recommendations as the national guidelines.

Estonia has enacted a National Strategy for Prevention of Cardiovascular Diseases 2005–2020 with the main goal “to reduce CVD mortality in men aged <65 years by 40% and in women aged <65 years by 30%.”[3]

They have set up various strategies which include the creation of various national plans to enhance the delivery of cardiac rehabilitation and implementation of the ESC guidelines. The Government has established state run smoking cessation clinics to help curb the

burden of smoking.[1] They also established a network of cardiovascular prevention units (one unit per district) staffed by cardiologists and other healthcare professionals to deliver care for high risk patients and to implement secondary prevention.[1] They have also started a Nationwide audit to identify how well the general practitioners are following up those with hypertension and how they are implementing screening for cardiovascular risk factors. Since 2006, the Government has also initiated a bonus system to encourage general physicians to achieve health targets through prevention of cardiovascular disease.[1] By 2008, it was seen that almost 80% of all physicians were a part of this program.[1]
Improvement in healthcare has been a focus and the 2014 Country report showed that Estonia increased acute care hospitals, as comparable to the rest of the EU with 10 cardiologists available per 100,000 population.[4] Furthermore, in 2011, insurance coverage for prevention activities (including medication and cardiac rehabilitation) were implemented.[4] Even though cardiac rehabilitation is partially reimbursed, the availability and quality of it being provided remains a serious concern.

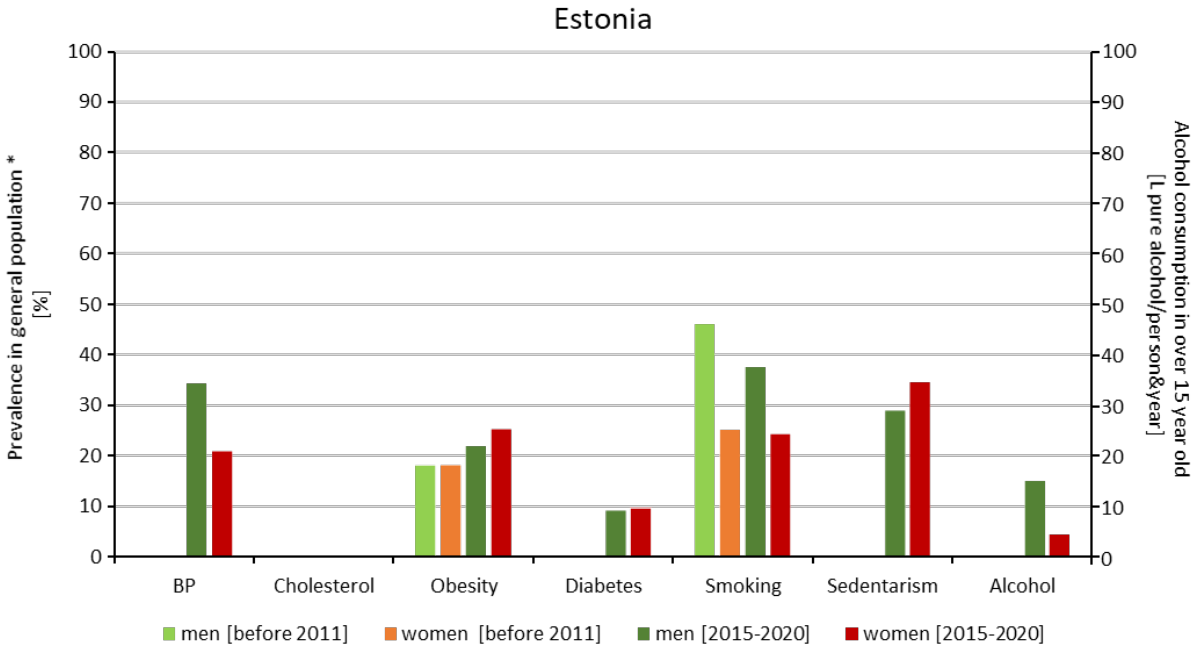
Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

The main plan highlighted in the *2011 benchmark study* revolved around the National Strategy for Prevention of Cardiovascular Diseases 2005–2020. This has been implemented through the years and has resulted in the main goal of the CVD reduction strategy being achieved. CVD mortality was reduced by 50% in the total population.[5] A recent release from the 2020 survey of the health behaviour by the Institute of Health Department found that there was a reduction in smoking by 8% over 10 years (1990-2020).[6] Despite the apparent reductions over a 10 year period, the two-year change from 2018 is not much and therefore, as mentioned in the National Institute for Health Development (2018) report, alcohol and tobacco continue to be a major health concern.[6]
The 2017 country health profile saw a sharp reduction in cardiovascular related mortality albeit with a rise in obesity and risky behaviours (i.e. smoking and binge drinking). Unhealthy lifestyle does not appear to have changed much over the years, despite policies coming about between 2006 and 2017 to curb smoking, drinking and obesity. However, this could be too early to observe any changes from these policies (i.e. smoking bans, the 'sober and healthier' program and sugar tax). Challenges exist in access to health care and healthcare systems, all of which could contribute to the delivery of CV health. In 2021, Estonia is on the right path to CVD prevention, but still has a long way to go before a larger effect of success can be observed.

Development of risk factors

Authoritative data for both baseline and follow up data were present only for obesity and smoking, while no data at all were available for cholesterol. Generally, no directly comparable data sources (same publisher) for the time frames "before 2011" and "2015-2020" were found.



* Age groups differ between risk factors and countries. The following age groups apply: BP: > 18 years; obesity: before 2011: > 16 years, 2015-2020: > 19 years; diabetes: > 30 years; smoking: 16-74 years; sedentarism: > 18 years; alcohol: >15 years

Data sources

Blood pressure: 2015, WHO.[7] Obesity: 2008-2009, National Institute for Health Development,[8] Estonia; 2016, WHO.[9] Diabetes: 2016, WHO.[10] Sedentarism: 2016, WHO.[11] Smoking: 2008-2009, National Institute for Health Development, Estonia;[8] 2020, WHO.[12] Alcohol: 2016-2018, WHO.[13]

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France

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

Several challenges for the implementation of the prevention guidelines were stated in the *2011 benchmark study*:

Industry interests:[1]

- Doubt over political will to promote smoking cessation because of revenue from tobacco tax
- Struggles to improve public nutrition because food industry resists interference of the government
- Patient and physician beliefs:1
- Neither doctors nor the general public regard prevention as a priority because France have lowest death rate for cardiovascular disease in Europe (France Paradox)
- Doctors (especially cardiologists) are not prepared and/or have time to promote smoking cessation

Guidelines:[1]

- Guidelines are too long for general practitioners
- Low guideline literacy
- High costs of dissemination and translation of guidelines
- SCORE Risk Calculator[1]
- Low use in clinical practice
- Informing about risk of dying makes patients anxious
- Not personalised
- Overestimates risk for French population
- Not working for younger patients with multiple risk factors
- Refers only to death and not major adverse cardiovascular events

Plans and actions initiated in/before 2011 to improve guideline implementation

Multiple actions were initiated before 2011 in France to improve guideline implementation. First of all, the Programme National Nutrition Santé (PNNS) (National Nutrition Health Programme), was launched in 2001 with the aim of improving the general health of the population through better nutrition. The first phase ran until 2005 and a

second phase (PNNS 2) ran from 2006 to 2010. The programme set nine nutritional goals, five of which were related to diet (fruit and vegetables, calcium and vitamin D, fat intake, carbohydrate and fibre, and alcohol), one concerned daily physical activity, and three involved nutritional markers (serum cholesterol, BP, and BMI). The PNNS is considered to be an exceptionally well-designed and well-implemented strategy both in France and among international experts. The programme has been extended for a second time, and PNNS 3 will run from 2011 to 2015. A nice example is the fact that salt in bread was substantially reduced over the past 10 years, despite much resistance from bread-makers. The decrease has not been widely publicised as the public might not respond positively to it.[1]

Secondly, the general scheme of the national insurance fund (covering 89% of the population) launched a cardiovascular prevention campaign for its members in the summer of 2010. Initially, men aged 35, 40 and 45 years and women aged 45, 50 and 55 years who do not already have a long-term illness have been contacted by post with information on cardiovascular risk and how to reduce it. A second mailing will contact older men (50–65 years) and women (60–75 years) when they are reimbursed for having their cholesterol measured (this does not include members who are already receiving cholesterol treatment) with the same information.[1]

Lastly, the ban on smoking in public places has been implemented strictly in 2007. Still, in 2011 the provision of smoking cessation assistance was thought to be insufficient. A helpline to assist in smoking cessation is operational, and national insurance will reimburse a patient for nicotine replacement therapy.[1]

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

The PNNS programme was extended for a third time, and PNNS 3 ran from 2011 to 2015. In 2019, an updated version 2019-2023 (PNNS 4) was recently started. Interestingly, the focus of PNNS 4 is broader and does not only focus on nutrition but the programme has also increased attention for physical activity promotion and the role of social initiatives to promote prevention. Furthermore, since 2011 health politics in France changed. There is an increased focus on prevention with more campaigns for healthy nutrition, the adoption of the Nutri-Score and stricter smoking rules (forbidden in public parks). A specific plan to reduce smoking (Programme National de Lutte Contre le Tabac 2018-2022) has been introduced) with the aim to reduce smoking in adults but also in adolescents. By 2032,

children born since 2014 are envisioned to become the first generation of non-smoking adults.[2]

A report of WHO in 2017 mentions that although France has lower incidence of CVD, the control of risk factors is not better than in many other European countries. Alcohol consumption and smoking remains high however it is lower than 20 years ago.[3]

Risk factor control in France is a little bit better in comparison with the 2011 CVD Prevention Guideline Implementation Report and the country report in 2016.[1,4] One of the main focuses of the Ministry of Health was smoking cessation. Multiple programmes were launched, and it seems that these programmes were successful. Furthermore, nutrition was also one of the key goals of the PNNS launched in 2001. The nutriscore is offered for food, but it is not mandatory. The latest reports seem to demonstrate a lower prevalence of dyslipidaemia and a lower percentage of the daily intake is derived from fat. However, the prevalence of overweight and obesity increased since the previous report. Furthermore, guideline-based physical activity in men increased but decreased in women. Some programs of healthy by sports are implemented and partially reimbursed. On the other hand, blood pressure control improved in women but was worse in men in comparison to the 2011 CVD Prevention Guideline Implementation Report.[1]

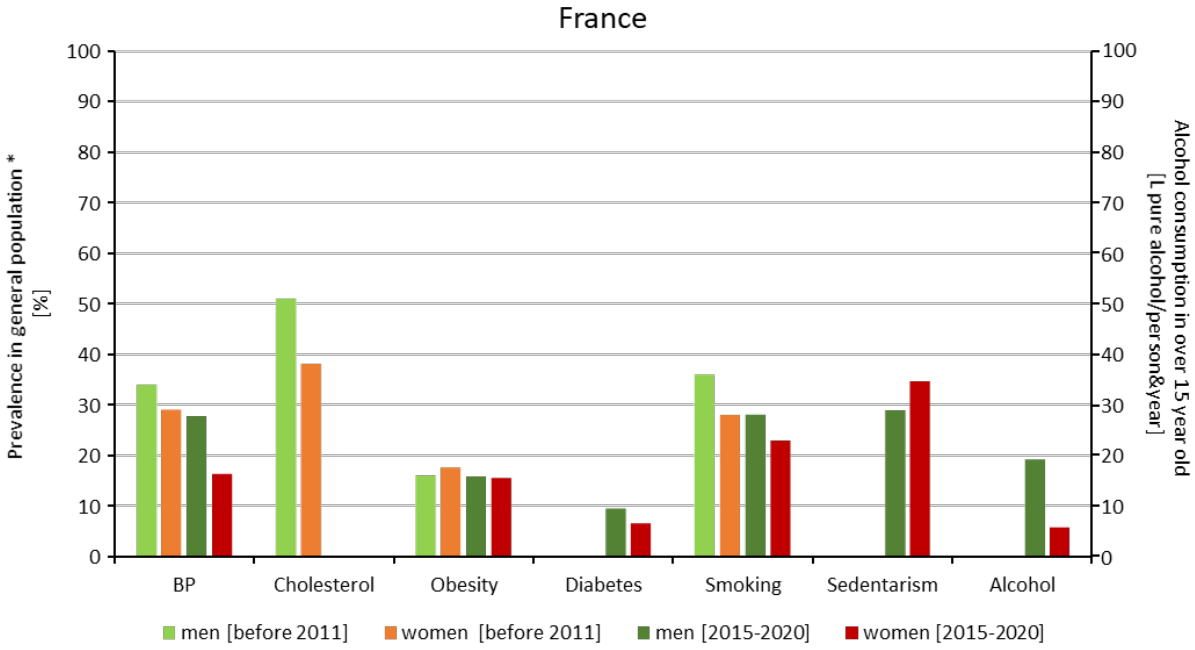
The main problems for implementation of the prevention guidelines in 2021 are:

Patient and physician beliefs: Physicians and patients in France are well aware about the role of cardiovascular prevention in health care. However, several barriers exist for the implementation of guideline-based prevention in France. A key problem for prevention implementation is reaching patients with lower socio-economic status. At the level of the physician different barriers exist. First of all, some doctors still belief in 'the French paradox' –that despite high intake of saturated fat and red wine, coronary heart disease mortality rates are low. Furthermore, there is a significant geographic gradient between the north and south of France. Lastly, a key barrier at the physician level is that they are often concerned of the amount of time it will take and the costs involved in starting prevention initiatives in patients.

