European Policies on Cardiovascular Disease Prevention and Health Promotion: A Comparative Study

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European Policies on Cardiovascular Disease Prevention and Health Promotion: A Comparative Study

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Abstract

As the number one cause of death, cardiovascular disease represents a threat to both the economic and social well being of European countries. As a result of a variety of coordinated efforts between the European Union (EU), national governments, non-profits, private industry, and local communities, cardiovascular disease (CVD) has been decreasing in most countries in recent years. Measures such as bans on trans fats in Denmark, social mobilization and prevention policy in Finland, and nutrition labeling in the United Kingdom have had major impacts on heart disease. For instance, Finland’s prevention programs have resulted in a 63% reduction in deaths due to CVD (Laatikainen, Critchley, Vartiainen, Salomaa, Ketonen, & Capewell, 2005). However, other countries, like Greece and Russia, are faced with rising incidences of heart disease due to increased economic stress, change from traditional diets, and poor national coordination. In this study, I have examined the policies that have been recommended by the European Union, as well as individual national policies, to determine that prevention and health promotion are the most effective ways to promote a heart healthy lifestyle.

Preface

Cardiovascular disease is of particular interest to me. I have worked with the American Heart Association and spent the last year studying the risk factors and causes, the social and economic effects, and efforts we can take to avoid its detrimental impact. I first became interested following my father’s death from a heart attack. As a completely preventable disease, it seems illogical to me that so many people per year die of CVD; I did not want anyone else to go through what I went through, and as a result I have decided to dedicate my energy to studying the disease. In addition, studying in Europe
presented an ideal opportunity for me to do research on CVD due to the uniqueness of the EU’s structure and the variation of policies in the region. I was interested to see what roles culture, policy, and economics have on the disease and prevention in the region.

**Acknowledgements**

First, I would like to thank the academic program managers and directors at the School for International Training in Nyon, Switzerland: Dr. Alexandre Lambert, Dr. Heikki Mattila, and Ms. Francoise Florens, for all of their guidance throughout this paper and the academic program. In addition, I would like to thank Susanne Løgstrup, the Director of the European Heart Network in Brussels for a wonderful interview and for providing me with contacts in order to enhance my research. In addition, I would like to thank Christina Dimopoulou at the European Society of Cardiology in Brussels for a helpful interview as well. Also, I would like to acknowledge Simon Rask, Chief Consultant, at the Danish Heart Foundation (Hjerteforeningen) in Copenhagen, Denmark for an informative interview. Finally, I would like to extend my thanks to Simon Gillespie, the Chief Executive at the British Heart Foundation, for dedicating his limited time to responding to my questions. I would also like to thank Gemma Calzada, a nutritionist in Geneva, Switzerland, and Adrian Fischer at the Swiss Observatory for Sports, for their helpful responses. In addition, I am dedicating this paper and my research to my Dad and all those who have been victims of heart attacks. I hope that in years to come less people have to endure the same loss and illness.
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Introduction

As the leading cause of death in Europe, cardiovascular disease (CVD) kills about 2 million people every year (European Commission, 2015). Cardiovascular disease (CVD) is a disease that occurs due to an excess of plaque that builds up in arteries. This build up can lead to heart attacks and strokes due to a restriction of blood flow to the heart or brain. Risk factors of CVD include: obesity, diabetes, smoking, unhealthy diet, sedentary lifestyle, stress, and excessive alcohol intake. In the past 50 years, there has been a major epidemiological shift from communicable diseases to non-communicable, chronic diseases, such as CVD, diabetes, cancer, and pulmonary diseases. As a result, these diseases, and CVD especially, have become a large focus of the European Union and the countries impacted. As a part of the study, I have compared policy measures that have been implemented by governments in a Western European country, two Northern European countries, a Southern European country, and an Eastern European country (the United Kingdom, Denmark, Finland, Greece, and Russia, respectively) in response to this heart disease epidemic. As a result of coordination in the EU through the EU commission and a variety of other heart disease centric organizations, private corporations, non-profits, local communities, and national governments, Europe has made progress on lowering the incidence of heart disease. Comparatively, some countries have done better than others. However, Europe and its citizens still face monumental cardiac health issues. As has been shown through my research, policy measures that lead to prevention, rather than reactive, secondary prevention measures are the most successful in controlling the epidemic. Europe must move past the current climate of non-governmental influence and the dominance of private corporate influence to follow in the lead of countries like
Finland; these measures will result in healthy populations with a lack of heart disease for years to come.

**i. Literature Review**

I consulted a variety of works of literature for my research. Most of my research was comprised of medical and public health journals covering the issue of heart disease in Europe and in specific countries. However, I also reviewed country reports and organizational reports on the situations within Europe. Some of these were very specific and provided information on country specific programs, others provided general information on statistics and rates. Of course, the conclusions of the articles varied based on which country or program they were referring to. For instance, articles that I consulted that were written on Russia came to a different conclusion on the situation there than those that I consulted that were written on the United Kingdom. The largest source written of information I used was from the European Society of Cardiology’s “Country of the Month” program. These articles summarized a variety of country’s CVD statistics, health programs, and prevention policies; these were very helpful in my case studies and for comparative understanding.

**ii. Research Questions**

In approaching my interviews, the main questions that I asked depended on the organization that I was consulting with. However, the following represent the main questions I attempted to answer with my research:

1) What are the prevention programs that are used in EU countries?

2) How are these programs helping to prevent CVD?

