



**FORUM FÖR  
HEALTH POLICY**

# **Disease Prevention and Health Promotion**

A report on interventions regarding chronic diseases

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## FOREWORD

Chronic diseases such as cancer and cardiovascular diseases are some of the leading causes of death in Sweden and other countries. Associated risk behaviours such as increased tobacco smoking, increased alcohol intake and unhealthy lifestyle factors are very common which increase the risk of developing chronic diseases.

As per the World Health Organisation, between 30% to 50% of cancer cases can be prevented. This is possible if we ensure that healthcare systems are well-equipped to effectively respond to the needs of the individuals with chronic diseases but more importantly, we also need to take preventive action to curb the growth of chronic diseases.

Disease prevention primarily involves the actions and interventions at individual or population level, which aim to reduce the burden of diseases. In the context of chronic diseases and associated risk factors, health promoting actions such as those targeting and encouraging overall well-being and healthy behaviours, also play an important role in reducing the burden of chronic diseases.

This report presents interesting interventions implemented in different countries which aim to prevent chronic diseases and promote healthy lifestyle for two of the most prevalent chronic diseases: cancer and cardiovascular diseases.

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Stockholm, February 2021.

## SVENSK SAMMANFATTNING

Incidensen (antalet nya fall) av kroniska sjukdomar, till exempel hjärt-kärlsjukdom, cancer, typ 2-diabetes och artros har ökat under de senaste åren. Levnadsvanor med tobak, alkohol, ohälsosamma matvanor och otillräcklig fysisk aktivitet är viktiga riskfaktorer för många av dessa sjukdomar. I Sverige och andra länder är behovet stort av nationella riktlinjer med fokus på prevention av dessa kroniska sjukdomar. Enligt WHO står kroniska sjukdomar för cirka 70 procent av dödligheten i hela världen varje år.

Prevention handlar om att vi förhindrar att kroniska sjukdomar och ohälsosamma levnadsvanor uppstår hos en frisk individ, men också om att förhindra att sjukdomar blir värre. Det finns olika nivåer av prevention. Primärprevention handlar till exempel om att uppmuntra hälsosamma levnadsvanor eller att införa vaccinationsprogram. Sekundärprevention handlar om att förhindra att asymtomatiska sjukdomar blir symtomatiska, vilket innefattar tidig diagnos och effektiv behandling.

Syftet med denna rapport är att presentera och analysera preventiva insatser som har genomförts i olika länder för att förebygga kroniska sjukdomar och främja en hälsosam livsstil. Fokus är på två av de vanligaste kroniska sjukdomarna: cancer och hjärt-kärlsjukdomar.

### **Policyrekommendationer för ett framgångsrikt preventionsarbete:**

- *Bygg hälsosamma samhällen och miljöer som arbetsplatser, skolor, stadsdelar:* North Karelia-projektet i Finland (54) visar att en samhällsbaserad intervention som involverar policyförändringar, livsmedelsindustrin, hälso- och sjukvårdssystemet, skolor, stormarknader, lokala medier och mediekampanjer kan vara användbara för att utveckla samhälls- och områdesspecifika interventioner. Detta hjälper till att bygga en hälsosam gemenskap och miljö genom att aktivt involvera invånare och tjänsteleverantörer i att minska ohälsosamma livsstilsbeteenden.
- *Stärk individer och samhällen genom att erbjuda möjligheter att delta i preventionsaktiviteter från förespråkande till självförvaltningsinsatser:* I Nederländerna riktar Minder drinken till individer som vill ta itu med sina dricksvanor och minska intaget av alkohol. Sådana insatser som riktar sig till individer är användbara eftersom de hjälper personen att förändra sitt riskabla

livsstilsbeteende (44,45); Det ger dem också chansen att agera på egen hand utan att behöva utsättas för stigmatisering eller skam.

- *Utveckla integrerade hälso- och sjukvårdssystem och stärk primärvårdssystemen för att engagera sig tidigare i hälsofrämjande aktiviteter:* Västerbottens interventionsprogram som lanserades i Sverige (52) visar att när vårdssystem och vårdgivare, särskilt i primärvården, får resurser och är aktivt involverade i screening för riskbeteenden bland befolkningen, kan det avsevärt minska ohälsosam livsstil och kronisk sjukdomsutveckling.
- *Utvärdering och uppföljning med kostnadsnyttoanalyser:* Att ta itu med utvecklingen av kroniska sjukdomar med hälsofrämjande och sjukdomsförebyggande program och interventioner behövs men måste utvärderas kontinuerligt. Det är viktigt att genomföra effektiva insatser som hjälper till att ta itu med hälsofrågan men också se om de är kostnadseffektiva med tanke på att det finns en begränsad mängd resurser i sjukvårdssystemen.
- *Stärk sjukvårdssystemen med incitament att fokusera på förebyggande och investera i hälsofrämjande och sjukdomsförebyggande:* Med ökningen av kroniska sjukdomar, varav de flesta delar modifierbara beteendemässiga riskfaktorer, är behovet av investeringar i förebyggande vård nödvändigt. Som nämnts i rapporten är hälsoutgifterna med fokus på förebyggande vård i länder ofta låga (8). För att förebyggande insatser ska kunna genomföras och bli hållbara krävs effektiv planering och budgetfördelning med mer fokus på förebyggande vård.

