Country report Iceland - December 2013

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Baseline information about Iceland

Government: Iceland is a parliamentary constitutional republic. Suffrage is universal from 18 years of age. The president is elected by direct popular vote for a term of four years, with no term limit. Most executive power rests with the Government, which is elected separately from the presidential elections every four years. Althingi is a legislative body of 63 members elected for a term of four years by popular vote. Judicial power lies with the Supreme Court and the district courts. The capital is Reykjavik, a city of 120,000 inhabitants. (1, 2)

Country size in km²	103,000 km²
number of inhabitants	325,010 (October 1st 2013)
Density of Population	3 inhabitants per km²
Development of population	+0,71 % (Jan. 2012–Jan. 2013) per year
Gross domestic product (GDP) in 2011 per inhabitant • Nominal • adjusted for purchasing power parities (PPPs)	42,351 USD (15. position in the OECD-ranking) 37,569 USD (15. position in the OECD-ranking)

Source: (1) http:/www.iceland.is/the-big-picture/quick-facts/ (2) http:/www.statice.is/

I. Structure of Health Care in Iceland

The Icelandic health care system is publicly financed and delivers services to the total population of 320 thousand inhabitants. Two thirds of the population lives in the greater Reykjavik area. Iceland is divided into 7 health care regions providing specialist care, primary care, elderly care and rehabilitation. There are 76 municipalities some of which provide elderly care. About 14% of the care is provided by private organizations while the majority is state driven. Private care is mostly specialist and dental care in an open office setting with no referral structure or gate keeping involved. Specialist care is generally financed as pay-per-service while the primary care and hospital services are almost exclusively financed by fixed state budget with little or little or no cost carried directly by the consumer. There is a national social security system, financed through taxes, with equal access to all levels of health care for all citizens. However, a lower proportion of the total cost of specialist and dental care (about one third) is covered by
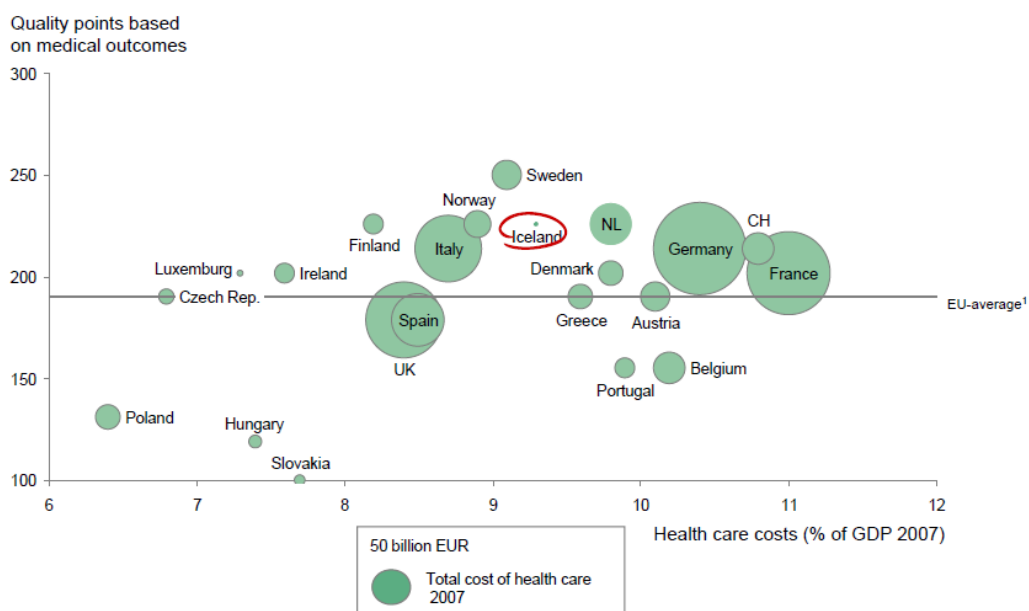
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the social security system than primary care (90% covered) or hospital care (covered 100%). Overall, 20% of health care cost is paid out-of-pocket by the consumer and 80% by the government. The current health care expenditure in Iceland is 9.3% of GDP, which is average among European countries. The financial crash in 2008 has put serious constraints on the financing of the state driven health care system, causing less than desirable budget for renewal of technical equipment in recent years. Adjusted for inflation the health expenditure has decreased 5% per annum 2008-2010. During the same time period the operating cost of Landspitali University Hospital has gone down by 16% (3).