3) What are the best approaches for preventing cardiovascular disease?
When discussing these issues with European wide organizations such as the European Heart Network and European Society of Cardiology I asked more general questions regarding the policies of the European Union, the impacts of these policies, and how they are accepted or applied in individual countries. When interviewing organizations within countries, like the Danish Heart Foundation, I inquired about the specific in-country policies, prevention methods, and the impacts of these. Also, importantly, I investigated how these countries and organizations applied these policies to the general public. Understanding how these countries implement their programs and policies for use with the general public is important to know how they can be applied elsewhere in other countries where prevention may be lacking or needs improvement.

iii. Research Methodology

I gathered my information from a variety of sources and figures. My primary information has been gathered and recorded through interviews with professionals. The methods of by which I questioned these individuals can be found in the Introduction (section ii). I contacted these organizations based on suggestions from Dr. Mattila and my own academic research. The European Heart Network (EHN) and the European Cardiology Society (ECS) are the largest organizations in the EU dedicated to CVD research, funding, and providing recommendations to the EU on what policies to adopt and push to member states. In addition, I received a variety of contact recommendations from Susanne Løgstrup at the EHN. I contacted these organizations and individuals via email and phone and often times had a variety of follow-ups. In addition, I experienced non-response from other European organizations, heart foundations, and cardiologists. I felt that interviews were my most valuable sources of information due to the
organizations’ distinct understanding of the topic, familiarity with the present day situation, and their future expectations and visions. As a result, I dedicated the majority of my time and qualitative research to interviews. However, I did use a variety of secondary sources, like articles from academic journals and organizational/country reports. This information was helpful to gain a grasp on background information, specific numbers/percentages, and case studies.

All my interviewees were aware of the direction of my research and my goals for the study. In addition, they all gave verbal permission to me to record the interview. They are also entitled to have access to my project as well. I have no conflicts of interests to declare.

**Analysis of Cardiovascular Disease Prevention Efforts**

**Overview of Europe**

i. **Cardiovascular Disease and Risk Factors in Europe**

As Europe is made up of a variety of societies, the main risk factors affecting CVD differ in each country; each society has their own factors that play into the manifestation of a heart disease epidemic. Variations can be explained by differences in lifestyles, governments, and stages of prevention and policy actions. Most notably, each country within Europe is in a different stage of the non-communicable disease transition; for instance, Finland had the highest rate of Coronary Heart Disease in the world in 1972 and it has since decreased, but now Russia holds the position as having the highest rate in the world (Mirzaei, Truswell, Taylor, & Leeder, 2008). Despite this, there have been some general trends in the continent and some major focuses.
As mentioned, CVD kills nearly 2 million people every year in Europe and is responsible for 47% of all deaths (European Heart Network and European Society of Cardiology, 2012). In Europe, CVD kills slightly more men than women (52% men versus 42% women). This is due to the lack of awareness about the disease among women and the lack of understanding of the variety of symptoms in women that differ from symptoms in men (European Heart Network and European Society of Cardiology, 2012). CVD is the leading cause of death in both Europe and around the world. Despite this, there is often a lack of research and monetary focus placed on the disease; as discussed by all of those that I interviewed, there is a much larger focus on cancer within the EU Commission, individual governments, and populations.

The map below shows the mortality rates in Europe by country in men from 0-64 years.

![Map of Europe showing mortality rates in men from 0-64 years](image)

(European Heart Network and European Society of Cardiology, 2012)

It is important to recognize that the cost of this disease, in both direct and indirect costs, are estimated at 196 billion euros per year, whereas the budget of the EU is only 140
billion euros per year (Løgstrup); this cost is divided between health care costs (54%), productivity loss (24%), and informal care (22%).

In terms of risk factors, smoking remains the major risk factor of concern for all of Europe. Smoking accounts for approximately 20% of all cases of CVD (European Heart Network and European Society of Cardiology, 2012). Smoking rates remain high throughout Europe, and though there has been a decline in all countries, excluding Russia, it has not been as rapid as expected or needed. In fact, among some demographics, the decreasing trend is even slower. For example, there has been less of a decrease in the prevalence of smoking among women due to the increased social acceptability of women smoking. The gender gap is now 32% of men smokers versus 25% of women smokers. In addition, there is larger prevalence of smoking among the lower socioeconomic classes; 52% of unemployed persons are smokers. This percentage indicates a problem for countries where economic recessions have occurred, like Greece and Russia. Most notably, some countries like Russia have seen a marked rise in the smoking prevalence among adolescents. Outside of these countries, smoking among adolescents has decreased, but at a slower rate than other demographics (European Heart Network and European Society of Cardiology, 2012). Clearly, smoking, in addition to other more individualized risk factors like obesity, lack of exercise, etc., represents a large threat to Europe.

ii. Problems with European Policy Implementation

In introducing policy measures to target CVD and its risk factors, the EU, the EHN, and ESC face a variety of problems. Firstly, cardiovascular disease is still not seen as the largest threat in Europe, despite its prevalence and social and economic costs. As
discussed by Susanne Løgstrup and the other experts I interviewed, cancer is given the
highest degree of attention by the population and of importance in research and funding
by the governments. Currently, the research investment in cancer is more than three times
the investment made into heart disease research (Løgstrup). With a lack of pressure from
the general population, it is more difficult to get legislation passed or to draw the
attention of European Parliament. The EHN and ESC work to encourage their members
to contact their EU representatives and push for policy change; they also work to
intervene, pre-empt policies, and spread awareness on the problem within Parliament
through events such as World Heart Day and through co-signing letters to Parliament.

However, despite increased awareness, there are still barriers that have developed in
recent years. There has been an increase in the amount of corporate influence throughout
Europe that has limited the amount of policy change that can occur, and what types of
policies are implemented. For instance, cancer research is encouraged by large
pharmaceutical corporations due to the value of investment and the amount of money
these drugs can produce. Also, developed in 2006, the Nutrition and Health Claims
Profile is an example of a policy that failed at the EU level due to industry influence. The
commission was in the process of developing nutrition profiles for certain foods with
high level of saturated fats, sodium, etc. so warning labels could be placed on packaging;
however, this effort failed due to its tie with industries and the potential that food
companies could be economically harmed by this warning labeling. In addition, there is a
large amount of fragmentation in the EU. The commission has the responsibility to
develop policies, but has no way to truly enforce this legislation in all member states. As
a result, only a small number of member states may adopt a specific policy; this is true in
the case of the Tobacco Product Directive in which only three countries (the UK, Ireland, and France) have adopted it. Finally, there has been a decrease on the EU policy level in providing policy recommendation for national governments. There is a new political climate of non-intervention; this makes it difficult to create a common standard in all European countries (Løgstrup).