## INTRODUCTION

When analysing the trends in occurrence of diseases worldwide, a rapid increase in the prevalence of chronic diseases- such as cardiovascular diseases (CVD), diabetes, cancer, arthritis, Alzheimer's disease and obesity- is observed (1,2). As per the World Health Organisation (WHO), chronic diseases account for almost 70% of mortality worldwide per annum (1,2). With the upsurge in the amount of people who suffer from multiple chronic diseases, implementation of efficient, cost-effective preventative and health promoting actions to curb the growth of chronic diseases is essential.

### Risk factors and underlying determinants

Risk factors for developing chronic diseases often include tobacco use, unhealthy diet, low physical activity and increased alcohol intake, which are also called modifiable risk factors (3). The underlying determinants of chronic diseases can be divided into 5 categories and include (4):

- ② biological factors of age or genetics,
- ② intrapersonal factors such as diet and lifestyle,
- ② interpersonal factors of community engagement and social support,
- ② living and working conditions including education, healthcare service provision,
- ② macro-level social-economic, cultural and environmental conditions and policies.

An individual's health and wellbeing over time is influenced by a combination of different determinants of health. For example, a reduction in exposure to risk factors and greater access to healthcare will lead to reduced incidence of chronic diseases and in turn, decrease premature deaths. In contrast to risk factors, protective factors are those which influence health in a positive manner. These include individual factors such as good nutrition, exercising daily but can also occur at a meso- and macro-level such as promoting smoking cessation among patients before surgery or imposing stricter policies regarding tobacco use.

### Cost implications

Over the years, a significant amount of resources has been dedicated to combatting some of the most known diseases such as cancer, CVD and diabetes. In this section, we present estimates of health-related spending such as on preventative care, defined as costs related to measures which aim to avoid and/or decrease the number and severity of injuries or diseases. The estimates also include costs for related complications and interventions targeted at individual and population level (5).

As per the 'Health at a Glance 2019' OECD report regarding overall healthcare related spending, countries like United States spent 16.9% of their GDP followed by Switzerland at 12.2%, Germany at 11.2%, Sweden at 11.0% and Netherlands at 9.9% (6). Analysing the trends of healthcare expenditure for preventive care in the different countries shows that a major proportion of healthcare spending is dedicated to chronic diseases. As per the European Commission, in 2016 70% to 80% of healthcare

related costs (approximately 700 billion euros) in the EU were spent on chronic diseases (7). As per Eurostats data analysis, in 2017 United Kingdom dedicated 5.2% from the total healthcare expenditure on preventive care compared to Finland at 3.8%, the Netherlands at 3.4% and Sweden at 3.3% (8).

The cost implications of chronic diseases can be observed both at an individual and organisational level as well as for society on a whole. For people suffering from multiple chronic conditions, complexity of treatment and management of diseases increases along with increased costs. The impact of indirect cost effects of chronic diseases also needs to be accounted for as they can lead to reduced labour supply and productivity. Healthcare systems need to ensure that sufficient resources are being spent on prevention as part of primary care while also meeting the needs of individuals and population groups. Focusing on prevention is a long-term investment as it helps prevent incidence of chronic diseases and reduce financial pressures on the health care system in the long run.

### **Current policy landscape**

From a policy perspective, at the international level several institutions have adopted resolutions and published policy reports focusing on prevention of chronic diseases and mitigating the effects of chronic diseases in society through proactive actions. The United Nation's resolution titled 'Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases' adopted in 2011 is a key document upon which policymakers at national level can use to formulate policies and strategies to combat chronic non-communicable diseases (9). The WHO Global Action Plan for the Prevention and Control of NCDs 2013-2020 provides a list of policy recommendations which can be adopted by Member States and other institutions (10).

At the European level, the European Commission has undertaken many projects tackling chronic diseases such as CHRODIS, a joint action on chronic diseases (8). Key focus areas of CHRODIS include health promotion and disease prevention, improved quality of life, multimorbidity care models, integrating more national policies focusing on the former and improving employment for people with chronic diseases (11).

Policy initiatives, both internationally and nationally, can have a significant impact on healthcare from setting priorities, drafting legislations, resource distribution to healthcare utilisation. With the rapid increase in chronic diseases worldwide, most countries have started prioritising and focusing on health promotion and disease prevention.

The purpose of this report is to present interesting interventions implemented in different countries which aim to prevent chronic diseases and promote healthy lifestyle. The focus of this report is to present interventions for two of the most prevalent chronic diseases such as cancer and cardiovascular diseases.