There is one university hospital in Iceland, located in the capital Reykjavik, providing specialized service for the whole country. In addition, there is one major hospital in the northern part of the country and six smaller regional hospitals. In addition there are 16 health institutions. There are 70 GP´s and 6 cardiologists per 100,000 inhabitants.

Generally, Iceland has good quality of care results compared to other European countries with especially low 30 day mortality rates after myocardial infarction, stroke and breast cancer (figure 1). The rate of coronary artery disease (before 75 years of age) has declined by 66% between 1981-2006 with a 80% mortality reduction in the same period. This was accomplished by general public awareness of the main risk factors of coronary artery disease as well as population wide public health interventions reducing the mean levels of cholesterol, systolic blood pressure and smoking prevalence during this period. Overall, 73% of the reduction in mortality from coronary artery disease was attributable to improving levels of these three main risk factors, while 25% of the mortality reduction could be explained by all treatment of coronary artery disease combined. There were, however, alarming trends towards increasing prevalence of obesity and diabetes which are a major challenge to the future development of cardiovascular disease prevalence and mortality. (4) In Iceland, only 1.6% of the overall health expenditure is invested in organized public health and prevention programs which is about half of the EU average (2008) (Figure 2).(3,5)

Figure 1: Quality of health care in Iceland.
Source: Boston Consulting Group 2013. http://www.velferdarraduneyti.is/rit-og-skyrslur-vel/nr/33074

Expenditure on organised public health and prevention programmes, 2008

Country	% current expenditure on health
Romania	6,0
Finland	5,7
Netherlands	4,9
Bulgaria (2007)	4,1
Hungary	4,0
Slovenia	3,9
Germany	3,7
Sweden	3,6
Slovak Republic	3,0
EU	2,9
Estonia	2,8
Czech Republic	2,7
Belgium	2,7
Spain	2,4
Switzerland (2007)	2,3
Poland	2,3
Norway	2,1
France	2,0
Austria	1,8
Iceland	1,6
Latvia (2007)	1,6
Denmark (2007)	1,4
Lithuania	1,4
Italy	0,7
Cyprus	0,7
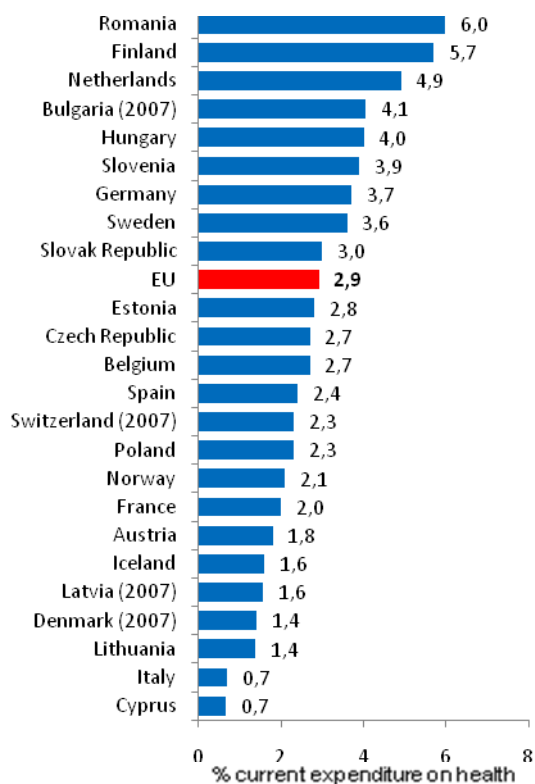
Source: *OECD Health Data 2010*; Eurostat Statistics Database.

Figure 2: Proportion of the European health expenditure invested in organised public health and prevention programmes, 2008