iii. European Programs and Policies

In response to the threat of CVD and despite the limitations, the EU and European-wide organizations such as the EHN and ESC have created a variety of programs and policy recommendations for their member states. To begin with, the ESC developed EUROSPIRE, an observational survey to track the number of people in the EU with CVD and to track risk factors, as well how patients respond to treatment (Montaye, De Bacquer, De Backer, & Amouyel, 2000). This survey is important to understanding how and where to implement prevention plans, as well as their effectiveness. In addition, a major step in ensuring that the appropriate policies are delivered to the European population was the establishment of the European Heart Health Charter in 2007. As discussed by Løgstrup and Reiner, the charter is composed of 23 articles on a variety of topics like research, assessment, and programs that are meant to tackle cardiovascular disease (Reiner, 2009). At this point, 29 countries have signed onto this agreement. To promote this, the EU sponsored the EHN’s program EuroHeart. EuroHeart’s goal is to support the efforts of the charter through its primary goals of “mobilizing broad support for cardiovascular health promotion and cardiovascular disease prevention with a view to achieving stronger cross sector cooperation…. map and analyze national plans, policies, and measures…. investigate issues concerning CVD in women…. improve prevention
practices at primary care level…, and implement and adapt European guidelines on CVD prevention to national situations” (EHN, 2007). EuroHeart has since been expanded to EuroHeart II to include more work packages on diet and nutrition in Europe. These programs culminate with policy recommendations and include workshops and meetings at the regional and national levels to help with implementation. However, despite the high number of countries who are engaged, there have been issues with national implementation due to a lack of national leaders and experts on the issues, a lack of funding, and a lack of guidance (Reiner, 2009).

Similarly, Economics of Chronic Diseases (EConDA) represents another EU funded organization established by the EHN, ESC, and other chronic disease focused organizations in order to investigate fiscally responsible policies for the prevention of CVD, cancer, liver disease, pulmonary disease, and other NCDs. These have resulted in specific policy recommendation papers in the last four years on trans fat, alcohol, salt, and clean air (Løgstrup).

In addition to programs that have been established by outside organizations and funded by the EU, the Union has also developed other policies targeting risk factors like the Tobacco Product Directive mentioned earlier. Mostly, the EU stands to establish policy suggestions that are entirely voluntary to member states. For instance, the EU has adopted several regulations on food labeling in order to make nutritional information more available to consumers. They have also created commissions to encourage physical activity in countries and provide recommendations. These policies and platforms require and rely on members to commit to devote resources and spread awareness, but, yet again, these are voluntary (European Commission, 2015).
The figure below shows the format of development, strategy, and accomplishments by the EU Platform of Diet, Physical Activity, and Health.

(European Commission, 2015)
iv. Analysis of European Policies and the Results of these Policies

As mentioned previously, the rates of heart disease have been decreasing in most countries within Europe in the past years. Much of this can be tied to the work done by the EHN, ESC, and EU. For instance, since the introduction of EuroHeart in 2007, disease rates have continued to decrease.

The graph above shows the Coronary Heart Disease (CHD) disease rates by country and by year.

(European Heart Network and European Society of Cardiology, 2012)

However, due to the fragmentation, the voluntary nature of EU regulations, and the current culture of non-involvement, the EU has not made enough strides in terms of prevention. In fact, based on the Reassuring European Attitudes about Cardiovascular Treatment Survey (REACT), a large portion of European physicians do not follow the guidance the EU provides for them; 19% responded to the survey saying they do not follow prevention care guidelines and post-cardiac event treatment. Despite this, 87% of
physicians say they believe in prevention efforts (Hobbs & Erhardt, 2002). The EU has not made the regulations and measures strict and have not given member countries the appropriate tools and resources to enforce the guidelines that health experts within the EU recommend. Many of these limitations for physicians include a lack of training on the guidelines, and a lack of financial capital; this also applies for countries that want to apply EU platforms on a national level. This lack of enhanced enforcement on behalf of the EU has not only lead to cardiovascular disease in individuals, but also led patients astray following a cardiac event. Based on the same REACT survey, six months after a cardiac event, 19% of individuals were still smoking, 25% were still overweight, 53% continued to be hypertensive, and 86% still had high cholesterol (Hobbs & Erhardt, 2002). Overall, in coordination with the EHN and ESC the EU has made progress in combatting CVD with prevention and with the introduction of the European Heart Health Charter and EuroHeart; however, these programs need better methods of enforcement and better support at the national level in order to be truly successful.

**Country Specific Problems and Policies**

i. **United Kingdom**

The United Kingdom has conducted a dynamic response to the issues presented by CVD. Currently, cardiovascular disease causes 160,000 deaths per year, or roughly a quarter of all deaths. Furthermore, CHD is the biggest killer in the UK, accounting for 73,000 deaths. However, the deaths due to CHD have been halved since 1981 (Unal, Critchley, & Capewell, 2005). Currently, each patient that suffers from CVD costs the UK about 7000 euros per year (this is about 4900 pounds per year) (Kruse, Davidsen, Gyrd-Hansen, Madsen, & Sorensen, 2008). In total, the cost of treating these patients and
dealing with lost productivity due to disability and death accounts for 19 billion pounds per year (British Heart Foundation, 2015). As a response to the number of deaths and the high cost, the UK has introduced a variety of prevention programs for high-risk individuals and the general population alike. Unfortunately, according to Simon Gillespie at the British Heart Foundation, CVD is not recognized as a priority among UK citizens; again, like other European nations, citizens see cancer as the biggest threat because they see CVD as a condition that is controllable and someone’s “fault.” Currently, of those who donate to charities, 40% donate to the British Cancer Foundation versus only 20% to the BHF. To handle this, the BHF is currently working to change public perception on the development of CVD. Also, like many other governments, the British government has begun to lower funding for prevention tactics that will contribute to a healthier population. Despite this, the BHF are working to target risk factors that contribute to heart disease.