## A. CANCER

Globally, approximately 18.1 million people had cancer and 9.6 million deaths occurred due to cancer in the year 2018 as per the WHO (12). Projections by WHO estimate that by the year 2040 these figures will have doubled bringing to light the serious problem cancer imposes to society and individuals (12). Some of the most commonly diagnosed cancer types in 2018 included: lung cancer, breast cancer among females and colorectal cancer (12). Naturally, there is variation among prevalence of diagnosed cancer types between countries among different population groups. In 2018, lung cancer was the leading cause of death accounting for an average of 18.4% total cancer related deaths worldwide (12).

The general pathophysiology of cancer often includes the transformation of healthy cells into abnormal, cancerous cells due to complex processes and uncontrolled cell proliferation (13). An interaction between genetics and external agents such as carcinogens can lead to this transformation (13). Some of the most common risk factors for cancer are tobacco use, unhealthy diet, decreased physical activity and increased alcohol intake (14). Other risk factors include infections by carcinogenic biologic agents such as *Helicobacter pylori*, Hepatitis B virus etc (14).

As per the WHO, between 30% to 50% of cancer cases can be effectively prevented by ensuring that evidence based, cost effective preventive strategies are implemented (15). Primary prevention of cancer entails ensuring that the disease does not evolve in healthy individuals by implementing vaccination programmes, screening programmes or ensure healthy lifestyle (quit smoking, increase physical activity) through health promotion programmes (16). Secondary prevention of cancer entails early detection of disease which can be done by implementing screening programmes (such as cervical cancer screening in Sweden) and timely diagnosis (16). Tertiary prevention of cancer entails reducing the risk of mortality upon onset of disease via correct and timely treatment and management of disease (16).

Thus, cancer prevention, especially primary and secondary prevention, play a key role in reducing the burden of cancer disease. In this chapter, examples of interventions from Sweden, Finland, United Kingdom and Netherlands for tackling cancer are presented.

## Sweden: Standardised Cancer Care Process

Access to care in a timely manner is crucial to the overarching disease prevention concept especially for diseases such as cancer, where prevention and early detection play a key role in reducing burden of disease. One of the most persistent and problematic issues in the Swedish healthcare system is related to prolonged waiting times in access to care (17).

One of the key policy initiatives was the Care Guarantee (Vårdgarantin) law of 2010 describing the maximum time a patient will have to wait for a first visit, for a referral or for treatment/surgery at different levels of care: primary care and specialist care (18) This policy initiative aims to ensure that access to care is provided in an efficient and timely manner. Examples include being able to get in touch with the primary healthcare providers (PHP) on the same day as requesting a consultation, receiving medical assessment from PHPs within 3 days, to be able to see a specialist doctor at most 90 days after referral and to get the prescribed treatment or surgery by specialist doctor in maximum 90 days (18). Over the years the number of patients scheduled for visits to specialist care within 90 days decreased from 90% in 2012 compared to 86% in 2016 (19). However, the latest statistics show that in September 2020, patients who got their scheduled first visit to specialist care within 90 days fell to 73% which can be the result of the ongoing COVID-19 pandemic (20).

In 2015, a 4-year national program for cancer care titled 'Standardised Cancer Care Process (SCP)' [Swedish: Standardiserade vårdförlopp i cancervården] was initiated (21). This programme aims to provide a standardised manual for diagnosis, check-ups and treatments, provide details of referral to sub-specialists and provide a target time frame for diagnosis of each type of cancer (22).

Regionala cancercentrum i samverkan (RCC Regional Cancer Center), conducted an analysis of waiting time periods using the national database (SKR:s väntetidsdatabas) after the programme was introduced (23). The results showed a reduction of the overall waiting time for cancer care between 2017-2019 (23). An example provided in the report focused on waiting times for starting breast cancer surgical treatment and results showed that between 2017-2019 in the first quarter, almost 50% of the patients received treatment within the given timeframe (23). In 2020, 46% of patients received breast cancer surgical treatment within the given timeframe compare to 43% in 2019 (24). It is likely that a standardised care process facilitates carrying out cancer diagnoses, treatments and check-ups in an efficient way.

A challenge in Swedish primary care has been early detection of cancer. This year Forum for Health Policy's Patient Prize was awarded to the Gynaecological Oncology Clinic at Central Hospital in Karlstad. The nomination of this clinic was advocated for by a cancer patient for the clinic's speedy and high-quality care processes (25). In her blog post, the patient describes her journey of obtaining cancer care starting with various referrals to various primary health care clinics for 8 months, until finally one doctor decided on extended tests and screening thus discovering the tumour (25). Early detection in cancer care plays an important role and it is necessary to improve coordination between primary and specialist care in order to deliver efficient and early care to patients.

However, it is important to take into consideration the impact of the ongoing COVID-19 pandemic. As healthcare services are prioritising combatting the pandemic, cancer care is being affected. This is evident in Sweden where the National Board of Health and Welfare has published temporary recommendations for treatment and care of different types of cancer in lieu of the pandemic (26). As per the Regionala cancercentrum i samverkan (RCC), there have been fewer patients in the standardised care program due to delays in screening. A registry study based on data from pathology laboratories showed that the number of newly diagnosed cancer cases was reduced by 12% in 2020 compared to 2019 (27).