II. Risk factor statistics

There has been a steep decline in the incidence and mortality from coronary heart disease in Iceland since 1981. For both men and women aged 25-74 years the incidence has dropped 66% and the mortality decline has been 80% (figure 3). This amounts to approximately 3.2% reduction in mortality per year. While 25% of this decline can be attributed to treatment of individuals, 73% is due to population risk factor improvements. The main contribution came from secular falls in cholesterol (32%), systolic blood pressure (22%) and smoking (22%). However, an adverse trend of increasing obesity and diabetes has resulted in increasing death rates by 4% and 5% respectively, partly eliminating the gain in recent years.
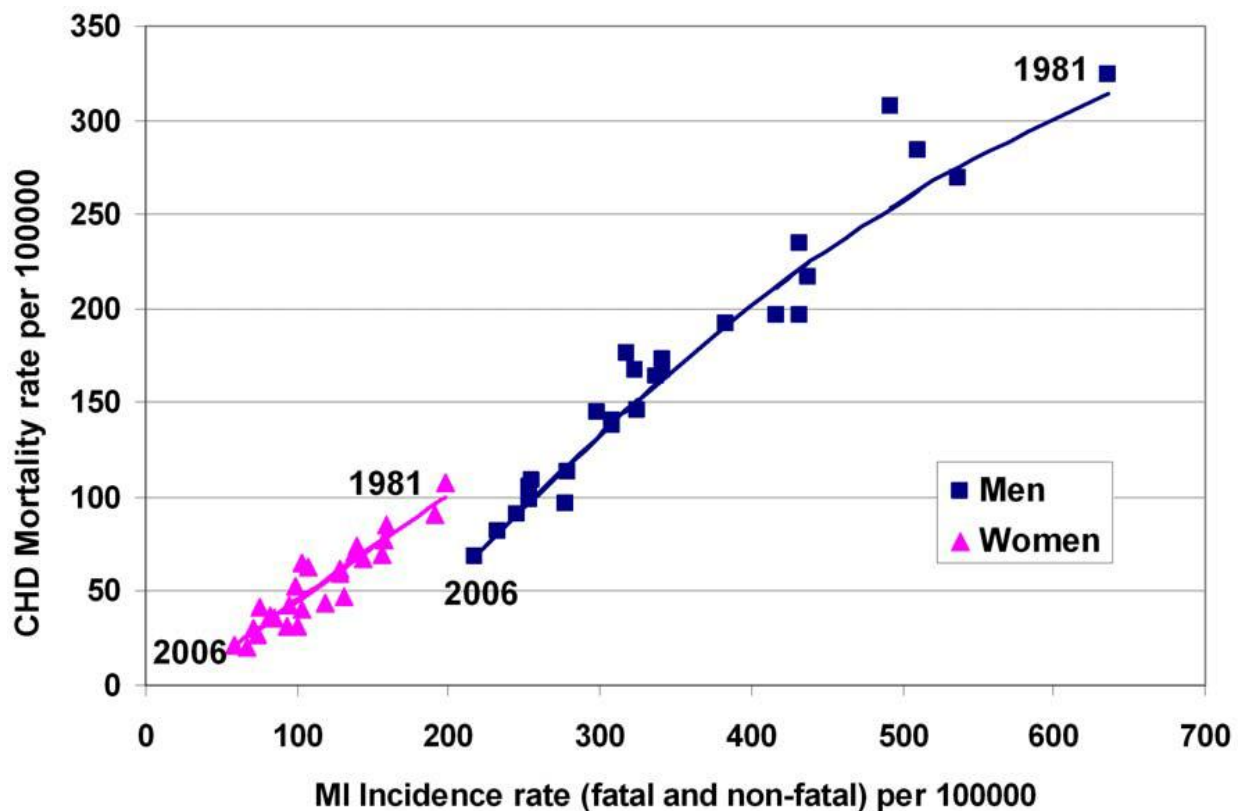

Figure 3. CHD mortality rates and MI incidence rates in Iceland between 1981 and 2006 for men and women of age 25–74. The rates have been declining along the superimposed trend lines.
Source: (4) doi:10.1371/journal.pone.0013957.g003

Risk factor statistics (Numbers representative for year 2010):
Source: Icelandic Heart Association

Age	Overall	Men	Women
Hypertension (>140/90 mmHg or on treatment)			
25-44	9.7%	11.5%	8.1%
45-64	38.1%	43.3%	32.8%
65-89	79.5%	77.5%	81.0%
Overall (25-89)	28.8%	32.7%	25.0%
Diabetes (99% type II)			
25-44	1.4%	0.9%	1.9%
45-64	4.5%	7.2%	2.5%
65-89	15.4%	19.6%	12.3%
Overall (25-89)	4.0%	5.0%	3.2%
Smoking	14.3%	14.9%	12.8%
Overweight	43%		
Obesity	21%		
Physical inactivity	46%		

Some examples of risk factor changes in Iceland are outlined below.