Guidelines: A barrier for the implantation of guideline-based prevention is that many GPs consider the guidelines as too long because they manage many conditions. Another barrier is that the cost is quite high to translate and disseminate the guidelines to all medical doctors in France.

Development of risk factors

Authoritative data for both baseline and follow up data were present only for blood pressure, obesity and smoking. Generally, no directly comparable data sources (same publisher) for the time frames “before 2011” and “2015-2020” were found.



* Age groups differ between risk factors and countries. The following age groups apply: BP: 18-74 years and 20-70 years, respectively; cholesterol: 18-74 years; obesity: 18-74 years; diabetes: > 30 years; smoking: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2006, Unité de surveillance et d'épidémiologie nutritionnelle;[5] 2015, WHO.[6] Cholesterol: 2006, Unité de surveillance et d'épidémiologie nutritionnelle.[5] Obesity: 2006, Unité de surveillance et d'épidémiologie nutritionnelle;[5] 2019, Ministère des Solidarités et de la Santé.[7] Diabetes: 2016, WHO.[8] Sedentarism: 2016, WHO.[9] Smoking: 2010, 2019, Ministère des Solidarités et de la Santé.[10] Alcohol: 2016-2018, WHO[11]

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Germany

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

Implementation of guidelines in Germany has been seen to be impeded by a number of structural factors in 2011, including an apparent disinterest of the government for prevention implementation.[1] This is reflected by the fact that reimbursement of doctors for engaging in prevention activities was limited. An agenda for prevention and the early detection of disease had been formulated but no steps had been taken for its realisation.[1] Lobbying from business and public income from taxes, e.g. on tobacco, were seen as a problem preventing the strict implementation of preventive measures, such as a strict smoking ban in restaurants.

In addition, a lack of screening programmes for CVD is noted, although regular monitoring of cardiovascular risk factors such as blood pressure is considered mandatory and is therefore part of the government's health agenda.[1] The low number of physicians training/specialising in preventive cardiology has been named as an additional structural problem. Moreover, on a more "philosophical" level, health insurance companies regarded prevention as an individual responsibility and did not pay for it.

On the positive side, the German guidelines recommended measures to reduce the risk associated with each risk factor. The recommendations were addressed to politicians and policy-makers.[2]

Plans and actions initiated in/before 2011 to improve guideline implementation

According to the *2011 benchmark study*,[1] it was intended to revise the smoking restrictions in public places. Physical activity is mainly encouraged by individual health insurance companies, employers, municipalities and other stakeholders in local actions and events, but not in a structured way by the government.

Using a colour code classification (Nutri-Score) demonstrating energy content and healthy and not healthy ingredients was added to the food products as unhealthy eating habits and lack of physical activity are the major contributors to the increasing rate of obese people in Germany, particularly among adolescents.

The German Society for Cardiovascular Prevention and Rehabilitation (DGPR) had intended to set up a certified specialization course on preventive cardiology ("Kardiovaskulärer Präventivmediziner").[3]

Status quo 2021

Were measures implemented? Where they successful?

Germany is the only EU country that allows the advertisement of tobacco products in public places as well as low taxes on tobacco products and smoking in public places. A new information campaign by the Federal Centre for Health Education targets smoking cessation on long-standing smokers.[4]

It is felt that the number of campaigns and events to promote a physically active lifestyle increase, but those are still initiatives of individual organizers (health insurance, cities, sportswear industry).

A number of personal prevention measures (regular check-ups, gym membership) is reimbursed to the patient by health insurances,[5] however, this differs between insurance companies. This correlates to the 2015 implementation of German Prevention Act, that focus on an enhancement of prevention-regarded expenditures by health insurances.[6]

In addition to the specialization course on preventive cardiology (DGPR), the German Cardiac Society (DGK)[7] now provide continued medical education and a second specialization course on preventive cardiology in Germany.[8] The number of health care professionals working in cardiovascular prevention and rehabilitation increased.[9]

Remaining problems in 2021

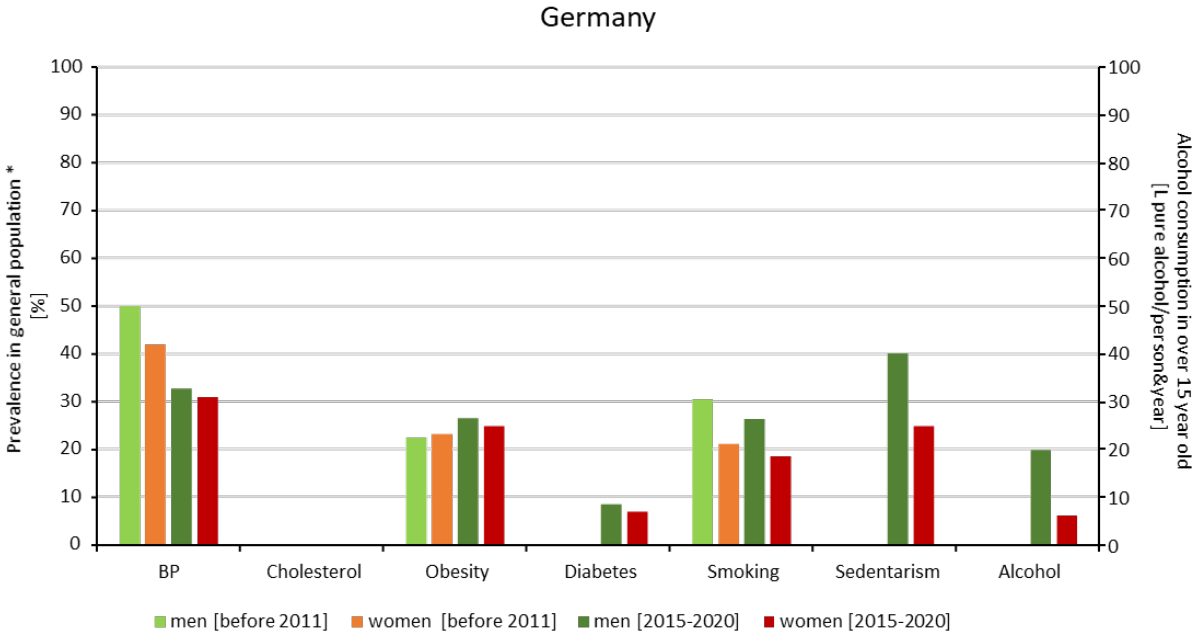
A number of structural problems remain, including the better implementation of anti-smoking regulations like complete ban on tobacco advertisement.[10]

The level of physical activity in the general population is still low and is felt to have dramatically decreased during the COVID-related lockdown(s) in 2020 & 2021, especially among children.[11] On a similar note, eating habits are considered still poor, albeit public awareness has improved somewhat and school/company cantines have in some places included a vegetarian meal/vegetarian day.[12]

Pharmacotherapy in CVD patients is not yet generally implemented according to the current guidelines.[13,14] The DGK promotes improved implementation of recent guidelines during its conferences and academy courses.[7]

Development of risk factors

Authoritative data for both baseline and follow up data were present only for blood pressure, obesity and smoking, while no data at all were available for cholesterol. Generally, no directly comparable data sources (same publisher) for the time frames "before 2011" and "2015-2020" were found.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: 18-79 years, 2015-2021: > 18 years, obesity: before 2011: > 18 years, 2015-2020: > 20 years; diabetes: > 30 years; smoking: before 2011: > 15years, 2015-2020: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 1998, National Health Interview and Examination Survey, Robert Koch Institute;[15] 2015, Federal Health Reporting at the Robert Koch Institute.[16] Obesity: 2002, Gesundheitsmonitor der Bertelsmann Stiftung (survey of the Bertelsmann Foundation);[17] 2016, WHO.[18] Diabetes: 2016, WHO.[19] Sedentarism: 2016, WHO.[20] Smoking: 2009, 2017, Federal Statistical Office Microcensus.[21] Alcohol: 2016-2018, WHO.[22]

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Ireland

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

The *2011 benchmark study* indicates that while it was generally agreed that adherence to guidelines was important, the real-world experience demonstrated that implementation was partial. Mainly, no formal system to support such process was established. Furthermore, concerns were raised regarding how much clinicians will 'pick up' the guidelines and adhere to them. Other reasons for the partial implementation process included guideline "fatigue" (too many existing guidelines, at times potentially conflicting for the clinician), lack of focus on prevention from both policy-makers as well as physicians, as well as inadequate outcomes monitoring.[1]

Plans and actions initiated in/before 2011 to improve guideline implementation

Several plans and actions initiated in/before 2011 to improve guideline implementation were created. These included designated programs such as:

- **Heartwatch** – a program which established in 2003,[2] focusing on secondary structured prevention in primary-care settings. This program is the product of collaboration between several bodies, including the Department of Health & Children, the national health boards, the Irish college of General Practitioners, and the Irish heart foundation. The program provided eligible patients and treating general practitioners a schedule of four visit per annum and details of the risk factors to be measures with target levels of control to be achieved.[3,4]
- **Cardiac rehabilitation services across the country** – According to the implementation of the 4th JTF guidelines report, many cardiac rehabilitation services were launched between 1998-2005.[1] The cardiac rehabilitation service in Ireland is provided by cardiovascular departments and general hospitals according to the 'EAPC country of the month report' from 2014, stating that virtually all cardiovascular departments offer such service, in outpatient settings.[5] It is provided by a multi-disciplinary team consisting physicians, nurse specialists, physiotherapists, dieticians, social workers and at times even a clinical psychologist. Programs include advice on exercise, behavioural changes, lifestyle and risk factor management. Participation of family members is strongly encouraged. Usually, rehabilitation is provided over 8 to 12 weeks.[5']

- **"Tobacco free Ireland"** – a policy document launched in 2013 to reduce smoking rates. It was developed by the Irish department of health. The aim of the program is to "take responsibility and systematically drive policy priorities in the area of tobacco control". This is achieved by monitoring tobacco use and prevention policies, offering help to quit tobacco use, warn about dangers of tobacco, and recommend the relevant bodies about tax raise on tobacco products and enforce bans on tobacco advertising and promotion. In 2004, a workplace smoking ban was introduced.

  One can assume that the tobacco free Ireland initiative has positive impact over smoking rates till date, as Ireland has a successful record in tobacco control and is regarded internationally as a leader in this area. The Tobacco Control Scale 2010 in Europe, published in March 2011, ranks Ireland second out of 30 European countries in terms of tobacco control.[6]
- **Physical activity guidelines published in 2009** – the health service executive and the department of health and children in Ireland have produced the national guidelines on physical activity for Ireland in 2009, in order to support the promotion of physical activity across different groups. The guidelines strive to emphasize the importance of active lifestyle to all Irish citizens and to outline recommendations for different age groups and to those with physical disabilities. The guidelines also include national policies in terms of education, sports, transportation, etc.[7]
- **Salt reduction initiatives** – the food safety authority of Ireland (FSAI) began working in 2003 with food industries personnel (manufacturers, retailers, caterers, etc.) to achieve gradual reduction in salt content of processed and prepared foods. The long-term goal was to reduce the average population intake of salt from 10 grams per day to 6 grams per day by 2010.[8] The salt reduction initiative included the introduction of food labelling in 2006, support of scientific working groups, etc.