Currently, health inequalities contribute strongly to the variety of risk factors that impact the rates of CVD in the UK. As cited by Gillespie, there are large differences in health in the varying areas of the UK based on the average SES. In areas with lower incomes, the population is more sedentary, less healthy in terms of nutrition, and heavier smokers. For instance, Gillespie relayed information about the town of Blackpool, a small community that was previously a popular spot for vacationers. After the tourism industry dissipated, the health and incomes in the community worsened. Now, smoking is at an all-time high and there is a high rate of smoking during pregnancy. Of course, outside of these communities, risk factors are still prevalent. In 2015 in the UK, 3.3 million adults have diabetes, smoking rates vary between 18-22% based on the
geographical area, about a third of the population, both children and adults alike, are obese, and 50% of women and 33% of men do not get enough exercise (British Heart Foundation, 2015). Additional percentages of the population do not eat enough fruits and vegetables and have high blood pressure and cholesterol.

The table below depicts the percentages of risk factors that are prevalent in the UK/England. (Furze & Mills, 2015)

<table>
<thead>
<tr>
<th>Table 2: Prevalence of principal CVD risk factors (2011/2012 data) – UK figures unless otherwise stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>Obesity</td>
</tr>
<tr>
<td>Physical activity</td>
</tr>
<tr>
<td>Cigarette smoking</td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
</tr>
<tr>
<td>Total cholesterol*</td>
</tr>
</tbody>
</table>

*Patients with CVD, Diabetes or Hypertension. No target level for patients without these conditions

Source: Health & Social Care Information Centre: Statistics on Obesity, Physical Activity & Diet. 2014
British Heart Foundation Cardiovascular Disease Statistics 2014

To combat these programs, the BHF has pushed for research, policy, funding, and education on prevention and lifestyle changes. According to Gillespie, the main focus of the BHF is research on the best ways to impact rates of CVD and new treatment methods. However, there is a large amount of work that goes into primary prevention as well. For instance, the UK adopted the policy recommendation from the EU on front of pack nutrition labeling. As mentioned in the “Overview of Europe” Section iii, as of 2015 this
labeling system involves a color-coded scheme to indicate to the consumers if the food/beverage involves healthy levels of fat, sugar, etc. (UK Department of Health, 2013). In addition, there have been steps taken to lower the prevalence of and impact of smoking upon the English population. Tobacco control is of particular concern in the UK because of the inability to respond to the effects of smoking on a secondary basis; the best way to prevent risk from smoking is to stop individuals from smoking to begin with (Unal, Critchley, & Capewell, 2005). According to Gillespie, most recently in October of 2015, it was made illegal to smoke in a car with children present; the law helps to protect children who are unable to make a choice about their exposure to secondary smoke. In addition, in 2009 a law was passed to ban the sale of tobacco products/cigarettes in vending machines. As a result of these policies and others, smoking in the UK has dropped by 33% (Unal, Critchley, & Capewell, 2005).

In addition, there have been a variety of messaging programs targeted for members of the population. Health at Work exists as a program that distributes information to employees about healthy lifestyle choices, Heart Healthy Kits and Pass It On is training for health professionals, there is prevention messaging for ethnic minorities, and the “10 Minutes to Change Your Life” educational series is about small changes that can be made in daily lifestyle. In addition, the Hearty Lives Programme by the BHF tests different programs on their implementation and service; these programs have been designed to impact nearly every group of the population, from urban to rural residents, wealthy to lower income residents, young and old, and ethnic minorities. In addition, on a broader scale, the National Health System (NHS) provides five yearly free health checks to 40-74
year olds that have not previously been diagnosed with CVD; this is a way of encouraging early detection (Furze & Mills, 2015).

In addition to these, the BHF has been the head of a few other larger, more geographically targeted programs. These programs have been primarily based in the Merseyside county of England with the help of the Heart of Mersey organization. In Mersey in 2005, the population there suffered from 30% more heart disease than any other part of the country. As a response, a program was undertaken to develop a smoke free environment and to lower the consumption of unhealthy food and beverages. This program is very similar to the one undertaken in North Karelia in Finland that will be discussed later (Lloyd-Williams, Capewell, Ireland, & Birt, 2008). More recently, in a study discussed by Gillespie and still not completely published, the Heart Lives Childhood Obesity Programme, based in the same area, is a targeted program that has been developed to impact the lifestyle habits of “Looked After Children” (LAC). LAC are foster care children; they are a part of a high risk group due to the lack of stable parenting and education. The program was designed to provide physical activity and healthy cooking workshops and education. Though I cannot provide specific numbers because the study remains unpublished as of now, the program enabled the majority of LAC to feel empowered to make healthy decisions, and the program improved their lives on both a health and a social level.

The United Kingdom’s focus on prevention programs on a variety of levels has made a large impact on the health of citizens. Though secondary prevention, through medications like beta-blockers, has increased due to governmental policy changes, primary prevention remains a strong way to target heart disease (DeWilde, Carey,
Richards, Whincup, & Cook, 2008). In fact, through the UK’s large programs it has been shown that primary prevention has an advantage over secondary prevention. In the UK, 58% of the fall in CVD mortality has been linked to a lowering of the risk factors. Furthermore, primary prevention has a seven times greater advantage over secondary prevention. In terms of gaining life years, in a study done with patients, a patient treated with primary prevention methods gained an average of 21 years of life, but one treated only with secondary prevention gained seven and a half years of life (Unal, Critchley, & Capewell, 2005). Clearly, primary prevention has had a great impact on the UK and can have a great impact elsewhere. Though rates of smoking, obesity, and CVD remain high in the UK, proactive primary prevention has taken great strides in lowering the risk for many citizens.

The graph below demonstrates the number of deaths prevented with methods of primary prevention versus secondary prevention in the UK.

![Figure 1](image-url)
ii. Denmark

Denmark has done extraordinarily well in terms of heart disease prevention. Since 1985, Denmark has experienced a 70% reduction in the amount of deaths due to CVD (EurActive.com, 2014). This was due to a variety of programs that have been introduced on a national and local level. However, in policy climate, Denmark is reflective of the European Union in many ways. I discussed this situation in an interview with Simon Rask at the Danish Heart Foundation. Similar to the EU and UK, cancer in Denmark is seen to be the biggest health threat; though the government and population recognize CVD as a problem, the Danish Cancer Society generates more attention and money than the Danish Heart Foundation. In addition, the Danish government, in coordination with the Danish Cancer Society and Danish Heart Foundation has put the most emphasis on smoking prevention. They have targeted this factor due to the negative effect it has on a variety of diseases, CVD only being one of them. As discussed by Rask, the major change in smoking habits came eight years ago in coordination with a government policy that prohibited smoking indoors in public places; this has not only helped decrease smoking in the Danish population, but also assisted in lowering the effects of secondhand smoke.