Naturally, despite standardised programmes for cancer care, diagnosis and treatment vary among individuals depending on early detection in primary care, accessibility to high quality care as well as the complexity of the disease. Nevertheless, with interventions, such as the SCP programme, with standardised processes, timely diagnosis and treatment, the burden of disease of cancer can be greatly reduced.

#### **Finland: Prevention through policy and legislation for Tobacco control**

Globally, one of the most commonly diagnosed cancer in 2018 was lung cancer as per the WHO (12). The most common risk factor for development of lung cancer and cancer in general is the use of tobacco. Worldwide, approximately 1.3 billion people or more smoked tobacco or used tobacco in some form in 2020 (28). Smoking tobacco accounted for nearly 11.5% of the total deaths in 2015 (29). The mechanism of action for tobacco on altering cellular biology or drug metabolism has been heavily researched (30,31). Given the strong evidence for impact of tobacco use and development of cancer, prevention strategies to modify tobacco use behaviour need to be implemented. An example of a national legislation in Finland for reducing tobacco use among population is a prime example of disease prevention intervention.

Prevalence of smoking tobacco was high among Finnish men in the 1960s (57%) and low among women (14%) (32). Between 1960 and late 1970, several initiatives to reduce smoking started and the implementation of the Tobacco Control Act (TCA) in 1976 was key in reducing smoking prevalence over the years (33). The TCA led to a smoking ban in public places, restricted tobacco advertisement (total ban in 1978) and imposed an age limit for purchase of tobacco products (33). Publishing health warnings on packaging was made obligatory for manufacturers, tobacco excise taxes were increased, and prevention programmes were started (33).

These initiatives greatly reduced smoking prevalence among men and women in Finland. In 2018, prevalence of smoking among men was 15% and 13% among women (32). In 2010, the primary aim of the TCA was to end tobacco use and in 2016 this objective included all tobacco and nicotine products including e-cigarettes and e-liquids (32). When assessing smoking prevalence among 14 to 16-year olds, a decrease from approximately 20% in 2000's to 7% in 2018 is observed (34).

The effect of such interventions assessed in a study by Heloma et al showed that the incidence of lung cancer among men decreased from 80 to 32 per 100,000 men starting from 1971. In addition, strong evidence for impact of national legislations on reducing prevalence of smoking and incidence of cancer was observed (35). Introducing national level policies and adopting stringent measures to reduce risk behaviours such as tobacco and alcohol use are often necessary in order to fight the increasing prevalence of diseases such as cancer.

#### **United Kingdom: Nation-wide HPV vaccination programmes**

Cervical cancer, primarily caused due to a virus known as Human Papillomavirus (HPV), is the fourth common cancer diagnosed among females, with an estimate of 570,000 cases occurring in 2018 (36). This accounted for nearly 7.5% of all cancer related deaths among females (36). Vaccination programmes are one of the key public health strategies used to combat and prevent infectious diseases. Currently, three vaccines targeting HPV 16 and 18 are available, which accounts for 70% of all cervical cancer cases (36).

In the United Kingdom, the HPV vaccination programme started in 2008 (37). The programme initially only targeted girls aged 12 to 13- years of age but in 2018, the Joint Committee on Vaccination and Immunisation (JCVI) extended the programme to include adolescent boys as well (37). The programme aims to offer vaccination to boys and girls aged 12-13 years of age with 2 doses of the HPV vaccine (38). Initially, the programme included a 3-dose schedule however in March 2014, following JCVI's advice this was changed to a 2-dose schedule, due to immunological studies assessing efficacy between different dosages showing similar effects (37).

The impact of the initial programme was assessed in a report by Public Health England (PHE) starting from 2008-2009 until 2013-2014 (37). The results showed that overall vaccine coverage for HPV increased from 80% in 2008-09 to approximately 85% in 2013-14 (37). Additionally, the prevalence of HPV 16/18 infection among 16-18-year olds decreased by 66% in 2010-2013 compared to 2008 (37). Acceptability of vaccinations is a highly subjective matter. A study conducted among parents of teenage boys regarding the HPV vaccine showed that attitudes, knowledge and beliefs about the vaccine differed between population groups (39). In the study many of the parents were unaware of an HPV vaccination which could have affected acceptance of the vaccination, nevertheless majority of the parents in the study expressed interest in vaccinating boys as well as girls (39).

However, vaccinations are restricted to certain strains of HPV and therefore screening programmes for cervical cancer should also be implemented, in order to ensure a multi-layered prevention strategy. Additionally, information campaigns which enable knowledge dissemination about cervical cancer and HPV should be introduced in order to raise awareness about the disease and how to prevent among all age groups.

### **Netherlands: Minder Drinken intervention for adults to reduce/stop alcohol consumption**

Modifiable behaviours related to cancer often include tobacco use and increased alcohol consumption. The WHO in their 'Global Status Report on Alcohol and Health 2018' stated that approximately 2.3 billion people were current drinkers (consuming alcohol) in 2016 (40). In 2016, alcohol-attributable non-communicable disease related deaths approximated to 1.7 million worldwide (0,6 million from digestive diseases, 0.6 from cardiovascular diseases) and 0.4 million from cancers (40).