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

The Heartwatch program led to significant changes in cardiometabolic risk factors, including an increase in diabetes detection, a statistically significant decrease in blood pressure values at 2 years, reduction in cholesterol levels, reduction in smoking rates, and increase in the uptake of relevant medications.[9] Due to financial reasons, the Heartwatch program has not progressed beyond the pilot phase.[1,2]

The salt reduction initiative resulted in a decreased mean daily/intake from processed foods by 1.1 grams according to a report published in 2013. The ambitious goal of 6 grams of salt per day was not achieved.[10]

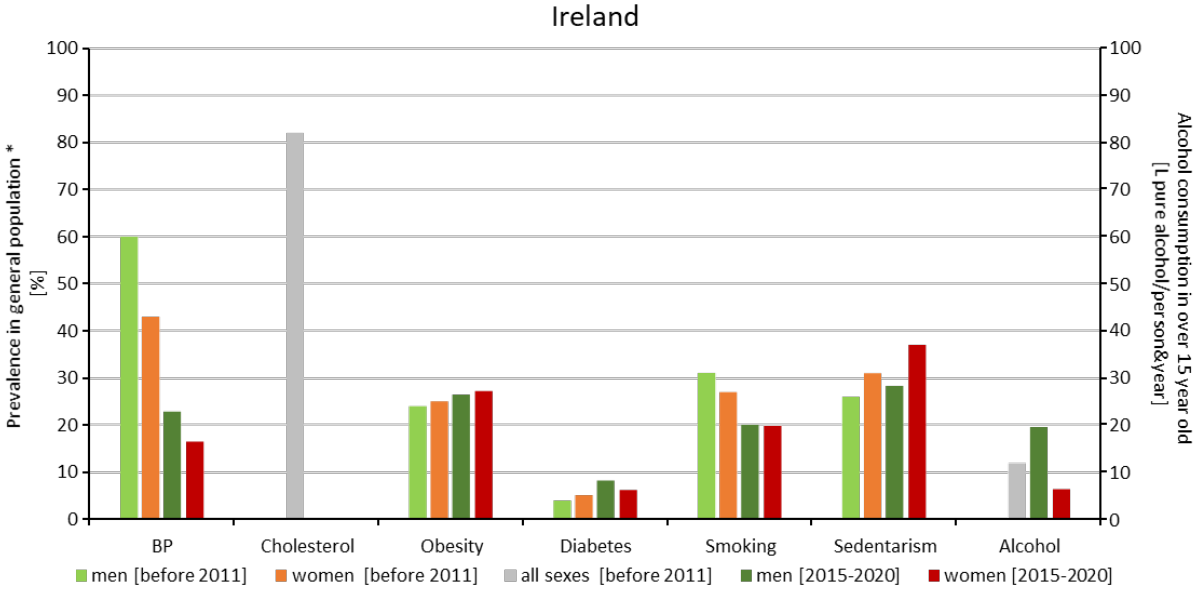
Following the implementation of the above-listed programs and the partial implementation of the JTF guidelines, a decrease in CV mortality and STEMI hospitalizations was noted: The 2014 country of the month EAPC reports mention a decrease in CVD mortality of 68% for men and 69% for women as well as a decrease of 3% in smoking rates and of ~28% in blood pressure values between 1985-2006.[5] Further data regarding changes beyond 2011 is currently not published in any official report, to the best of our knowledge.

Ongoing efforts to reduce the impact of cardiovascular risk factors remains. For example, in 2018 an alcohol act was introduced. This is a set of regulations regarding the marketing and advertisement of alcohol.[11]

Ongoing issues which might influence the future of prevention in the country included an aging population, inadequate funding for preventive programs and potential inequalities in access to healthcare services across the country, as well as a decrease in cardiac rehabilitation programs, with some programs being closed throughout the decade in the face of a growing population.

Development of risk factors

Authoritative data for both baseline and follow up time frame for each sex were present only for smoking, albeit from different sources. No sex-specific data is available for blood pressure, cholesterol, obesity, diabetes and alcohol consumption for 2005-2011.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: > 18 years, 2015-2020: 20-70 years; obesity: before 2011: > 18 years, 2015-2020: > 19 years; diabetes: before 2011: > 16 years, 2015-2020: > 30 years; smoking: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2007, SLAN;[12] 2015, WHO.[13] Cholesterol: 2007, SLAN.[12] Obesity: 2007, SLAN;[14]-2016, WHO.[15] Diabetes: before 2007, estimates of the Institute of Public Health;[16] 2016, WHO.[17] Sedentarism: 2007, SLAN;[14] 2016, WHO.[18] Smoking: 2007, SLAN;[12] 2020, WHO.[19] Alcohol: 2010, National Substance Misuse Strategy;[20] 2016-2018, WHO.[21]

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Italy

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

The National Plan of Health (PSN) 2014-2018 issued several recommendations to help improve cardiovascular prevention and rehabilitation.[1] Annual evaluations of all cardiovascular prevention and rehabilitation services are carried out by AGENAS (National Agency for Regional Health Services, https://www.agenas.gov.it/). Several limitations however hindered the implementation of PSN objectives. The world economic crisis at the time lead to significant reductions in health expenditure. Lack of political support from the relevant health authorities was clearly apparent. Admittedly, some progress was apparent, with the introduction of new legislations (see below). No adherence studies pertaining to guideline implementation and treatment compliance were carried out. Lack of communication with the general practitioner and family also prevents optimal patient care.[2]

Plans and actions initiated in/before 2011 to improve guideline implementation

Targets for implementation in 2011 benchmark study

The *2011 benchmark study* came up with several objectives to help reduce the impact of cardiovascular risk factors. The report mentions reducing the percentage of patients suffering from hypertension, hypercholesterolemia, diabetes, obesity and metabolic syndrome. The authors also highlight the importance of achieving risk factor target objectives in all CVD patients. Adequate referral and adherence to cardiac rehabilitation was also emphasized. Appropriate lifestyle measures in the general population was also a priority, addressing smoking cessation, healthy eating and encouraging physical activity.[2]

Actions taken

Following the 2011 recommendations, Italy opted to develop its own risk assessment tool and incorporate it within its own national disease prevention plan. The *Progetto Cuore card* helps determine cardiovascular risk, with a ≥ 20% score equivalent to ≥ 5% high risk on the SCORE algorithm.[3] Risk assessment software to support community practitioners was also introduced.[4] The anti-smoking law that came into force in 2003 also encouraged smoking cessation and prohibited smoking in public spaces. A 2007 law[5] also emphasized the importance of multi-disciplinary collaborations between primary care physicians and other health care workers. Awareness campaigns like *Progetto Cuore* and *BancomHeart* helped

improve patient care whilst also encouraging patients to take ownership of their chronic condition (http://www.cuore.iss.it/ & https://www.bancadelcuore.it). Cardiac rehabilitation also took central stage. There was a bigger emphasis on improving referral, adherence, and overall quality of care. An extended program that includes competence in cardiovascular prevention and rehabilitative cardiology was introduced for all fellows.[6]

Status quo 2021

What has been *achieved? Were measures implemented? Where they successful? Which problems remain in 2*021?

The *Progetto Cuore* helped determine the cardiovascular risk factor profile for Italian patients, also comparing new validated scores with the SCORE risk scores.[3,7,8] A formal re-evaluation of the prevalence of cardiovascular risk factors and the likelihood of cardiovascular events due to this large ongoing project is not published.

The physical inactivity pandemic in the 90s together with the unfavourable eating habits leading to a high prevalence of obesity lead to the creation of several preventive initiatives. The *Progetto Cuore* was one of the pioneering projects, financed by 1% of the national health fund and coordinated by the Istituto Superiore di Sanità (National Institute of Health). The development of validated cardiovascular risk charts and a score software were two important landmarks in cardiac prevention in Italy.[9]

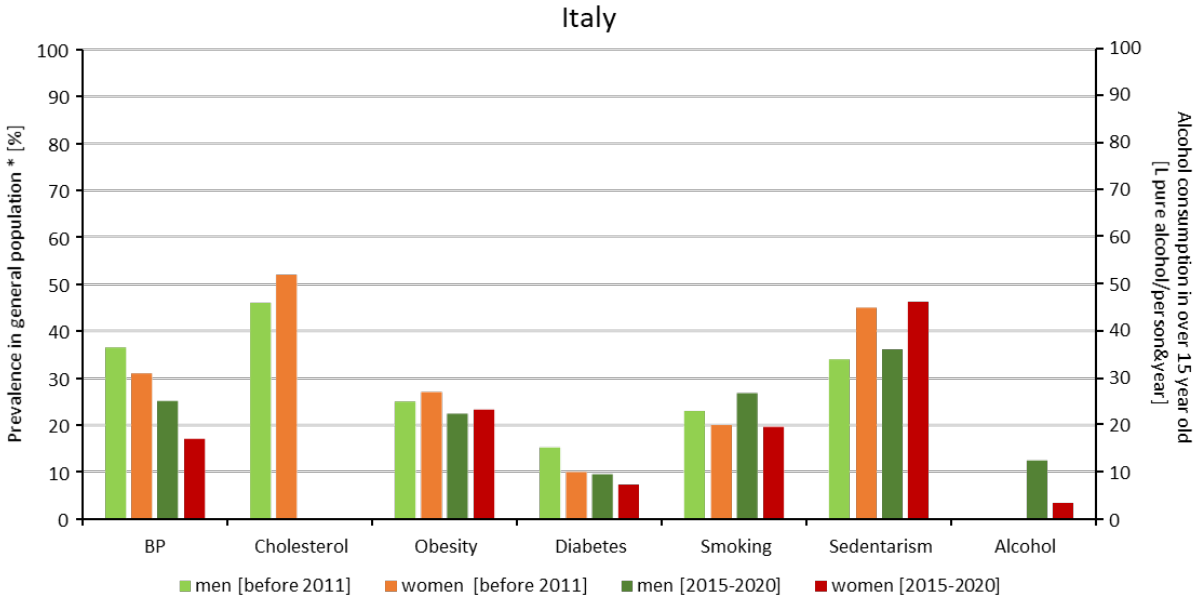
Baseline data from this cohort clearly highlights that ensuring adequate levels of all modifiable cardiovascular risk factors minimizes cardiac events.[7] It was very clear that widespread cardiovascular preventive measures across the whole population were needed. The creation of digital platforms helped facilitate this change. It is a comprehensive surveillance system, used to monitor fatal and non-fatal CVD events in the general population across eight regions in Italy (Brianza, Caltanissetta, Florence, Friuli-Venezia Giulia, Modena, Naples, Rome and Veneto).[10,11] Data is extracted from death certificates (ISTAT) and hospital discharge records (HDR), using the latter to also collect data on diagnostic and therapeutic procedures.[12]

A risk assessment software validated for the Italian population was also created. It was easy to use by family physicians and cardiologists alike, fast and objective in assessing the absolute global cardiovascular risk in primary care.[8] On subsequent follow up risk evaluations, 11% were reclassified to a lower risk class.[4] Systolic and diastolic blood pressure decreased by 0.6 mmHg and 0.5 mmHg. Total cholesterol decreased by 4.1 mg/dL and smoking prevalence also improved by 3.1% (95% CI 2.3%-4.0%). Such a positive impact highlights the software's ability of modifying cardiovascular risk as a first step towards implanting a widespread cardiovascular prevention strategy in primary care. This

personalised risk score is easy to use and offers a pragmatic assessment which may be used to influence public health policy.[4] Better education amongst cardiology fellows has also helped ensure a more uniform care (http://www.cuore.iss.it/formazione/formazione), though the exact impact of this initiative has not been evaluated objectively as yet.

Development of risk factors

Reliable data for both baseline and follow up data were present for hypertension, obesity, smoking and physical inactivity, albeit from different sources. No national prevalence data has been published with respect to hypercholesterolaemia recently. No baseline data was published for diabetes and alcohol consumption.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: > 35 years, 2015-2020: 20-70 years; cholesterol: > 35 years; obesity: before 2011: > 35 years, 2015-2020: > 20 years; diabetes: before 2011: > 35 years, 2015-2020: > 30 years; smoking: 16-74 years; sedentarism: before 2011: > 35 years, 2015-2020: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2010, Health Examination Survey;[13] 2015, WHO.[14] Cholesterol: 2010, Health Examination Survey.[13] Obesity: 2010, Health Examination Survey;[13] 2016, WHO.[15] Diabetes: 2010, Health Examination Survey;[13] 2016, WHO.[16] Sedentarism: 2010, Health Examination Survey;[13] 2016, WHO.[17] Smoking: 2010, Health Examination Survey;[13] 2020, WHO.[18] Alcohol: 2016-2018, WHO.[19]

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The Netherlands

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

Several challenges for the implementation of the prevention guidelines were stated in the *2011 benchmark study*:[1]

- Role of cardiologists: Cardiologist fear that their role will be attenuated by focussing on cardiovascular care in the primary care sector
- Quality of Care: Multidisciplinary primary care clinics may not have the expertise to care for patients with multi-morbidity
- Payment structure: Avoiding incentivising practitioners to expand treatment beyond the actual needs of the patient, which would increase health care costs in the long run
- Integrated care: Integration of services for secondary prevention between GPs and hospitals is poor and communication between the two is lacking.
- Policy and strategy: It was planned that a new heart health strategy would be launched in 2010, but it was postponed as the government has changed in the meantime.
- Health insurance: There are implicit disincentives for insurance companies investing in prevention in the current system.