However, the biggest contributor to the decrease in heart disease deaths is Denmark’s ban on trans fat. In 2003, Denmark became the first country in the world to ban trans fat from food (EurActive.com, 2014). Trans fat is a high contributor to heart disease and one study shows that consuming five grams of trans fat per day is associated with a 25% rise in the risk of developing CVD in your lifetime (Restrepo & Rieger, 2015). This ban has had a high contribution to the lowered prevalence of CVD, as well as the lowered
mortality rates. However, to demonstrate the current climate of corporate influence within the EU, the Danish government faced a lawsuit from the EU in 2004 due to the ban’s interference on free trade; it was seen as discriminatory against companies that sold foods with trans fat (EurActive.com, 2014). Though this lawsuit was abandoned in 2007, it represents the overwhelming influence that corporations have on health policy today in Europe and in the national sphere.

In addition to the main policies of banning trans fat and smoking in indoor public spaces, Denmark has also integrated a variety of other prevention programs into their daily life. Both the Danish Heart Foundation and the Danish government have made efforts to integrate physical activity into the Danes’ lifestyles. For instance, according to Rask, the government has extended the school day for the 80-90% of children in public schools to “whole day school.” With this change, the government now requires that children exercise for 45 minutes per day at school; though this program is still being implemented, the effects it will have on childhood obesity and rates of CVD later on will be strong. At the local levels of the Danish Heart Foundation, the communities have created “heart paths,” which are marked walking paths in order to encourage aerobic exercise among the population. In addition, the infrastructure in place in Denmark favors bikers and walkers. As Rask mentioned, in Copenhagen, the capital of Denmark, 45% of the population bikes to work.

Despite all these measures, primary prevention, like in the EU overall, has been downgraded. Rask discussed that in recent years, due to the aging population and the amount of money it now requires to care for them, money in the country’s budget has been moved from primary prevention to other programs supporting the older population
and secondary care for them. This shift acknowledges the larger the move to government non-intervention that is seen across Europe.

Other factors that influence heart disease in Denmark include health inequalities that limit the population from having the means to understand and access information on heart disease prevention. However, as Rask notes, economic situations do not stop consumers from having the means to purchase healthy products; food deserts are not a strong concern in Denmark. Similarly, the 2008 recession did not have a strong influence on heart disease prevention efforts; the aging population has had more effects on the health prevention budget than the recession. In addition, diet, excluding trans fat, has only had a small influence on the population’s health. Though, as Rask noted, a smaller amount of the Danish population eat whole wheat bread now and there is a now higher consumption of salt than in the past; the Danish Heart Foundation is in the process of expanding programs that target these issues. Overall, Denmark represents a very advanced country within the EU. Their policies on trans fat, exercise, and infrastructure promote a healthy lifestyle that has overwhelmingly lowered the number of CVD deaths in the country. However, like the rest of the EU, there have been pullbacks in terms of primary prevention due to budget changes and corporate influence; this will have a negative effect on generations to come. However, Denmark has succeeded in making the healthy choice the easy choice in many cases.

iii. Finland

Finland has one of the most innovative and unique situations related to cardiovascular disease. CVD mortality rates have dropped 65% since the 1970s (World Health Organization, 2015). Actual CVD incidence has dropped by 80% since the 1970s
(Pulska, 2009). In the late 1960s and 1970s, Finland had the highest rate of heart disease deaths in the world with about 85% dying from the disease. In addition, one particular area of Finland, North Karelia, experienced these risk factors more than other areas, and as a result, had a higher rate of CVD than the average in Finland. Before this, a combination of risk factors and high-risk behavior contributed to the disease in Finland and created an environment which death by heart disease was expected. However, an intense prevention program and lifestyle switch implemented by Pekka Puska, a Finnish doctor and expert changed the population dramatically. As a result, the average Finnish person has gained 10 years on their life expectancy (Pulska, 2009).

The graph above depicts the peak of the heart disease epidemic in Finland and its gradual decline.
(World Health Organization, 2015)

In Finland in 1965, butter use by the average Finnish person was at 18kg per day and fat composed 40% of the diet. In addition, the Finnish population consumed very few
fruits and vegetables and was extremely sedentary. Cholesterol was extremely high in the population. Some reasons for the poor diet included a payment program in which dairy farmers were paid based on the percentage of milk fat within their milk instead of the protein. This led to a society that consumed milk largely laden with unhealthy fats. In addition, the diet involved a large proportion of butter for cooking and consumption, and there were fat fillers in many traditional dishes, like sausage. For fruits and vegetables, consumption was limited due to a lack of production and short growing seasons; the Finnish population did not import a large amount of fruits and vegetables due to their high prices. There was also a high rate of smoking. Like the rest of Europe, much of the Finnish population adopted smoking as a part of daily life following its major introduction to society during and post- World War II (Buettner, 2015). However, the largest single indicator and risk factor for heart disease in Finland was high cholesterol; this was the target of many of the prevention programs (Laatikainen, Critchley, Vartiainen, Salomaa, Ketonen, & Capewell, 2005).