A key initiative that the National Institute for Public Health and the Environment in the Netherlands has introduced is the development of an intervention database called 'loketgezondleven' (41). This database serves as a key component of the integrated health promotion centre established by the Dutch government (42). The focus of the integrated health promotion centre is to encourage healthy living by ensuring that systematic, evidence-based interventions are implemented in daily practice (43).

One of the interventions listed on the website is called 'Minder Drinken' [English: Drink Less] which has been identified to have good effectiveness in providing support to individuals (age 18+ years) to reduce or stop alcohol consumption (44). The intervention consists of an online self-help program whereby the participant gets information and tests for current alcohol drinking patterns via an app and can set goals for reducing alcohol consumption while keeping track of achievements (44). Naturally, support is offered via an online forum moderated by Alcohol Infoline of Trimbos Instituut and contact function on the intervention webpage (44). A study assessing the generalisation of the Minder Drinken intervention to real world setting showed that the web-based self-help program was effective, feasible and well-accepted to reduce alcohol consumption behaviours (45).

Interventions are not only limited to organisational levels such as policy changes or delivery via healthcare professionals but can also be targeted at individual level such as the Minder Drinken intervention. Among people with alcohol use or alcohol use disorders who wish to change their lifestyle, shame or fear of stigmatisation can often prevent them from seeking help from professionals. As a preliminary step in self-management, individual intervention such as Minder Drinken can be useful in helping people take the initiative to start changing their lifestyles.

## **Conclusion: Cancer**

Cancer control and care can focus on prevention, screening, early diagnosis, treatment, palliative care and also health promotion actions. As seen from the examples provided above the knowledge pool regarding interventions targeting cancer is diverse. Prevention plays an important role in cancer control. Preventive measures targeting behavioural factors such as trying to reduce tobacco use by implementing strict legislation can reduce consumption. As data suggests, population level interventions in the form of regional cancer centres and development of standardised care pathways can be useful in delivering efficient services. Nation-wide immunisation programmes such as for HPV or hepatitis can be useful for preventing cancer by targeting non-behavioural risk factors. These non-behavioural risk factors include prevention of cancers by vaccinating individuals against viruses like HPV which has the potential to cause cervical cancer among women. However, interventions are not limited to population or community level but can be implemented at an individual level. By encouraging and empowering individuals with the tools to promote their own well-being and health, the burden of prevention at healthcare level can be alleviated. In conclusion, implementation of evidence-based programmes, interventions and policies targeting risk factors of cancer both at population and individual level can be useful in reducing the burden of disease.

## B. CARDIOVASCULAR DISEASES

Cardiovascular diseases (CVD) accounted for 31% of total deaths in 2016, approximating to 17.9 million people (46). Heart attacks and strokes are the most common acute CVD events. They can, however, be caused by underlying long term factors such as coronary artery disease (46). The risk factors for CVD often are similar to the risk factors for other chronic diseases such as tobacco use, increased alcohol intake, low levels of physical activity but also include obesity and being overweight (46). The risk of CVD also increases with age and can be influenced by one's genetics and sex (47). Other macro level factors include socioeconomic status, health policies, rapid urbanisation and cultural influences on health behaviours (46).

The exact pathophysiology of CVD differs depending on the type of disorder. However, one of the major precursors for CVD is atherosclerosis. Atherosclerosis occurs when there is a chronic inflammation of arteries, a process driven by lipid accumulation such as low-density lipoprotein, and over time results in CVD such as heart attacks, coronary artery disease (48).

As per the World Health Organisation, in Europe approximately 80% of premature heart diseases and stroke are preventable (47). With the growing burden of disease of CVD, initiatives at international and national level have been undertaken to address the issue. An initiative called 'Global Hearts' has been started as a collaboration between the World Health Organisations, United States Centre for Disease Control and Prevention, World Stroke Organisation and others (49). The aim of the initiative is to address the threat of CVD. The initiative consists of 3 technical packages (49):

- SHAKE which consists of evidence-based policy recommendations for national governments to implement in order to lower salt consumption among populations
- HEARTS which provides countries with tools necessary to ensure best CVD management practices at primary healthcare level
- MPOWER which consist of six measures which can help countries implement the provision highlighted in the WHO Framework for tobacco control.

Many of the risk factors for CVD are modifiable behavioural factors such as unhealthy lifestyle, low physical activity, diet and nutrition. In this chapter, we provide examples of interventions which can be useful in addressing this issue.

## **Sweden: The Västerbotten Intervention Programme**

The rise in non-communicable diseases such as cancer, cardiovascular diseases and Alzheimer's disease and dementia in Sweden has been unprecedented. As per statistics from Socialstyrelsen (National Board of Health and Welfare in Sweden) in the year 2019 the leading cause of deaths among men and women was cardiovascular diseases, accounting for approximately 31% of all deaths (50). However, when comparing the number of deaths due to CVD in the year 2019 to the years 2016-2018, CVD attributed deaths per 1000,000 persons decreased by 9.6% among men and 12.5% among women (50). Despite this promising decrease in mortality, premature deaths due to CVD need to be prevented and one way of addressing this issue is by tackling unhealthy lifestyles.