Plans and actions initiated in/before 2011 to improve guideline implementation

In the 2006 policy document 'Choosing for a healthy life', promoting a healthy lifestyle was made a main theme of the prevention policy and for the first-time key goals were used. The key goals were smoking cessation, reducing alcohol consumption, tackling the increased prevalence of overweight, promoting physical activity, prevention and better management of diabetes, better care for mood disorders and lastly reduce the socio-economic differences in healthcare. A national smoking cessation programme was also launched in 2006.[2]

Lastly, a new payment structure for cardiovascular disease management that is aligned with the multidisciplinary guideline and the care model was introduced in January 2010. Under this payment structure, prevention programmes can be covered by health insurance companies.[1]

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

In 2014, the Netherlands launched a National Prevention programme.[3] The National Prevention programme was focused on smoking cessation, reducing alcohol consumption, tackling the increased prevalence of overweight, promoting physical activity, prevention and better management of diabetes and lastly better care for mood disorders. In 2019, the National Prevention Agreement was started. The National Prevention Agreement contains agreements on tackling smoking, overweight and problematic alcohol use. It is signed by patient organisations, healthcare providers, health insurers, municipalities, sports associations and associations, companies, social organizations and the national government.[4]

Concerning nutrition, the implementation of a nutritional label is part of the National Prevention Agreement, although discussions about the 'Nutri-Score' are still ongoing.[5] While a subsidy on fruit and vegetables and a sugar-sweetened beverage tax is currently not included in the National Prevention Agreement in the Netherlands,[6] the National Institute for Public Health and the Environment listed them as a top priority for additional measures in the prevention of obesity and associated chronic diseases.[7]

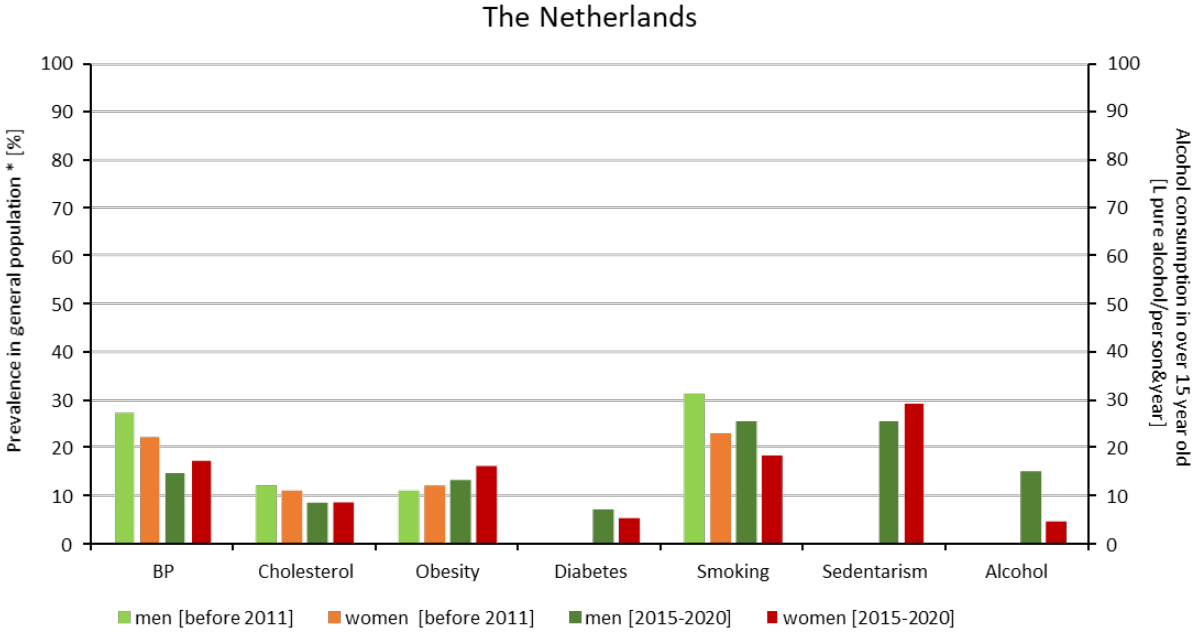
Several measurements to reduce tobacco use have been taken: taxes on tobacco have increased, from 2020 onwards, tobacco products cannot be visibly displayed in stores and institutional smoking bans have been introduced in multiple public areas such as hospitals, schools and train stations. Still, the Dutch Institute for Public Health and the Environment concluded that additional measures on top of the National Prevention Agreement are needed to protect children and pregnant women from the harms of smoking.[6]

To increase physical activity in the young, the Youth Fund for Sports and Culture supports children and adolescents in socially disadvantaged families to access sports opportunities. It pays their club membership and, in some cases, sporting equipment. It is in place in every province, and 19 cities have their own funds. The Fund collaborates with 220 (of 388) municipalities, and 60.103 children were enabled to take part in sports.[8]

The recent numbers show that the Netherlands did a good job in reducing the prevalence of most risk factors. There is better control of arterial hypertension and hypercholesterolemia. Furthermore, the smoking rates are decreasing. However, while obesity rates remain below the EU average, obesity is on the rise.

Development of risk factors

Reliable data for both baseline and follow up data were present for hypertension, cholesterol, obesity, and smoking, albeit from different sources. No baseline data was published for diabetes, physical inactivity/sedentarism and alcohol consumption.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: not given, 2015-2020: ≥ 12 years; cholesterol: whole population; obesity: ≥ 18 years; Diabetes: > 30 years; smoking: ≥ 18 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

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Norway

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

The 4th JTF in 2011 brought together plans and strategies to curb the burden of cardiovascular disease (CVD) in Europe. Norway identified major cardiovascular risk factors in the population that required immediate action to control CVD. The *2011 benchmark study* identified smoking, poor fruit and vegetable consumption, inappropriate energy balance (indicated by high saturated fat consumption of 14% of the daily energy intake), physical inactivity, obesity, hypertension, and hypercholesterolemia. Among these cardiovascular risk factors, smoking, diet and physical inactivity were high priority targets.[1] Despite these priorities that were highlighted, there were certain factors that contributed to the non-implementation of the guidelines. One reason for this was that key elements of the 3rd JTF guidelines were not found to be suitable (risk was overestimated by a factor of almost two and the thresholds for pharmacological therapy were inappropriate in the Norwegian context). Furthermore, the 4th JTF guidelines were open to modifications but delayed in talks with ESC which resulted in the Government taking steps to establish a national guideline setting different thresholds for pharmacological treatment, distinct from the ESC guidelines.

Plans and actions initiated in/before 2011 to improve guideline implementation

Norway-specific guidelines were much needed as there were different thresholds identified for Norwegians, which were different from other Europeans. This process was initiated by the Health Directorate with the first guidelines being published in 2009.[2,3] To better disseminate the guidelines, the Health Directorate organised various implementation conferences with physicians and healthcare professionals involved in primary prevention being the key target groups. The impact of the national guidelines however, are yet to be studied.

Screening programs for CVD which were at a time very prominent appear to be losing traction over the years with only local screening being carried out at the time of this report.[1]

To better engage in prevention, incentivisation was considered through the *Green Prescription* program[4] which was launched in 2003 to reimburse physicians providing lifestyle advice to their patients. This however, did not become very popular even though patients were reimbursed for their participation. Similar lack of success was observed for smoking cessation through incentivisation to physicians.

While smoking and physical inactivity continued to be a key concern at the time of the 4th JTF, policies related to smoking, were poised to receive a new direction to better enforce control of smoking. Additionally, inter-sectoral approaches (i.e. involving schools, work, transport, local environment, and leisure) targeting physical inactivity was developed in 2008; the effects of which are yet to be ascertained.[1]

Targets for implementation in 2011 benchmark study

The main targets proposed in the *2011 benchmark study* were related to the need for successful implementation of the guidelines.[1] Additionally, there is a strong target that should be developed towards a better risk estimation (considering the age and gender) and determining an acceptable threshold for pharmacological interventions.

Status quo 2021

Were measures implemented?

The various program and plans listed in the *2011 benchmark study* have not been very popular. Additionally, various activities have been organised by the National Cardiology Society to help promote prevention of CVD. This included seminars/lectures for physicians, patients and healthcare professionals to promote prevention of CVD. The Health Directorate developed "Healthy Life Centers" at the primary care level which promoted smoking cessation and physical activity.[5] They also gave advice on healthy diets, alcohol consumption and mental health, but the competences varied between the different Healthy Life Centers.

Partnerships were forged with food and trade organizations, manufacturers of food and beverage, food retailers and service industry to promote healthy diet through a reduction in salt, sugar and saturated fat intake while promoting healthy fruit and vegetable options.[6] The 'Salt Partnership', is one such initiative that envisaged the reduction of salt intake by 30% by 2025 by reducing salt content among processed foods and food being served.[7]

Considering the variations in the Norwegian population from the rest of Europe, national guidelines are imperative. An update to the previous guideline is currently underway by the National Cardiology Society task force.[8]

Where they successful?

The Healthy Life Centers are filled with immense potential to reach the entire nation especially since they target those individuals who otherwise would not participate in fitness programs on their own. However, there appears to be a discrepancy between what is

offered and what is expected, with respect to staffing and their competencies, in these centers.[5] There are large regional differences in whether the municipality have a Healthy Life Center and what preventive programs they offer. In addition, referral strategies varied between centers and regions.[9] A formal nation-wide evaluation of these programs is however still lacking.

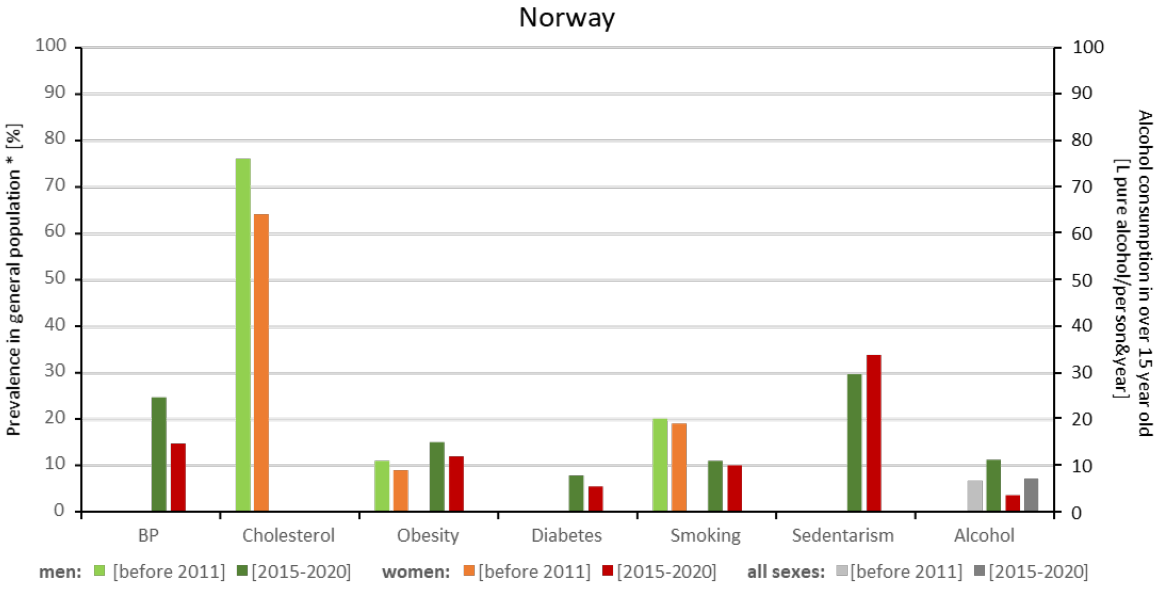
It is felt that communication and collaboration issues between different levels of the health care system hamper the rapid development and growth of initiatives on a national scale. Along with this, the inter-sectoral collaborations pose challenges that slow down the implementation of many programs.

Which problems remain in 2021?