The above graphs depict the butter and fat consumptions in Finland. (Pulska, 2009)
To handle the high incidence of heart disease in Finland and in North Karelia in particular, Puska introduced small programs in North Karelia and then applied them to Finland on a broader scale. A large degree of social mobilization occurred; for instance, an outreach organization called the Martha Organization reached out to local churches, schools, and families and taught them how to cook meals with vegetables so vegetables could be incorporated into the Finnish diet on a daily basis (Buettner, 2015). In addition, Puska and his team recruited ambassadors in the community, who were often times community stakeholders, to relay the importance of diet and exercise. On a broader level, there was national coordination with schools for nutrition and physical activity education, and coordination with the private sector, NGOs, and international organizations. The WHO (World Health Organization) specifically assisted and guided Finland as the Finnish government adopted the WHO Global Strategy on Diet, Physical Activity, and Health (Petrukhin & Lunina, 2011). On a governmental and private level, the government restructured the way that farmers were paid, causing them to reduce the amount of milk fat in their dairy products. In addition, in a large step tobacco advertising and smoking in public spaces was banned (World Health Organization, 2015). In addition, Puska and the government worked with private corporations to change the composition of the foods they produced. For instance, Puska lobbied sausage producers to remove a fatty, salty filler from their food and replace it with another filler composed of mushrooms. Though there was some hesitance from the companies at first out of fear of losing money, the change resulted in greater sales and healthier consumption. In addition, Puska worked with companies to establish a process of freezing local fruits and vegetables (particularly berries) during harvest season so they could be distributed and consumed year round.
Finally, through work with private corporations, NGOs, and the communities, changes were made in restaurants and stores as a result of bans and lifestyle changes; these included the introduction of salad bars in restaurants, butter replacements in stores and restaurants, and a ban on free soda refills at restaurants.

As we know as a result of these programs, the Finnish and those in North Karelia have gained a significant number of years on their life expectancy, and the rate of heart disease in the population has decreased by 80%. From the study in North Karelia, we learned about the great impacts that lowering risk factors and introducing prevention programs can have on the population. For instance, studies in Finland showed that by lowering cholesterol by one point can lower the risk of developing heart disease by two points (Buettner, 2015). In addition, this study and program has shown that prevention programs are much more affordable and cost effective than the high-risk approach. Though both were used, the prevention approached demonstrated a clear advantage in the amount of lives affected and saved. It is most effective to target the largest risk factors and work on those factors in order to impact the entire population (Pulska, 2009). These changes can occur in the population without the members completely realizing they are occurring. For instance, a Finnish victim of heart disease recognized that he could not pinpoint the exact time that his diet and lifestyle changed for the better; he said that it “just happened” (Buettner, 2015). Clearly, the population approach to prevention can have a large impact. Though there are some barriers to implementation, these can be overcome with international support, coordination between sectors, work with the community, flexible intervention based on the individual community, and industry collaboration and understanding (Pulska, 2009). This program has been shown to be so
effective that it has become the model in other programs in the United Kingdom (Merseyside) and in the United States in the Blue Zone Project (Buettner, 2015).

The two graphs shown here depict the impact of the project in Finland on CVD risk factors and mortality rates. (Pulska, 2009)
iv. Switzerland

Currently, CVD is the main cause of death in Switzerland at 33%; however, mortality has deceased by 41% in 20 years (Swiss Info, 2015). This has been a significant drop in mortality. There are a variety of factors and programs that play into this change, but this mortality drop does not necessarily represent the same drop in prevalence. Currently like some other countries in this study, Switzerland does not report on the prevalence of the disease, only the mortality. This represents a flaw seen in many European countries today. By reporting only the mortality, the country can be missing a large demographic facing the disease. For instance, a younger population may be developing the disease, but not dying from it yet; also, as people live longer with new medical technology and drugs, they will be living longer with CVD. Therefore, mortality is not entirely an accurate representation of the situation (Heart Disease in Europe, 2013).

Switzerland is similar to Denmark in terms of its prevention programs. Like the Danish Heart Foundation and BHF, the Swiss Heart Foundation provides education, tests, and support to the Swiss population on risk factors like smoking, high blood pressure, and obesity (Fondation Suisse de Cardiologie, 2013). Also like the rest of Europe, smoking is a major contributor to the rates of heart disease in Switzerland; in 2010, 19% of the population reported smoking daily. The National Smoking Stop Smoking Program run by the Swiss Society for Smoking Prevention provides education and support to individuals trying to quit, as well as education for health professionals on effects of smoking and how to help their patients quit. The Swiss Heart Foundation sponsors this program. It has helped lower the percentage of smokers by 5% since 2001 (Swiss Society for Smoking Prevention, 2015).
In addition, as discussed by Adrian Fischer at the Swiss Society of Nutrition, there are a large variety of exercise programs in place to encourage physical activity in a variety of sectors of the population. There are programs on different levels of government to determine policy and maintain infrastructure to promote a healthy populations (walking paths, sports clubs, etc.). It has been shown that a targeted approach like this is essential to increasing activity (Stamm, Structural and Cultural Factors Influencing Physical Activity in Switzerland, 2005). Similar to Denmark, programs that have resulted include a compulsory sport requirement in schools for children. There are also subsidies for sports clubs that offer activities for children; the Swiss program “Youth + Sport” (Federal Office of Sports, 2015) is an example. There is currently an increase in activity level for ages 5-10 which demonstrates that these programs that encourage activity and require it in schools are effective. Recently, and similarly to the European climate, we are seeing decreasing spending on prevention, there has been a decline in subsidies and compulsory sports for adolescents (Swiss Confederation, 2015).

Despite the programs for physical activity, there is a lack of programs on nutrition in Switzerland. As discussed with a nutritionist in Geneva, Gemma Calzada, though the Swiss have a culture of eating healthily and organically, there have still been changes in diet. The Swiss now consume more sugar and fats then in the past, contributing to heart disease. In addition, health inequities make it difficult for all families to afford the organically produced food that is often more healthy than non-organic food; families will choose the most convenient option. There are small programs in school for children on nutrition, but nothing for adults and nothing substantial. In terms of enforcement of EU recommendations, Switzerland abides by voluntary nutrition labeling.
In general, Switzerland has done well in prevention by incentivizing physical activity and exemplifying a healthy diet as it is in the top five of countries with the lowest incidence of heart disease; however, more programs could improve the situation extraordinarily. In fact, the lower rates in Switzerland are more tied to historic eating habits and fitness culture than programs that are currently in place. In addition, a shift away from a focus on mortality would help to provide a more well rounded view and understanding of the CVD situation in Switzerland.

v. Greece

As a Southern European, Mediterranean country, Greece is unique compared to the UK, Denmark, Finland and Switzerland. Currently, CVD accounts for approximately 48% of all deaths in Greece (Vassilaki, Linardakis, & Philalithis, 2014). Even more notable, though CVD mortality rates have been dropping, the rate at which they have dropped is significantly lower than the rest of Europe. Within Greece there has only been a 10% decline, while the remainder of the EU has experienced a 36% drop (Vassilaki, Linardakis, & Philalithis, 2014). In addition, Greece was the only EU country to increase in rates from 1980 to 2009 (Vassilaki, Linardakis, & Philalithis, 2014). Since 2009, however, the rates have again decreased. There are a variety of factors in Greece that are playing into these rates and changes.