A prime example of a large-scale community intervention designed to tackle the increased burden of CVD is the Västerbotten Intervention Programme. The intervention is available and offered to all municipalities in the Västerbotten county and aims to promote and support healthy lifestyle behaviours among inhabitants to combat risk of develop CVD or diabetes (51). The intervention consists of 2 health checks at a healthcare centre in Västerbotten where various tests and measures are performed for example to assess blood glucose or blood pressure (52). The patients are also asked to fill in a questionnaire assessing the individual's lifestyle and social life (52). After the initial visit, individuals are invited for the 2nd meeting, where they are offered a consultation with a specialised nurse based on test results and the questionnaire. Using motivational interview technique, the specialist nurses provide patients with a 'health talk' which addresses the patient's lifestyle based on the test results from the 1st visit and is the core element of the intervention as it is imperative in order to help individuals develop and nurture healthy lifestyles (52). Examples of healthy habits include increasing physical activity, decreasing alcohol consumption, eating a balanced diet etc. This health check visit invitation is offered to residents around 40th, 50th and 60th birthday (52).

An evaluation of the health checks conducted from 1990-2006 in Västerbotten showed that mortality decreased in Västerbotten compared to the national average (52). By implementing cost effective, large scale interventions involving primary healthcare to address the risk factors of CVD is an effective and prime example of good practices regarding interventions to tackle CVD.

### **Finland: The North Karelia project**

With the rise in chronic non-communicable diseases like CVD and with risk factors rooted in unhealthy lifestyle behaviours such as psychosocial stress, poor nutrition and increased tobacco use, susceptibility increases at both individual and population level. Other factors such as economic situation, physical environment (air pollution, urban planning) and cultural aspects further increase the risk of developing CVD.

Some common methods of used to tackle such issues involve prevention at community level as seen above in the Västerbotten Intervention Programme. Community based interventions can either be focused to an organisational level such as primary healthcare centres or can have multiple components, involve multiple stakeholders and incorporate different approaches to prevention. They are useful in helping individuals modify unhealthy lifestyle behaviours, support health promotion using strategies such as knowledge dissemination, education, but can also include policy changes at macro-level (53).

An example of an integrated community-based intervention for CVD is seen in Finland. The North Karelia project started in early 1970's in response to the high mortality rate due to CVD in Finland and was a collaborative initiative with local and national authorities along with WHO (54). Launched in 1972, the project was used to assess whether a community-based intervention using health services, public policy and other stakeholders would be useful in reducing risk factor levels among the population (54). The intervention was theory based and used multiple strategies such as involving media and communication campaigns, involvement of general practitioners and public health nurses, environmental changes involving collaboration with food industry and policy changes at macro-level (54).

The project ran for 25 years and resulted in a decrease in unhealthy behaviours, with smoking percentage falling to 31% in 1997 from 52% in 1972 among middle-aged men (54). By 1995 coronary heart disease mortality rate annually among middle-aged men in North Karelia reduced approximately 73% compared to before the intervention was implemented (54).

Implementation of interventions at community level which are theory-based, evidence-driven and can be implemented in the national policy framework can be useful in preventing development of chronic non-communicable diseases. Such multi-component interventions can target many risk factors at the same time and incorporate different strategies. Community-based programmes have an advantage, in the sense that instead of targeted individual interventions, which can be expensive in the long run, a community intervention with multiple components can target many outcomes and individuals at the same time.

## **United Kingdom: Change4Life programme promoting healthy behaviours among children**

One of the most common risk factors for developing cardiovascular diseases is obesity or being overweight (55). As per the WHO, the estimated proportion of adults who were overweight in 2016 was 1.9 billion and more than 650 million were obese (56). Development of obesity/being overweight is influenced by one's genetic makeup, environmental factors (urban planning) and lifestyle factors such as diet and physical activity (55). It is imperative that healthy lifestyle habits are followed from a young age as studies have shown that there is a higher risk of developing CVD related risk factors in later life due to childhood obesity (57).

In the United Kingdom, results from the Health Survey for England in 2017 showed that 28.7% of adults are obese and 35.6% are overweight (58). The survey results also showed that 9.5% of children aged 4-5 years old were obese and 12.8% were overweight (58). These numbers increase at ages 10-11 years old where 20.1% are obese and 14.2% children are overweight (58).

Change4life is an intervention programme implemented by Public Health England in 2009 with the aim to increase awareness and knowledge regarding healthy eating among families, by targeting parents in being active and involved in ensuring that good nutrition and diet habits are followed (59). This is then expected to translate into small yet meaningful changes in dietary habits. The campaign uses a social marketing strategy in order to raise more awareness and there is a webpage dedicated to the intervention from which parents can obtain information on healthy food recipes, activities to increase physical activity and other food related facts (60).