Despite the efforts of the Government and Professional bodies, the burden of lifestyle diseases remains a major public health concern in Norway. Immense success has been seen for smoking cessation with the country seeing a drop in overall 9% in 2014 to 5% in 2019 for adults aged between 16-44 yrs.[10] Alcohol consumption, based on sales from grocery stores and in "Vinmonopolet" alcohol stores, has not changed much over the years though (5.1% in 2012 to 5% in 2016).[10] Physical activity appears to have made a slight increase from 2015-2019 with 56% between 16 and 79 years being active for >150 min per week.[10] However, the proportion not exercising frequently are rising ever so slightly from 2018-2020 (25% vs. 27%).[10]

Development of risk factors

Reliable nationwide data for both baseline and follow up data were only present for obesity and smoking, albeit from different sources. No baseline data was published for hypertension, diabetes, physical inactivity/sedentarism and alcohol consumption and no follow-up data are available for hypercholesterolaemia. In the regional Tromsø Study data on trends for hypertension and cholesterol are available for a population with a cardiovascular mortality around the average for Norway showing decreasing blood pressure in both the upper and lower part of distribution indication a decrease not only due to antihypertensive treatment but also to life style factors. Similar reductions in total cholesterol were also seen.[11,12]



* Age groups differ between risk factors and countries. The following age groups apply: BP: > 18 years; obesity: 16-79 years; diabetes: > 30 years; smoking: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2015, WHO.[13] Cholesterol: 2000-2003, Nationwide health survey.[14] Obesity: 2008 and 2019, Norhealth database.[10] Diabetes: 2016, WHO.[15] Smoking: 2010 and 2018, Norhealth database.[10] Sedentarism: 2016, WHO.[16] Alcohol: 2010 and 2020, Statistics Norway.[17]

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Poland

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

The most important factors which had a negative impact on effectiveness of treatment and prevention of cardiovascular diseases (CVD) and implementation guidelines into practise were vast prevalence of patients with burden of CVD,[1] insufficient use of the potential of primary health care structures and limited accessibility to specialized healthcare. The primary care doctors had no additional reimbursement for effective treatment, furthermore the access to cardiologist was limited.[2]

Funds aimed for prevention were insufficient and marginal, while funding for treatment accounted for a large part of the funds reimbursed in the health services.[3]

The first decade of 21st century was characterised with high therapeutic innertia.[4] This had significant negative effect for reaching the therapeutic goals for treating dyslipidaemia and hypertension. The second decade brought some improvements in this regard, especially among the high risk patients.[5,6] CVD remains the leading cause of death and a vast burden in medical, social and economic terms.

The situation of cardiac patients was improved in a limited spectrum. The results of the IMPACT study conducted in 1991-2005 show that 54% of reduction of CVD mortality was related to lower prevalence of CV risk factor and 34% were related to an improved access to cardiologic therapy.[7]

Plans and actions initiated in/before 2011 to improve guideline implementation

Up to 1997, knowledge about prevalence of CV risk factors was limited and studies that were conducted at the time described epidemiology only in small populations and couldn't be extrapolated on the general polish population. Between 1997 and 2011, a number of nationwide studies[1,8,9] were published, which assessed the prevalence of the most important risk factors for cardiovascular diseases on a representative sample of Poles. The next important step in epidemiology in Poland was the WOBASZ[8] study performed in the framework of POLKARD in 2003-2006. The WOBASZ programme (Multi-centre National Population Health Examination Survey) aims to describe the most important burdens of risk factors of CVDs in the Polish population.[8]

On 15 November 2010, the "Smoking Cessation in Public Places" Act came into force. The law banned smoking in areas like bus stations, shopping malls, public offices, restaurants

etc. This law was updated on 22 July 2016 with cessation for smoking electronic cigarettes.[10]

The most important health strategies are defined in the National Health Programme.[11] Among the main objectives for 2016-2020 were:

- Improving the diet, nutritional status and physical activity in the general population
- Prevention and solving problems related to the use of psychoactive substances, behavioural addictions and other risky behaviours
- Prevention of mental health problems and improvement of the mental well-being in the general population
- Promotion of healthy and active aging

To improve the low ratio of rehabilitated post-AMI patients in 2017, KOS ZAWAŁ[9] (Managed Care for People After Myocardial Infarction) programme was introduced.[12,13] The main goal of this action was to improve the access to and compliance in rehabilitation of post-AMI patients by changing the system of refinancing of cardiological procedures. In 2019, 12% of all post-AMI patients underwent the KOS ZAWAŁ program. Mortality was one third lower in patients participating in the KOS ZAWAŁ programme.[9]

In Jan 2021, the Sugar Tax[14] for products containing sugar was introduced. Products like sugar sweetened beverages are burdened with the new tax. This strategy is supposed to decrease demands for products with price.

Polish Society of Cardiology and Section of Prevention and Epidemiology of Polish Society of cardiology are active promoters of adherence to guidelines. Annual conferences entitled "Preventive Cardiology" have taken place on behalf of both Society and Section since 2007.

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

Due to the smoking cessation laws (2010 and 2016) smoking ratio decreased by 7%, both for men and women. The prevalence of e-cigarette use as well as heated tobacco use in a general population in Poland is relatively low. Belonging to the age group 30-49 years, attaining a lower educational level and living in a medium-sized city were significantly associated with current smoking status, and those groups should be recipients of tobacco control programs. Further tobacco control activities are needed to achieve smoke-free Poland in 2030.[15]

Still, it is too early to evaluate the full impact of the Sugar Tax, but first estimated data show that 10% increase of price may induce 14% reduction of volume sold of sugar sweetened beverages.[16]

Alcohol consumption has not changed particularly between 2010 and 2018, and is still higher than the EU average.[17]

During the COVID-19 pandemic period, between spring and autumn 2020, 41.2% of Poles aged 20 or older noticed changes to their body weight, with 28.3% of the respondents reporting an increase in their body weight, and 12.9% reporting reduction. The values were similar for both men and women - 27.6% and 13.8% for the male population, while for women these were 28.9% and 12.2% respectively.[18]

Low physical activity accounts for 2.3% of deaths and 1.1% of disability adjusted life years in Poland. Every third Polish citizen does sports or takes up leisure physical activity in the spring, summer or autumn season. As many as 70% of men and 64% of women admitted not undertaking such activity.[18]

Mortality from CVD is decreasing, but due to prevalence of CV risk factors the total lifespan between 2017-2018 had decreased among women, and did not change among men.[18]

Which problems remain in 2021?

The Polish healthcare system has suffered from COVID-19 pandemic and patients had limited access to healthcare providers during the pandemic. Actions of stakeholders were focused on pandemic issues and CV prevention was not the most important goal of policy makers and legislative.[19]

The education programs for primary schools and high schools lack proper health education.[20] The medical school curriculum contains only a few hours of preventive medicine related subjects during 6-year educational program.

According to 2020 NFZ Report, the CVD's risk factor management in Poland translated to reduction of AMI from 2014 to 2019. However, it more intense actions are required.[21]

The National Health Programme sets new strategies for Polish healthcare in 2021-2025.[22]

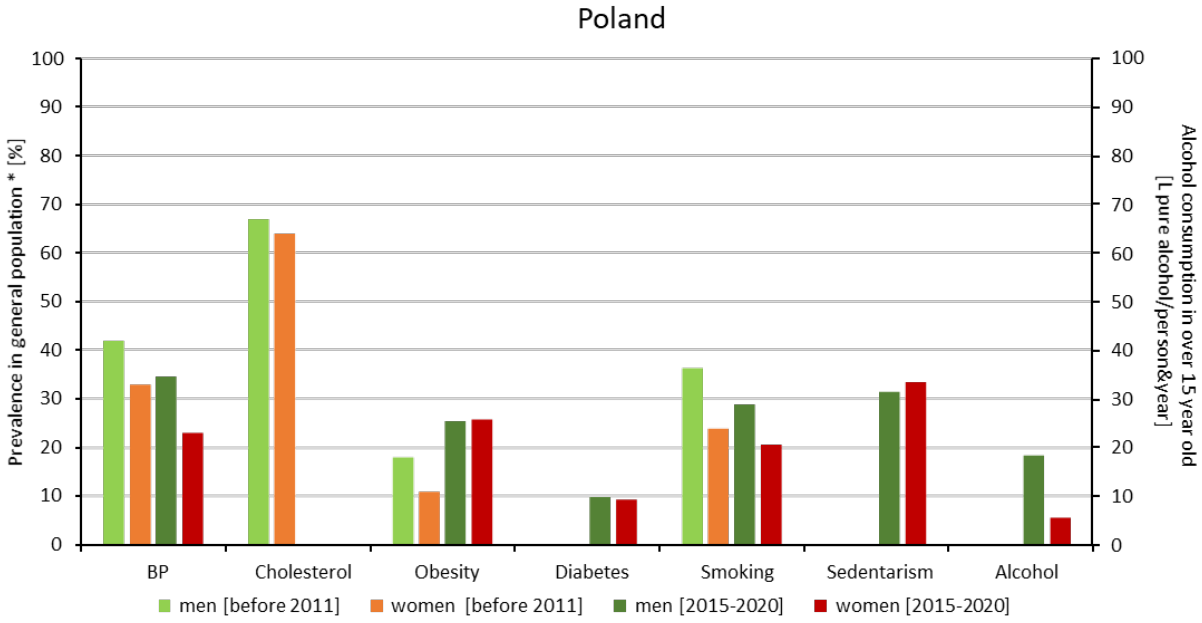
Four of five main goals are areas that may improve effectiveness of prevention programs:

1. Prevention of overweight and obesity,
2. Tobacco and alcohol addiction prevention,
3. Mental health promotion,
4. Environmental health and infectious diseases.

The Polish population is still a high risk population with insufficient access to specialized outpatient care[23] with high prevalence of lifestyle related diseases.

Development of risk factors

Reliable data for both baseline and follow up data were present for hypertension and smoking, albeit from different sources. No baseline data was published for diabetes, physical inactivity/sedentarism and alcohol consumption and no follow-up data are available for hypercholesterolaemia.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: 20-74 years, 2015-2020: 20-70 years; cholesterol: 20–74 years; obesity: before 2011: 20-74 years, 2015-2020: > 20 years; diabetes: > 30 years; smoking: before 2011: > 15 years, 2015-2020: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2003-2005, WOBASZ survey;[1,8] 2015, WHO.[24] Cholesterol: 2003-2005, WOBASZ survey.[25,26] Obesity: 2003-2005, WOBASZ survey;[27] 2016, WHO.[28] Diabetes: 2016, WHO.[29] Sedentarism: 2016, WHO.[30] Smoking: 2009, Central Statistical Office Poland;[31] 2020, WHO.[32] Alcohol: 2016-2018, WHO.[33]

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Romania

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

Lack of prevention infrastructure: CVD prevention was poorly supported in the Romanian health system. There was a lack of centres for prevention (only 3 in the whole country). Neither the State nor the district insurance funds had provided the financing to develop prevention services.[1]

Doctors were not reimbursed for engaging in cardiovascular prevention activities.[1]

There was a lack of data on CVD and risk factors in the population. It was difficult to get a picture of the cardiovascular health of the country and impossible to set targets for reductions in risk factors. The extent to which doctors adhere to the guidelines was unknown.[1]

Plans and actions initiated in/before 2011 to improve guideline implementation

Targets for implementation in 2011 benchmark study

To aim for greater simplicity in the message to both general practitioners and the general public about risk factors.[1]

Actions taken

The new strategy ("Applied Cardiology") established primary prevention as its main priority. It involves close cooperation with the Romanian Health Ministry and Romanian Ministry of Education. According to this program, the Romanian Society of Cardiology (RSC) and its 10 Working Groups, together with the Romanian Heart Foundation and the Athletic CardioClub are actively involved in the implementation of the "Applied Cardiology" strategy.[2]

The group translated the executive summary of the guidelines, published it in the national cardiology journal and sent out to doctors.[1] The working group aims to engage GPs with prevention, invites them to congresses and organises courses on reducing cardiovascular risk in patients.[1] The SCORE risk calculator for high-risk countries has been translated into Romanian and distributed to GPs.[1] A RSC initiative is the program for ambulatory monitoring of the blood pressure using the patient's own mobile phone, etc.