A: Cholesterol

The mean total cholesterol level in Iceland has been declining in recent decades, almost exclusively due to dietary changes. Total cholesterol was 6.01 mmol/L in 1981 but had declined by 14.5% to 5.14 mmol/L in 2006. This change reflects major changes in the Icelandic diet following the issue of Dietary Goals for Icelanders published by the National Nutrition Council in the fall of 1986 and a subsequent approval of a National Food and Nutrition Policy by the Icelandic government in May 1989. This policy was based on dietary goals aiming at reducing consumption of saturated fat, mainly from dairy products and lamb. This resulted in a 73% drop in whole milk and dairy consumption between 1980 and 2006 and the lamb and mutton consumption decreased by 50%. The lamb supply has been replaced by other meat products, mainly poultry and pork. Also margarines from hydrogenated fats have decreased by 73%. A very important public health intervention was enacted in 2010 when a regulation was passed limiting the amount of trans-fats to 2% in processed foods. The 0.9 mmol/L decline in the population level of total cholesterol explains 32% of the mortality fall between 2006 and 2010. (4)

Up until 2006 the effect of statins on the population level of cholesterol was very small. The mean total cholesterol among women 25-74 years of age in 2008 was 5.10 mmol/L. That year, 4.8% of females were taking statins. When they were excluded the mean total cholesterol value was 5.11 mmol/L. Among 25-74 year old males the mean total cholesterol in 2008 was the same as for females, 5.1 mmol/L. Excluding the 8.9% of males taking statins, the mean cholesterol level was 5.18 mmol/L. Therefore, statin use is not a main driving force of population changes in total cholesterol for either sex in Iceland. Since 2006 the mean cholesterol levels have stopped declining and reached a plateau in 2010 (5.18 mmol/L for women and 5.16 mmol/L for men). (5)
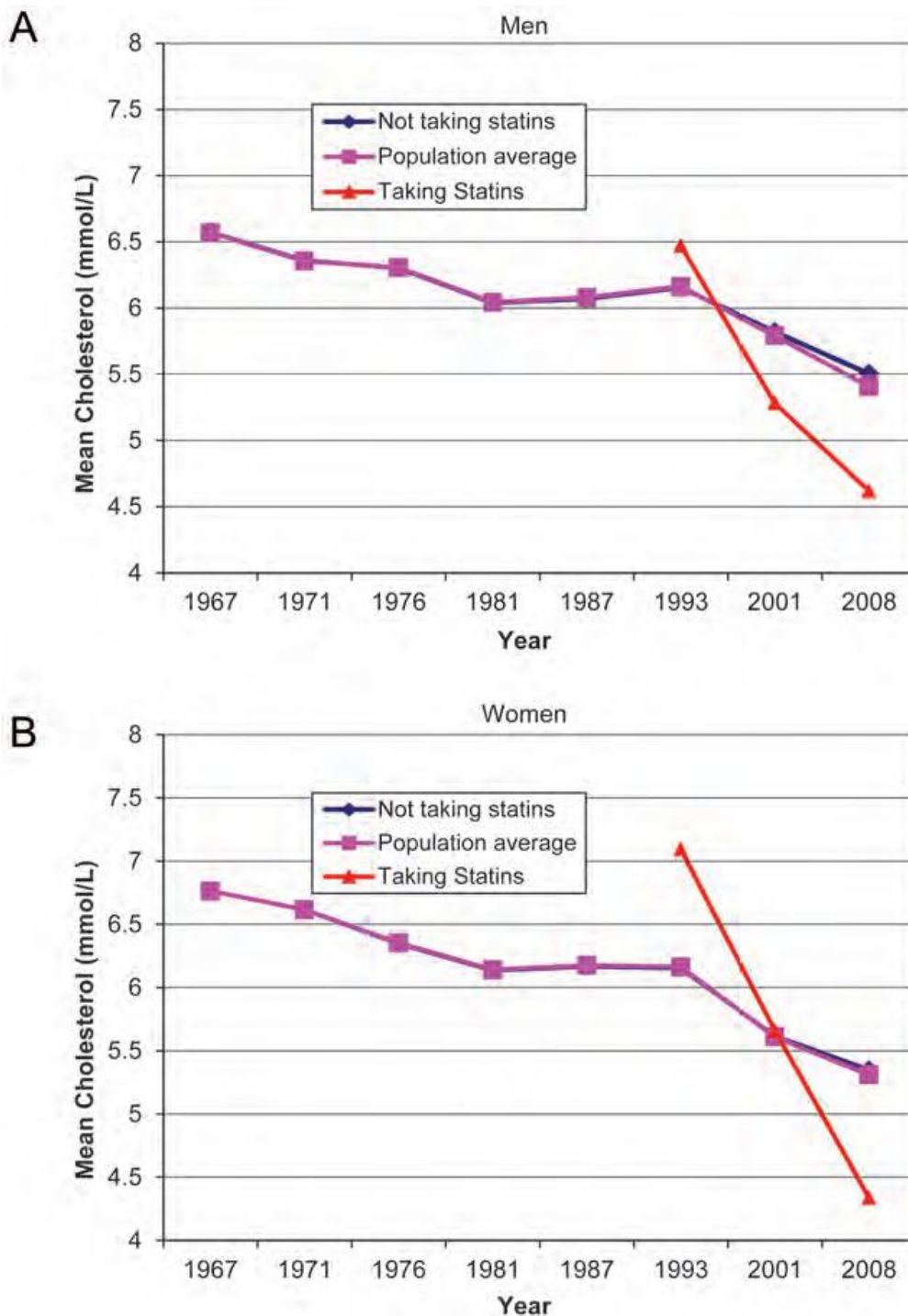
Figure 4: The total cholesterol age adjusted to the age of 50 in (A) men and (B) women from 1967 to 2008. Population average (boxes), individuals taking statins (triangles), individuals not taking statins (diamonds). (5)
(Refers to figure 2)