Several studies have been conducted to evaluate the campaign and results have shown that while awareness and knowledge regarding healthy lifestyle increased among parents, sustainability, engagement and adherence to such campaigns requires more effort and better implementation (59,61). Many factors can affect the uptake of such an intervention within a population and some of these are environmental issues such as access to organic and affordable vegetables and fruits for families with low socio-economic status. Changes made to the intervention such as specifying the target group (children or parents), involving primary healthcare professionals and other components can be added to make the campaign more effective.

### **The Netherlands: The Cardiovascular Risk Management programme**

Above we presented some examples of interventions addressing CVD at community or population levels primarily targeting individual lifestyle or habits in order to achieve lower disease related mortality. However, interventions can also be introduced at an organisational level that is in healthcare settings. These interventions are often implemented to target healthcare professionals such as medical doctors and nurses in healthcare settings.

In the Netherlands, 26% of total deaths were attributable to CVD and this was the second-highest cause of death after cancer at 32% in 2016 (62). With CVD being the leading cause of death among elderly women and second highest cause of death among elderly men, guidelines for cardiovascular risk management at a multidisciplinary level were drawn, providing information and recommendations regarding preventative treatment (63,64).

The CVRM programme is delivered via general practices and involves healthcare professionals and nurses in primary care settings. The main components of the integrated CVRM programme include information on diagnosis, treatment and follow-up of risk factors of CVD with a focus on reducing the prevalence of risk factors (65). Some of the risk factors include hypertension, high cholesterol levels, being overweight or smoking (65). The programme includes obtaining a referral from general practitioners or specialist in order to obtain a consultation in the CVRM programme (65). The consultation usually lasts 45 minutes and is conducted by a specialised nurse/healthcare professional with follow-ups annually (62,65).

The implementation of such a guideline at the healthcare level is a prime of example introducing interventions which can, in addition to individual targeted interventions, can help reduce risk factors of CVD. With proactive preventive actions at primary care level, including screening, monitoring and regular follow-up on reducing risky behaviours, development of CVD among essentially all age groups can be prevented. By providing resources, time and training to practitioners and information regarding the existence of such programmes and their benefits to patients, the burden of cardiovascular diseases would reduce greatly. It is important for healthcare systems to develop effective guidelines which can be implemented at nation-wide level.

## **Conclusion: Cardiovascular diseases**

Cardiovascular diseases are one of the leading causes of mortality and most common chronic diseases worldwide. The risk factors for cardiovascular diseases and cancer in terms of behavioural factors are very similar. Daily physical activity and healthy diet and nutrition plays a key role in the prevention of CVD. Implementation of risk management programmes as mentioned above, patients at high risk of developing CVD can be offered prevention interventions at an early stage and this can help decrease their risk. Obesity is a leading risk factor for CVD, and it can be prevented by introducing healthy lifestyle programmes such as the Change4Life programme which promotes healthy behaviours such as good nutrition among children. For effective prevention of CVD, individuals need to be educated on healthy lifestyle and behaviours. Community level interventions such as the North Karelia project in Finland or the Västerbotten intervention programme in Sweden are prime examples of interventions which have been implemented and studied at community level, which involves cooperation and collaboration between the individuals and healthcare system. When healthcare systems and providers are actively involved in improving patient lifestyle and screening for potential risk factors, and when individuals are engaged and committed to work on reducing exposure to risk factors, it can decrease the growth of chronic diseases among the population.

## THE IMPORTANCE OF EVALUATION IN DISEASE PREVENTION AND HEALTH PROMOTION

The focus on health promotion programmes and disease prevention interventions being implemented and studied has increased in recent years. However, if we are to implement these programmes and interventions in routine use and practice, they need to be rigorously evaluated in terms of cost-effectiveness, impact on health, impact on disease and impact on population. As prevention related spending is limited in terms of financial resources, only those interventions and programmes which demonstrate efficacy, effectiveness and cost-effectiveness need to be implemented. For this reason, evaluation plays a major role in the health promotion and disease prevention sector. Many times, the long-term cost effectiveness of interventions cannot be determined which makes evaluation of interventions focusing on prevention challenging.

Furthermore, most interventions and programme studies which assess effectiveness study the impact of the intervention in addressing the health challenges. Many interventions are often studied using randomised-control trials however the implementation of such interventions occurs for a longer period of time in real-life compared to trials. In light of this, economic models for evaluation of long-term cost benefits based on effectiveness studies are important to assess the cost impact over many years.

There is a need for continuous evaluation of interventions and programmes in health promotion and diseases prevention. Evaluation needs to focus on the effectiveness and economic costs and benefits, but also focus on assessing whether the intervention is sustainable. Health problems and risk factors can change over time which means interventions also need to be constantly changed and updated to ensure that the correct risk factors and health problems are being addressed.