An alliance for CVD prevention was formed in 2009 between Romanian medical societies – cardiology, diabetes, nephrology, and general practice – and the ministries for health and

education. The alliance acts as a forum for the different societies, influences at the government level to take action at a national level against the main cardiovascular risk factors. The launch of the alliance generated considerable media coverage in Romania.[1]

The RSC established the Romanian Heart Foundation in 2010 with aim of extending the message on prevention to the general public. It became a member of the European Heart Network[1] and is preparing public campaigns targeting the detection of cardiovascular risk factors and promotion of physical activity, on a yearly basis with the occasion of the World Heart Day.[2]

At the national level, primary prevention is provided by the Ministry of Health through the "National program for the prevention of chronic disease".[2] It is delivered through mass-media (broadcast and digital media). The main radio stations and TV channels are also involved in everyday advertising for a healthy lifestyle (via popular shows like "The Health Pill"). In primary care, including in schools, general advice for a healthy lifestyle is provided.[2]

The main arena for both primary and secondary prevention is the country's hospitals, through their departments of Cardiology and Internal Medicine. Patients receive recommendations for the prevention and treatment of the main cardiovascular risk factors, which include printed flyers.[2]

- Smoking: RSC actively participated to a national campaign that resulted in a law that bans smoking in all closed public spaces (2016). A national anti-smoking campaign is developed for the next future.[2–4]
- Hypertension: an online original application (www.tensiuneamea.ro) for self-diagnosis of hypertension was developed. This application (also available on smartphones) is continuously promoted.[2]
- Lack of exercise: an original association (Athletic CardioClub [ACC], www.roacc.ro) was founded for promoting the benefits of the physical activity having cardiologists in the first line.[2]
- High cholesterol: a set of writing materials was developed by RSC.[2]

Plenty of associations, clubs and foundations are also committed to promoting cardiovascular prevention, but they are not working in a synchronised and quantifiable manner.[2]There are a lot of preventive campaigns ("Romania Respira", "PROFI iubeste sanatatea", "Romanian Heart Week", "Promenada Inimilor", "Alearga pentru inima ta", "CLIPA", "Heart Failure Awareness Day"), and projects ("SOS Cardio", "Bike for your heart!", "Heart Ball", "Your Heart Agenda", "Young Health Programme", "UEFA – Multy European City Initiative", "Act now. Save a life", "Stent for Life").[2]

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

Romania has no audit system to evaluate the results of nationwide cardiovascular prevention. Data are available only from reports of the National Statistics Institute concerning some cardiovascular risk factors (smoking, alcohol etc.), or from annual statements regarding cardiovascular mortality.[2]

There is an ongoing national survey called SEPHAR (Study for the Evaluation of Prevalence of Hypertension and Cardiovascular Risk in Romania), organised by the Romanian Society of Hypertension, which is now at its third edition.[5] Romania has also participated through one of its elite cardiology centers (Timişoara) to EUROASPIRE editions II, III and IV.[2,6]

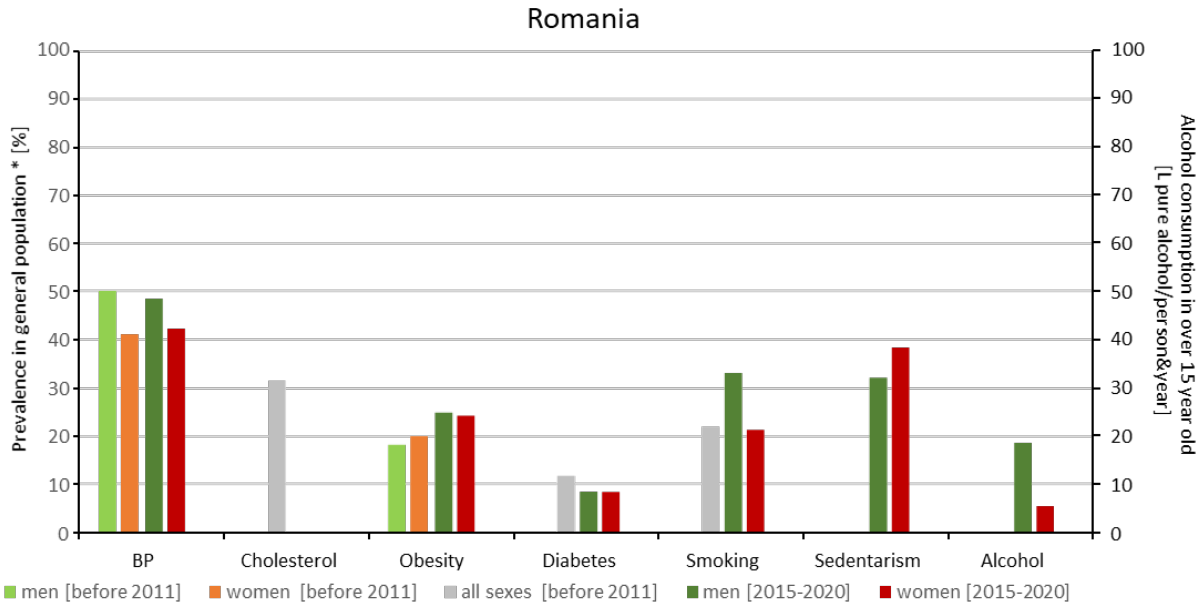
Which problems remain in 2021?

According to the 2016 Romania country report[2] the following problems remain:

The main obstacle is the stressful economic situation that hinders the achievement of the goals. Romania is the only country in Europe where life expectancy is continuously deteriorating.[7] Romania ranks among the countries with the highest prevalence of smoking in the world. The country is located in the red zone of hypertension (HTA), in a very advanced area of diabetes prevalence and high cholesterol in the blood.[7] The cardiac rehabilitation is not fully reimbursed. CVD prevention (together with rehabilitation) is part of the training in cardiology but few universities included it their curriculum for students.[2] More funding is necessary in order to reach out all Romanian citizens (especially those living in small villages).[2]

Development of risk factors

Reliable data for both baseline and follow up data for both sexes and from comparable sources were only present for hypertension and obesity. For hypercholesterolaemia, diabetes and smoking, sex-specific data are not available for 2005-2011. Data are not from comparable sources for both time points for diabetes and smoking. No baseline data was published for physical inactivity/sedentarism and alcohol consumption.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: ≥ 18 years, 2015-2020: 20-70 years; cholesterol: 18-85 years; obesity: > 19 years; diabetes: 18-85 years and > 30 years; smoking: before 2011: 18-85 years, 2015-2020: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

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Russian Federation

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

Russia is a huge country and there are substantial regional differences in all types of mortality, morbidity and trends in risk factors (RF). While mortality and morbidity from cardiovascular disease (CVD) were high, some trends were moving in a positive direction.[1] In 2011 no specific targets had been set for reductions in two main RF: hazardous alcohol consumption and smoking. Smoking restrictions did not extend to an outright ban in public places. Cafés and restaurants were permitted to designate smoking and non-smoking zones.[1]
Control of cholesterol was poor, as reflected in the EUROASPIRE III study. Russia was second of the European list with 25.7% of CHD patients on LDL target (<2.5 mmol).[2]

Plans and actions initiated in/before 2011 to improve guideline implementation

Russia became a Party to the WHO Framework Convention on Tobacco Control on September 1, 2008.[3] In 2009, the Ministry of Health and Social Development of the Russian Federation initiated a major state programme including the establishment of 502 "Health Centers" for adults and 193 for children, that started to provide health checks (body mass index, total cholesterol, glucose level, blood pressure, smoking status, carbon monoxide in the exhaled air, spirometry, dental examination, etc.), as well as preventive counselling on CVD RF on a free of charge basis.[4] The first Russian Guidelines on CVD Prevention were published in 2011 (also in pocket version).[5]

<u>Targets for implementation in 2011 benchmark study</u>

To publish and distribute an updated version of the guidelines. To publish two versions of the Russian guidelines: a short, easy-reference version containing targets for the control of CVD RF, and a long version. To publish the long version in the two national journals that have highest impact factor, Kardiologiia and Cardiovascular Therapy and Prevention. To distribute the guidelines through the national society of general practitioners to its members.

Actions taken

The First Global Ministerial Conference on Healthy Lifestyles and NCDs control took place in Moscow 28–29 April, 2011 and resulted in a political declaration (Moscow Declaration), committing world governments to develop a global policy on NCDs prevention as well as a global monitoring framework.[6] The commitment to develop such policy was reflected in the Federal Law #323 “Healthcare of citizens of the Russian Federation” which was passed later that year (2011) and set specific goals for reducing total and disease-specific mortality and gave priority of preventive strategy in healthcare.[6]

The infrastructure for prevention of non-communicable diseases includes regional centres for medical prevention, health centres, departments and offices of prevention.[7] Implementation of the all-Russian large scale systematic health screening (Dispanserization program) was launched in 2013 and provided an opportunity for all adult citizens to check main parameters of health according to current guidelines and get the preventive counselling on a free of charge basis.[8,9] The Guidelines on organization of preventive medical examination and dispanserization in the context of COVID-19 were published in 2020.[10]

New targets were set by the Ministry of Health of the Russian Federation in 2012: reduction of smoking rates by 36% (from 39.1% in 2011 to 25.0% in 2020); reduction of alcohol consumption by 31% in 2020 (from 14.5 in 2011 to 10.0 litres of alcohol per capita in 2020). The anti-smoking Federal Law #15 of February 23, 2013 "On Protecting the Health of Citizens from the Effects of Second Hand Tobacco Smoke and the Consequences of Tobacco Consumption" came into effect. It is one of the strictest laws of the world. It prohibits smoking in all public places, including cafes and restaurants; prohibits all forms of domestic and cross-border tobacco advertising, promotion and sponsorship; regulates specific contents, packaging and labelling with text and picture health warnings; prohibits tobacco products sales in specified locations (via vending machine and the internet, in sport, healthcare, cultural facilities, near schools etc.)[11] On July 31, 2020 the restrictions were expanded to all nicotine-containing products, which is especially important because of the spread in recent years of electronic cigarettes, tobacco heating systems, etc.[12]

In 2011, the Russian Federation supported the adoption of WHO’s European Action Plan to Reduce the Harmful Use of Alcohol 2012–2020, and has been implementing many of its recommendations since: gradually raised excise taxes on alcohol; introduced a minimum unit price policy, gradually increased the minimum unit price, introduced a real-time tracking system on the production and sale of alcohol, began a comprehensive night ban on sales of alcohol nationally and strict policies on alcohol-free public space and alcohol marketing.[13]

In 2014 the new State programme of the Russian Federation “Development of Healthcare till 2020 year”: Subprogramme 1. Prevention of NCDs and healthy lifestyle started.[6] The year 2015 was declared by the President of Russia a year of combating CVD: a large number of events were held to raise public awareness about CVD, their risk factors, and the importance of early access to medical care.[14]

In 2013 the National Guidelines on Non-Communicable Diseases Prevention and in 2018 the second Russian Guidelines on CVD prevention were published with the participation of the Russian National Society of Preventive Cardiology, the Russian Society for the Noncommunicable Disease Prevention and the Russian Society of Cardiology.[15,16] The guidelines were published in the best National journals and presented at the numerous conferences. All ESC clinical guidelines are promptly translated into Russian. Also national guidelines for dyslipidaemias, arterial hypertension, etc. are regularly updated.[17] In Russia, a wide promotion of the SCORE charts has been performed. The Russian translation of HeartSCORE is also available.[1]

A big number of social campaigns and projects have been conducted since 2011. They include: “Dress in red”, “Together for Healthy Hearts” (since 2019). Many activities were organized by the Medical Volunteers movement, established in 2013: “Protecting Hearts”, “Children for Adults’ Protection" programs, #KindnessToTheVillage and #WeAreTogether all-Russian projects.[6,18]

Since 2011, well-known international projects on monitoring of CVD risk factors and secondary prevention of CVD were realized in Russia, including EUROASPIRE IV, EUROASPIRE V, EuroCareD, INTERSTROKE, etc.[19–22] Continuous monitoring of the quality is conducted to evaluate the efficacy of preventive efforts.