Greece currently faces a great set of risk factors including stress, unhealthy diets, and a high rate of smoking. Overwhelmingly so, smoking is one of the greatest risk factors. Of those who experienced a cardiac event, 33% reported being active smokers; another third reported having quit smoking before the event. In addition to these individuals, 48% of non-smokers responded that they were exposed to secondhand smoke at work or at
home; though not as strong as being an active smoker, secondhand smoking can clearly have a grave impact on health. In addition, adolescents are active smokers; 10-20% of boys report smoking and 5-15% of girls report the same (Konstantinos, 2015). In addition to smoking, obesity, hypertension, and high cholesterol all have an impact on heart disease rates.

One of the main reasons for the high, increasing rates of obesity in the population is the shift away from the traditional Mediterranean diet; this is one of the biggest factors in CVD growth in this region, as well as Greece. Traditionally, a Mediterranean diet is composed of whole wheat, fruits, vegetables, and olive oil. In particular, olive oil has been shown to be protective to the development of CVD. However, with urbanization and globalization, the role of olive oil in the population has been diminished and there has been a rise in consumption of butter and other fats. This has played an especially important role in certain areas of Greece; for example, the Greek island of Crete has the highest fast food consumption out of the other 12 Mediterranean islands in the surrounding area (Vassilaki, Linardakis, & Philalithis, 2014). In addition to a changing diet, low socioeconomic states (SES) and stress has played a role in the development of obesity and the other risk factors. In recent years, Greece has suffered a large economic downturn that has contributed to a rise in poverty and financial hardship. This not only contributes to stress, which is correlated to a rise in heart disease, but also makes it harder for individuals to purchase healthy food. Like smoking, the result of these changes has been seen noticeably in the younger generations. They have been more accepting and open to embracing a Western diet and abandoning their traditional diet.
Below is a table depicting the rates of current risk factors in Greece. The rate of smoking has diminished since 2001, but obesity, hypertension, etc. are noticeably on the rise.

<table>
<thead>
<tr>
<th>% data</th>
<th>Survey 2001-2 (N = 3042)</th>
<th>Survey 2011-2 (N = 2583)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>43</td>
<td>33</td>
</tr>
<tr>
<td>Physical activity</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Obesity</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Hypertension</td>
<td>30</td>
<td>52</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>39</td>
<td>62</td>
</tr>
<tr>
<td>Diabetes</td>
<td>7</td>
<td>20</td>
</tr>
</tbody>
</table>

(Konstantinos, 2015)

The prevalence of smoking in the younger generations, and the rise in other risk factors in the young population, indicate that a shift needs to be made in public health in Greece to an “upstream population approach.” This means that the younger generation would be targeted in prevention efforts to create a healthier society in the future.

However, there are currently a variety of prevention programs that target the general population. The main program in place now is CHALLENGE. CHALLENGE is a program designed for patients and doctors in order to implement a registry to track patients, cardiac episodes, and encourage follow-up appointments; currently over 1,600 patients are registered (Konstantinos, 2015). This program will help with prognosis overall in the future. In addition, there are a variety of other registries designed to track patients with hypertension and other risk factors. In addition, there are two main campaigns designed to educate the general public. One is for education on cardiopulmonary resuscitation (CPR) and the other, “ACT NOW, SAVE A LIFE” is for education on the symptoms of heart attack and stroke in order to encourage victims and those around them to seek immediate medical help (Konstantinos, 2015). Finally, there is a national smoking prevention program that has integrated social media, guides, and advertisements on TV/radio. The campaign educates on the effects of smoking,
encourages quitting, and provides support to those who are trying to quit (Konstantinos, 2015). Related to this, there have been bans on smoking in indoor public spaces.

Despite these programs, risk factors and CVD remain high. Unfortunately, smoking bans have not been enforced properly, and 33% of the population still reports smoking (Konstantinos, 2015). In addition, though the programs in place do help patients who have experienced a cardiac event, there are no programs, besides the inadequate smoking ban, that truly provide primary prevention. Also, there are no policies programs to limit the effect that globalization has had on diet and the other risk factors. In addition, due to the financial crisis in Greece, many patients cannot afford to stay in the cardiac support programs that are currently in place. Finally, the government has pulled money away from primary prevention due to the financial crisis (Konstantinos, 2015). This lack of prevention funding in a time where the public cannot afford to eat a nutritious diet, exercise, or get the medical care they need indicates that Greece’s rates in heart disease may begin to slowly rise yet again (Vassilaki, Linardakis, & Philalithis, 2014).

vi. Russia

Russia currently holds the position for the highest rate of CVD in the world. As of 2013, CVD was responsible for 57% of all deaths (Petrukhin & Lunina, 2011). In 2013 when 20.5 million adults underwent health screening, 44% already had an NCD and 23% were at risk for developing CVD (Boytsov, 2014). Though now slowly decreasing, this exorbitantly high rate has arisen out of a combination of various risk factors and the historical and present political situation. To begin, at the start of the epidemiological transition to non-communicable diseases, Russia was still the Soviet Union. During this time, much of the country was impoverished, there was a lack of funding for health care,
and the government was focusing much of it health action on communicable diseases. As a result, Russia missed a crucial opportunity to begin to target chronic diseases and implement health policies that would have an effect today (Petrukhin & Lunina, 2011). Unfortunately, the lack of health care expenditure on prevention continues today in Russia. Health expenditure only accounts for 3% of the Russian GDP; this has been further reduced in recent years (Petrukhin & Lunina, 2011).