Policymakers need information regarding impact of such interventions on health issues, burden of disease but also regarding the economic impact of implementing interventions. In Sweden, due to a decentralised healthcare system municipalities (kommun) are responsible for elderly care and have autonomy over assigning budgets such as regarding care services. Regions have the responsibility for providing health care. Finally, at the national level, legislation and policy guide the distribution of state subsidies to municipals and regions. The state is also responsible for the social security system. But the three governing levels are constitutionally independent and have the mandate of taxation. Costs on one level, for example investments in disease prevention on a regional level might lead to benefits on a national level, for example decreased costs for social security. Therefore, it is necessary, in this context, for transparency when it comes to health economic effects. Finally, as data suggest, more resources should be allocated for prevention so as to alleviate the pressure on healthcare systems as well as help alleviate the effects of chronic diseases on the economy such as increased sick leave.

## POLICY RECOMMENDATIONS

The rise in chronic diseases such as diabetes, cancer and CVD can be reduced by targeting modifiable behavioural factors such as tobacco use, physical activity, diet and alcohol use in order to prevent diseases from developing or progressing. Actions such as promoting healthy lifestyles among individuals and communities, implementing organisational level actions such as screening programmes, immunisation programmes in addition to macro level policy changes can all be beneficial in preventing the rise of chronic diseases. Below, we have provided with some overarching policy recommendations and linked them to the intervention data provided in the report above:

- Build healthy communities and environments such as workplaces, schools, neighbourhoods: The North Karelia project in Finland (54) shows that a community based intervention involving policy changes, food industry, healthcare system and providers, NGOs, schools, supermarkets, local media and media campaigns can be useful in developing community and area specific interventions. This helps build a healthy community and environment by actively involving inhabitants and service providers in reducing unhealthy lifestyle behaviours.
- Empower individuals and communities by providing opportunities for participation in prevention activities from advocacy to self-management interventions: In the Netherlands, the Minder drinken intervention targets individuals who wish to address their drinking habits and reduce intake of alcohol. Such interventions targeting individuals are useful as they help empower the person in changing their risky lifestyle behaviour (44,45) It also provides them with the chance to act on their own without having to face any stigmatisation or shame.
- Develop integrated healthcare systems and strengthen primary care systems to engage earlier in health promotion activities: The Västerbotten Intervention Programme launched in Sweden (52) shows that when healthcare systems and healthcare providers, especially in the primary care system, are provided with the resources and are actively involved in screening for risk behaviours among the population, it can significantly reduce unhealthy lifestyle and chronic disease development.

- Evaluating and follow up with cost – benefit analyses: Addressing the development of chronic diseases with health promotion and disease prevention programmes and interventions needs to be constantly evaluated. This is important in order to implement only effective interventions which help address the health issue but also those which are cost-effective given that there is a finite amount of resources in healthcare systems.
- Reinforce healthcare systems with incentives to focus on prevention and invest in health promotion and disease prevention: With the rise in chronic diseases, most of which share modifiable behavioural risk factors, the need for investments in preventative care is necessary. As mentioned above, healthcare spending focusing on preventative care in countries is often low (8). In order for preventive interventions to be implemented and sustained, efficient planning for budget allocation is needed with more focus on preventive care.

## CONCLUSIONS

The prevalence of chronic diseases is rising and will continue to rise with the increasing trend of increased life expectancy. The impact of chronic diseases is growing steadily, and this places a huge strain on healthcare systems. Effective interventions to tackle risk factors of chronic diseases are being researched, validated and available to be implemented. At the governmental level, prevention of chronic diseases needs to be prioritised rather than answering to the threat of each disease independently. Due to the ongoing COVID-19 pandemic, healthcare systems worldwide have been facing challenges regarding maintenance of provisions of efficient care services to people.

Recently however, considerable amount of resources such as financial and healthcare workforce related have been dedicated to and are being prioritised for combatting the current pandemic. Due to this shift in prioritisation, provisions of care services such as screening visits for cervical cancer, visits to the hospital for vaccinations, continuity of treatment for those with cancer can be hindered. Due to unprecedented events such as the COVID-19 pandemic gravely affecting healthcare systems, preventive measures to combat the burden of chronic diseases need to be established and implemented so that the culmination of such adverse events with the rise in chronic diseases do not put healthcare systems under immense pressure.

Many chronic diseases share similar risk factors which can be targeted using effective interventions. At the healthcare level, health providers need to be equipped with the knowledge, tools and reimbursement schemes to ensure that health promotion is incorporated in every step of the care pathway. Knowledge regarding healthy behaviours should be disseminated at population level. At the population level, communities and individuals need to engage in improving lifestyle habits by active participation. At the same time prevention programmes and interventions needs to be constantly evaluated to certify which measures are effective and cost-effective given limited resources in healthcare systems.

Naturally, the importance of prevention and health promotion must not only be for major chronic diseases such as cancer, diabetes, obesity or cardiovascular diseases. It also incorporates diseases such as psoriasis, osteoarthritis and asthma, all of which severely impact quality of life among patients. Chronic diseases not only affect the health of an individual but also have socio-economic effects. Intersectoral cooperation is necessary in order to ensure that quality of life among those who suffer from chronic diseases is improved.

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