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

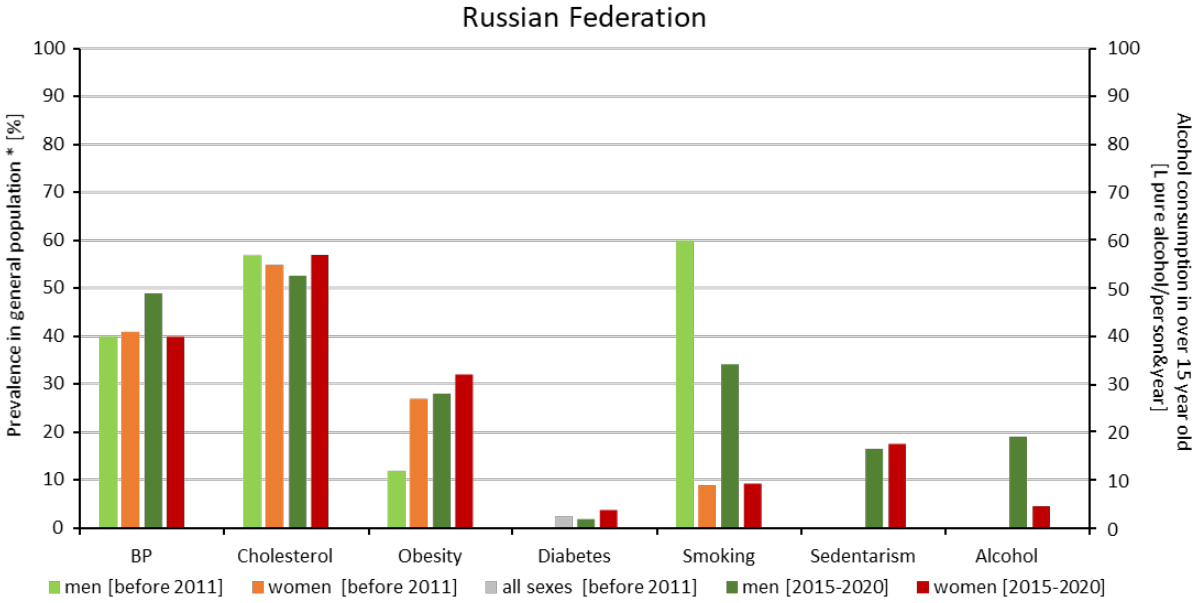
- CVD mortality has decreased by 23%: 753 (in 2011) vs 574 (in 2019) per 100 000.[23]
- All-cause mortality dropped by 39% in men and 36% in women between 2003 and 2018, and the life expectancy increased.[13]
- Smoking rates have decreased: 21.5% relative decline in adult smoking prevalence in 2016 compared with 2009.[24]
- Between 2003 and 2016, total per capita alcohol consumption decreased by 43%, with a 40% decline in recorded consumption and a 48% decline in unrecorded consumption.[25]

Which problems remain in 2021?

The COVID-19 pandemic has brought new challenges for implementation of CVD prevention guideline. The CVD mortality is still higher than in European countries.[23,6] The life expectancy is still lower than in European countries.[6] There is an increase in obesity, diabetes prevalence (see diagram). In relation to RF, the main efforts should be aimed at combating the growing prevalence of obesity, increasing the efficacy of hypertension treatment, maintaining the policy of implementing the "anti-tobacco" law, correction of other RF (alcohol, physical inactivity, fruit and vegetable consumption).[26] Development of cardiac rehabilitation services (including home-based) is needed. Implementation of telemedicine and artificial intelligence technologies may help to overcome new challenges.

Development of risk factors

Reliable data for both baseline and follow up data for both sexes were available for blood pressure, cholesterol, obesity and smoking, albeit from different sources. For diabetes, no sex-specific data are available for 2005-2011, but both time points are from comparable sources. No baseline data was published for physical inactivity/sedentarism and alcohol consumption.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: age not given, 2015-2020: 25-64 years; cholesterol: before 2011: age not given, 2015-2020: 25-64 years; obesity: before 2011: 19-60 years, 2015-2020: 25-64 years; diabetes: > 18 years; smoking: before 2011: > 18 years, 2015-2020: 25-64 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2010, *2011 benchmark study* (interview);[1] 2017, ESSE RF epidemiological study data.[26] Cholesterol: 2010, *2011 benchmark study* (interview);[1] 2017, ESSE RF epidemiological study data.[26] Obesity: 2010, *2011 benchmark study* (interview);[1] 2017, ESSE RF epidemiological study data.[26] Diabetes: 2010;[27] 2017, Federal Diabetes Register.[28] Sedentarism: 2016, WHO.[29] Smoking: 2010, *2011 benchmark study* (interview);[1] 2018-2019, survey.[30] Alcohol: 2016-2018, WHO.[31]

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Spain

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

Several factors hinder the implementation of cardiovascular prevention guidelines. Healthcare budget cuts, lack of professional incentive systems, limited cardiac rehabilitation services and failure to introduce nationwide campaigns are some of the barriers faced by most regions.[1] Unfortunately, only 36% of the cardiac care units are equipped with their own cardiac rehabilitation program (RECALCAR Registry).[2]

Plans and actions initiated in/before 2011 to improve guideline implementation

Targets for implementation in 2011 benchmark study

Several recommendations in *2011 benchmark study* had been put forward to address the various problems obstructing optimal patient care. Assessing physician performance and auditing health care systems using computer-based systems was strongly encouraged. The importance of implementing guideline recommendations into regional health policy was strongly advocated.[1]

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

Actions taken

Several different initiatives helped implement the benchmark report recommendations. A pocket version of these same guidelines was created, with the more comprehensive version disseminated to various healthcare professionals in academic publications and meetings. The SCORE risk score was recalibrated for the Spanish population.[3] A Cardiac Rehabilitation Registry (R-EUReCA[4]) (2014) was set up, in combination with a stronger collaboration with primary care. Several free national health services were launched (nutrition classes, smoking cessation counselling, rehabilitation services).

In terms of policy, the launch of the *Prevention and Health Promotion Strategy of the Spanish National Health Service* in 2013 promised to facilitate a common framework for primary prevention and health promotion.[5] An updated version of this strategy is expected in the coming months. The *Observatory for the Study of Nutrition and Obesity* (February 2013) also encourages policy development pertaining to obesity and adequate nutrition in

children (https://www.aesan.gob.es/en/AECOSAN/web/nutricion/seccion/observatorio.htm).[6] A smoking ban was implemented in 2005 (partial) and 2010 (full). Regrettably, a more recent revision of this legislation has yet to be fully implemented due to COVID-19 pandemic. Finally, a 2 yearly report outlining evidenced-based priorities in cardiovascular prevention is issued by the Spanish Society of Family and Community Medicine.[7]

The country now boosts one of the highest life expectancy rates in the world (82.1 years). Significant drops in the prevalence of diabetes, hypertension and smoking were also recorded.[8–10]

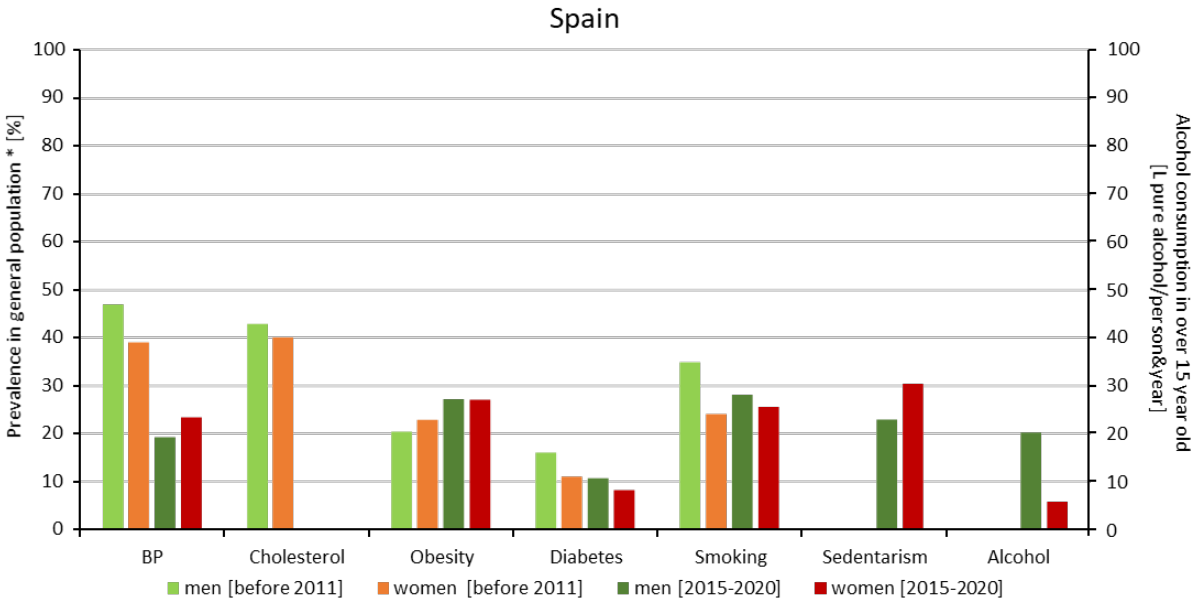
Which problems remain in 2021?

Significant milestones have been achieved since the first benchmark report. Others add on measures (see below) may however improve current patient care.[2,11]

1. Including CV risk assessment and control as quality indicators in professional incentive systems[11]
2. Reinforcing multidisciplinary collaboration between different health care professionals and primary care physicians
3. Devise minimum quality standards for cardiac rehabilitation programs whilst also encouraging the setting up of rehabilitation programs in all Spanish regions[4,7]
4. Promoting generally wellbeing and the benefit of primary prevention in communities
5. Encouraging and motivating politicians and health authorities to devise policy documents and new legislations pertaining to cardiovascular prevention[12]
6. A strong will to fight against smoking

Development of risk factors

Baseline data and follow up data have been published for blood pressure, obesity, diabetes and smoking, albeit from different data sources. No data later than 2015 are available for hypercholesterolaemia and no data from between 2005 and 2011 are available for sedentarism and alcohol consumption.



*Age groups differ between risk factors and countries. The following age groups apply BP: before 2011: 35-74 years, 2015-2020: 20-70 years; cholesterol: 35-74 years; obesity: > 19 years; diabetes: before 2011: 35-74 years, 2015-2020: > 30 years; smoking: WHO: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2000-2010, DARIOS study;[13] 2015, WHO.[14] Cholesterol: 2000-2010, DARIOS study;[13] Obesity: 2005, 2016, WHO.[15] Diabetes: 2000-2010, DARIOS study;[13] 2016, WHO.[16] Sedentarism: 2016, WHO.[17] Smoking: 2007, National health survey;[18] 2020, WHO.[19] Alcohol: 2016-2018, WHO.[20]

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Sweden

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

According to the "Main Report. Implementation of the 4th Joint Societies' Task Force Guidelines on Cardiovascular Disease Prevention in Clinical Practice."[1] the most important factors leading to non-implementing preventive guidelines in Sweden before 2011 were as above:

- Swedish public health care is decentralized and the main source of financing is taxes. Access to care is universal. It is divided into 3 levels: national, regional and local. At the national level, the Ministry of Health and Social Affairs is responsible for the disorderly operation of the system and is responsible for shaping health policy. The advisory and supervisory body responsible for health and residents is the National Council of Health and Social Welfare. The second tier includes 21 regional councils, which constitute the basis for healthcare provision. At the third level, 290 municipalities are responsible for the provision and financing of social welfare services. However, these three levels do not provide a space for dialogue between the stakeholders: GPs and cardiologists. Such dialogue is essential in order to reach agreement on treatment plans and procedures to ensure patient handover.
- A key factor for the effective implementation of the guidelines is the involvement of primary care. National guidelines were not used to the same extent by GPs as by cardiologists. The guidelines, due to their volume and detail, are not ideal for general practitioners. Such an overload of information, not all of which is applicable to GPs, is one of the difficulties in implementing the guidelines. Some family doctors know and apply the ESC and SCORE guidelines in everyday clinical practice. The dissemination of GP guidelines largely depends on the will of the individual coordinators at the regional level.
- Fatigue in guidelines usage appears to be a problem among doctors in Sweden, mainly family doctors, who are responsible for treating such a large number of medical conditions. The overabundance of guidelines on, among other things, cardiovascular prevention - ESC and national, regional and local guidelines - is a significant obstacle to implementation of the guidelines. Despite the bulk of the documents, the ESC guidelines are considered clear, well presented, and effectively communicated by physicians. It was recognized that while a great deal of effort has

gone into preparing the guidelines, apart from significant changes in treatment, the rest of the knowledge is ignored.

- Lack of incentive structures promoting adherence to guidelines.

Plans and actions initiated in/before 2011 to improve guideline implementation

A large part of the 2011 benchmark study[1] was devoted to aspects of working with GP's. Reaching GP's with guidelines was limited due to the structure of GP's and Swedish Association of General Practice (SFAM) which is the main provider of guidelines to GP's. Therefore, convincing even few GP's to use SCORE was considered a huge step forward.
According to 2011 benchmark study[1] the most successful of actions taken so far includes increasing awareness of SCORE risk scales and improving both the quantity and quality of publications in public health.