In addition, the prevalence of risk factors and the variety of such have a great impact on the rates of CVD within Russia. The primary risk factor seen in Russia is unique compared to the rest of Europe. In Russia, the largest factors are the drinking rates and the alcohol consumption within the nation. Excessive alcohol consumption currently accounts for 45.6% of all cardiac deaths (Petrukhin & Lunina, 2011). However, like the majority of Europe, smoking is also still a large risk factor in Russia; about 23% of the population currently smokes. Though smoking has decreased somewhat in men in the last 10 years, smoking among women has increased by 50% (Boytsov, 2014). This increase, like in other European countries, is tied to the increase in the view that it is socially acceptable for women to smoke. In Russia, 29% of all CVD deaths are due to smoking (Petrukhin & Lunina, 2011). In addition to these main risk factors, the population is very sedentary, with about 33% of the population lacking sufficient physical activity (Boytsov, 2014), and they also consume a poor, non-nutritious diet. Russians consume a large proportion of animal fat (about 32-36% of their diet) (Boytsov, 2014). Poor nutrition accounts for 29% of all CVD deaths (Petrukhin & Lunina, 2011). This contributes to high blood pressure, which 42% of the population currently has (Petrukhin & Lunina, 2011). In addition to these factors health inequality plays a large role in the development of
CVD. Many people do not have access to areas to exercise, healthy foods, or proper health facilities because of their socioeconomic status (SES). In fact, health improves by 33% in higher income groups within Russia (Petrukhin & Lunina, 2011).

To handle the risk factors and the rise of CVD within Russia, the government has attempted to introduce a variety of prevention programs and policies. In 2014, the Health Ministry created the protocol, “Disease Prevention and Promotion of Healthy Lifestyle: Development of Primary Healthcare,” which focuses on improving care and prevention for NCDs (Boytsov, 2014). In this directive, the government is attempting to increase the number of healthcare professionals available, increase those familiar with prevention, increase research, and increase the efficiency of the healthcare prevention system. In addition, in 2007 the Russian National Society for Preventative Cardiology was established, and in 2011 the first guidelines for preventing CVD were released (Boytsov, 2014). To follow along with this, the government and Russian Health Ministry have established free screening for adults and more recently, screening for children. In addition, there are programs monitoring the new prevention and care efforts and there are conferences between the Russian Society for Preventive Cardiology and other European cardiology organizations (Boytsov, 2014).

Despite these efforts, Russia faces severe challenges with implementation due to the size of the population and the inaccessibility of some areas of the country (Boytsov, 2014). In addition, there is still a lack of legislation tied to prevention, a lack of leadership on the subject, and most importantly a lack of funding; coordination is very difficult in the Russian government due to these factors. Also, like other European countries, Russia faces a large private interest and lobby in tobacco. Despite the effects
that tobacco has on the health of the population, it has been hard for the Russian
government to implement bans, restrictions, and the World Health Organization (WHO)
tobacco framework due to the influence that the tobacco lobby has in Russia. Though the
framework has been ratified, there have been restrictions and problems implementing it
(Petrukhin & Lunina, 2011). This makes progress difficult. As a historically
disadvantaged country, Russia needs to make strides in order to lower their burden of
heart disease before it takes a greater toll on their society.

**Conclusion**

After a complex examination of the cardiovascular disease situations in the
European Union and individual countries, it is evident that primary prevention can have a
large positive impact. Currently, CVD is the main cause of death in Europe and costs
countries an overwhelmingly large amount of money and lives. The EU, along with the
EHN and the ESC, have attempted to lower the burden across Europe through programs
that assist governments in implementing prevention programs, track progress, and
provide guidelines; however, the EU faces political, financial, and structural barriers. In
looking at individual European countries, we see many of the same boundaries. I have
examined six countries based on their rates, programs, and geographical location. The
UK, as a Western European country, has made strides in lowering the CVD rates through
broad prevention policies that target a wide array of the population; they have had
incredible success despite political barriers and high rates of obesity. Both Finland and
Denmark as Northern European, Nordic countries have had huge successes as well. In
Finland, a broad population approach has completely changed the lifestyle and cut deaths
by over half. Denmark’s policy on banning trans fat has had a similar, yet not as broad
result. Switzerland, as a central European country does extraordinarily well in terms of heart disease rates, but this is based more on cultural eating and exercise habits; the country lacks prevention programs. Greece as a southern, Mediterranean country faces a variety of limitations due to the current economic crisis and transition away from Mediterranean diet. The lack of properly implemented prevention efforts there explains the slow decrease in CVD rates and the potential for a rise in the near future. Finally, Russia has a severe historical disadvantage that has resulted in the highest rates of CVD in Europe. A lack of leadership, as well as the strong presence of private corporate lobbying, explains the lack of control of risk factors and high CVD rates. When looking at these countries it is evident that those who have taken primary prevention measures, such as trans fat bans, nutritional labeling, and social mobilization, have had the largest decreases in CVD. Moreover, primary prevention that lowers risk factors in Europe has been responsible for more than 50% of the reductions seen in CVD rates (Montaye, De Bacquer, De Backer, & Amouyel, 2000). However, because no country faces the exact same risk factors, medical conditions, and societal conditions, it is impossible to generalize one primary prevention approach for all European countries. To help control the development of CVD and limit its impact, we must take examples from Finland, Denmark, and the UK and apply them to countries like Greece and Russia with individualized research to see the most change and save the most lives. Regardless of the specific policies taken to combat countries risk factors, it is important that these policies be progressive, population based, and properly led and funded. Most importantly, programs that target risk factors and engage in primary prevention are the most effective to saving lives from cardiovascular disease.
Abbreviation List

- Cardiovascular Disease (CVD)
- Coronary Heart Disease (CHD)
- Non-Communicable Disease (NCD)
- European Union (EU)
- World Health Organization (WHO)
- Socioeconomic Status (SES)
- European Heart Network (EHN)
- European Society of Cardiology (ESC)
- Economics of Chronic Diseases (EConDA)
- United Kingdom (UK)
- National Health Service (NHS)
- British Heart Foundation (BHF)
- Danish Heart Foundation (DHF)
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