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

Both the Swedish Society of Medicine and the Swedish Cardiac Society have well established Committées and working groups[2,3] to implement preventive guidelines on health behaviour and equal health for patients and on a public health level.
Finally, in collaboration between physicians, nurses, physiotherapists, dieticians and the Swedish Heart and Lung Patients Association, a national model has been created for post-myocardial infarction care, including all elements of cardiac rehabilitation. This 2018 model is now applied at a large majority of the hospitals.[4] Those models were incorporated in 2018 to 2020. Effects on public health are limited so far.
Encouraging people by doctors and government for increasing consumption of vegetables had positive effect.[5] this was achieved among others actions by publishing national nutrition guidelines . The national guidelines were published at 2015 by the Swedish National Food Agency (Livsmedelsverket) and the original name was "Find your way to eat greener, not too much and be active!" (*Hitta ditt sätt att äta grönare, lagom mycket och röra på dig*). The official body responsible for the development and implementation of the Food-Based Dietary Guidelines in Sweden is the National Food Agency, which has a close collaboration with the Social Board of Health and Welfare. A training for health care professionals has been developed and launched in collaboration with the Social Board of Health and Welfare. The official body responsible for the development and implementation of the Food-Based Dietary Guidelines in Sweden is the National Food Agency, which has a close collaboration with the Social Board of Health and Welfare. A training for health care

professionals has been developed and launched in collaboration with the Social Board of Health and Welfare.[5]

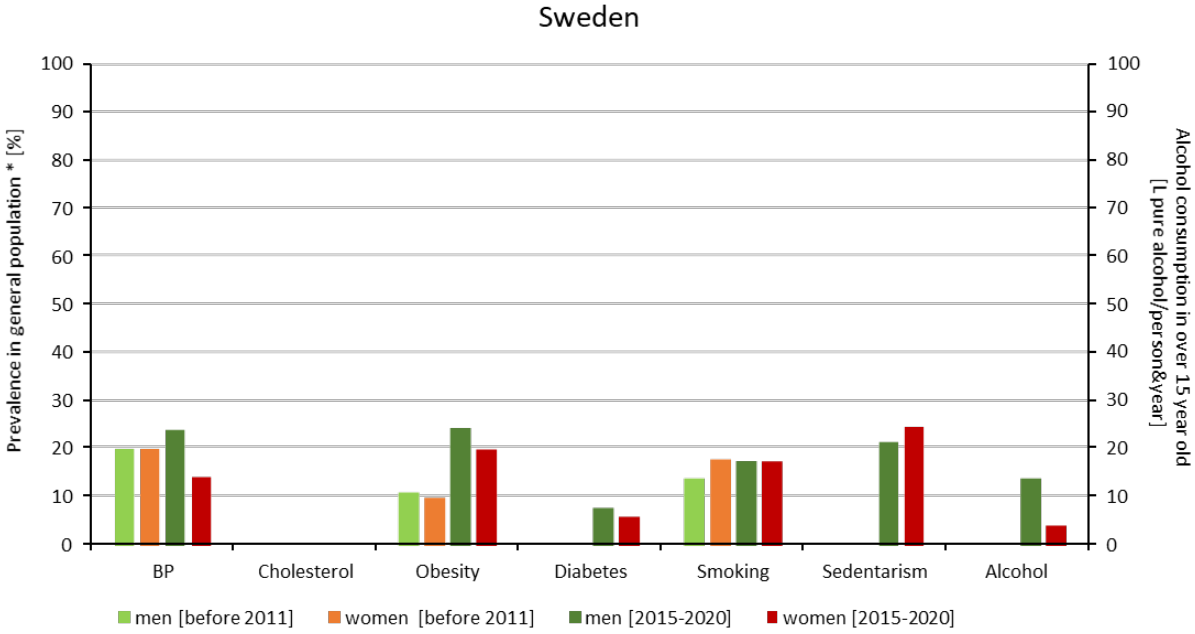
In the last years a national knowledge-driven quality development system was implemented. The system is divided in National Action Areas with the purpose to define guidelines and formulate national patient-centred care plans for different diseases including coronary heart disease. On a regional level Regional Action Areas implement these national guidelines and care plans. GPs have been advised to inform patients about physical activity thereby using a "physical activity on recipe" prescription. Swedish health authorities now use the numbers of prescriptions per health centre as a quality indicator, which has stimulated the use of this method. Even though this is not common yet, also counselling and mutual agreement "recipes" on smoking abstinence have been introduced.[6]

Which problems remain in 2021?

Obesity, especially obesity in children is a common problem in Swedish population. The prevalence of obesity has increased in Sweden between 2006 to 2018 (50 % of the adult population answer in 2018 that they have overweight or are obese).[7]

Development of risk factors

Authoritative data for both baseline and follow up data were present for blood pressure, obesity, and smoking, albeit from different sources. No data at all were available for cholesterol. Partial data were available for diabetes, sedentarism and alcohol consumption.



* Age groups differ between risk factors and countries. The following age groups apply: BP: before 2011: 16-84 years, 2015-2020: 20-70 years; obesity: before 2011: not available, 2015-2020: > 19 years; diabetes: > 30 years; smoking: before 2011: not available, 2015-2020: 16-74 years; sedentarism: > 18 years; alcohol: > 15 years

Data sources

Blood pressure: 2006, Swedish National Public Health Survey;[8] 2015, WHO.[9] Obesity: 2008-2009, Statistics Sweden: Living Conditions surveys.[#] 2016, WHO.[7] Diabetes: 2016, WHO.[10] Sedentarism: 2016, WHO.[11] Smoking: 2008-2009, Statistics Sweden: Living Conditions surveys;[12] [#] 2020, WHO.[13] Alcohol: 2016-2018, WHO.[14]

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United Kingdom

Guideline implementation strategies

Status quo 2011

Main factors leading to non-implementation of guidelines

According to the *2011 benchmark study* of the 4th JTF guidelines, the UK chose to rely on different sets of guidelines, such as the National Institute for Health and Clinical Excellence (NICE) guidelines (a suite encompassing different conditions, risk factors, diagnostic procedures and interventions; Endorsed by the Department of Health) and the second joint British Societies guidelines (JBS2).[1–3] The *2011 benchmark study* also states that the level of adherence to guidelines by general practitioners was generally regarded as "high".[3]

Plans and actions initiated in/before 2011 to improve guideline implementation

Comprehensive actions were initiated prior to 2011 to improve guideline implementation, including the launch of national programs designated to reduce the burden of risk factors. Examples for such programs include:

1. “Change 4 life” – This program was launched in 2009 as part of a national ambition to inspire social movement towards healthier diet and physical activity behaviours), by involving the National Health Service (NHS), local authorities, businesses, community leaders, charities, schools and families.[4]
2. “Hearty lives” – This program, started in 2009, aimed to tackle health inequalities between different communities. This was done by funding interventions throughout the UK, including community-focused projects focusing on sports, arts, health education, psychological support for patients at risk for coronary heart disease, promotion of physical activity among children, and more.[5]
3. “Heart matters” – a free service that provides information and advice to people who want to improve their health, with approximately 200,000 active members. Information is available online, or in the form of a magazine.[6]

Status quo 2021

Were measures implemented? Where they successful? Which problems remain in 2021?

The "Hearty lives” program enrolled more than 159,000 participants. The program was terminated in 2012, however. According to the final evaluation report (available at the British heart foundation- BHF, website), there were statistically significant improvements

among participants in relation to key behaviours around diet, exercise, smoking and alcohol. However, at the national level, no clear evidence for impact on local strategies or lifestyle changes among wider communities was noted.[5] As a follow-up to the termination of the "Hearty lives" initiative, however, an additional 1.2-million-pound funding was granted in August 2013 by the BHF for projects that aim to reduce the risk of CVD among children and young people across the UK, by encouraging healthier lifestyle.[7]

According to the "Health profile for England report" from 2019 (an official government publication available online),[8] the following changes in common CV risk factors were noted in the UK:

Diabetes prevalence has increased in the last 20 years, estimating that 3.5 million people aged 16 years and over were suffering from diabetes (diagnosed or undiagnosed) as of 2019 (which equals roughly 10% of the population of this age). Specific ethnic groups were suffering from far higher rates of diabetes, particularly the black ethnic group according to an earlier national report from 2018;[9] More men than women had diabetes in 2019.[8]

However, downward trends were seen with other risk factors, including the prevalence of smoking in adults (which declined between 2009 and 2019. In 2019, 6% of all adults were defined as current e-cigarette users, and generally, men were more likely to smoke than women), as well as the prevalence of high blood pressure in adults between 2009 and 2019. Obesity rates, however, continue to raise in the UK.[8,10]

In summary, one can assume that the national-based interventions since 2011 was, in fact, successful in reduction of different risk factors and CV morbidity.

Issues which remain unsolved in 2021 include the above-mentioned raising rates of obesity and further challenges which were discussed in the *2011 benchmark study*, including: health inequalities - as suggested by a time-trend analysis published in British Medical Journal in 2017, health inequalities were on the rise following termination of designated strategy to tackle this issue,[11] lack of proper rehabilitation programs in some parts of the country, an assumption that prevention will be "picked up" by primary care physicians instead - without vast designated programs/clinics/trained clinicians in the field, as well as the economic climate which affects the introduction of different preventive/rehabilitation programs. Of note, the UK might be facing unique prevention-related challenges on the brink of Brexit: A modelling study which was recently published suggested that Brexit could, theoretically, decrease fruit and vegetable consumption.[12]

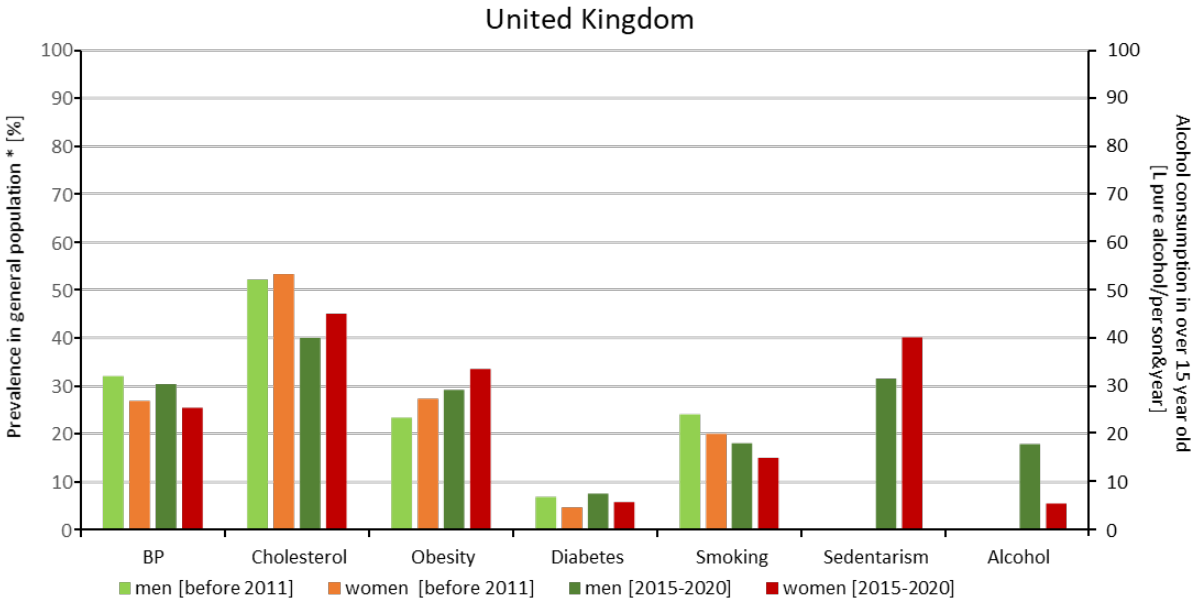
However, there is still room for hope: The latest NHS GP contract (a local contract agreed between the NHS and the practice) includes specific prevention goals. These goals comprise changes in the quality and outcome target for blood pressure (from 150/90 to 140/90 mmHg), and the commissioning of "CVDPrevent" program by the NHS. This national clinical audit programme for primary care routinely extracts anonymized GP data in order to detect

and manage high blood pressure cases, high cholesterol cases, and atrial fibrillation events.[12]

Also, on 7th January 2019, the UK government published a paper entitled "The NHS Long Term Plan" – this established the strategic focus for the NHS for the coming years and described some targets which need to be met by 2029 (10 years on from the document publication date).[13] These include a high level of Guideline-recommended secondary prevention medication, increased uptake of cardiac rehabilitation programmes, and a CVD Prevent audit across primary care. The Long-term plan is supported by financial measures: For example, £10 million have been invested in cardiac rehabilitation in 2021-2023, with a further £12 million from 2023 onwards.

Development of risk factors

Authoritative data for both baseline and follow up data were present for blood pressure, cholesterol, obesity, diabetes and smoking. Partial data were available for sedentarism and alcohol consumption.



* Age groups differ between risk factors and countries. The following age groups apply: BP: > 16 years; cholesterol: > 16 years; obesity: > 16 years; diabetes: > 16 years; smoking: > 16 years; sedentarism: > 18 years; alcohol: > 15 years

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