B: Smoking

The prevalence of smoking has declined dramatically since 1985. In 1981 47% of the adult population smoked daily, the prevalence was 23% in 2006 and in 2012 the proportion of daily smokers among adults was 14.3%. This has been the result of successful public health interventions dating back to 1969 when the first legislation on

warning text on cigarette packs was passed by the Icelandic parliament. In 1971 tobacco advertisements were prohibited in the printed and broadcast media and in 1977 all advertisements of tobacco were banned. In 1979 the first Smoke-free day was held, a national campaign to raise the public awareness of the health risk involved with tobacco smoking. In 1984 a more strict legislation on tobacco control was passed that banned smoking at workplaces. Smoking was prohibited in all cinemas in 1994 and in international flights in 1995. Selling tobacco to minors became illegal in 1996. In 2001, Iceland became the first nation to prohibit tobacco and tobacco trademarks to be visible to the consumer at point of sale. Any form of media coverage of individual tobacco products for purposes other than warning of their harmful effects was enacted the same year. In 2005 Iceland had implemented the FCTC and in 2007 a total ban of smoking in public places was enacted. During the first 5 months after the ban, the incidence of myocardial infarction dropped by 17% compared to the 5 months period prior to the ban. (4, 6)
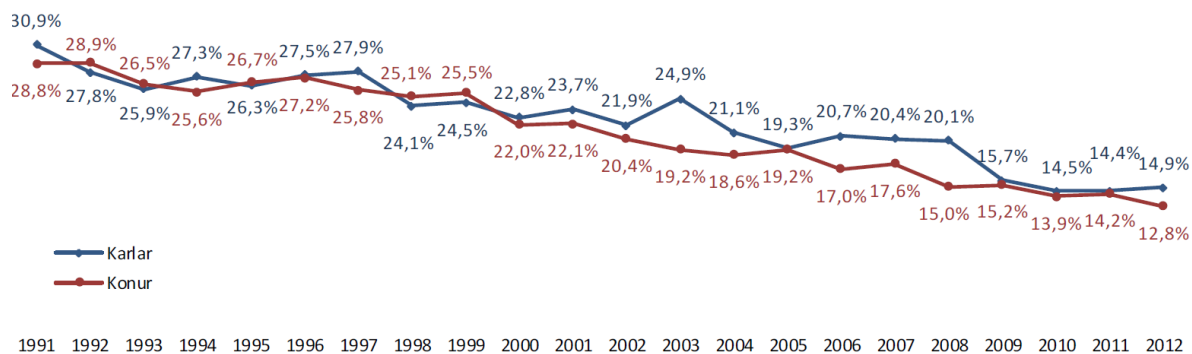
Þróun - Greint eftir kyni

Figure 5: Directorate of Health 2013: Prevalence of daily smoking among adult population (15-89 years) in Iceland.
Source: (6) Directorate of Health. www.landlaeknir.is. Karlar=Men, Konur=Women

C: Blood pressure

Little data is available on salt consumption in Iceland over the years. In general a transition has occurred from the traditional Icelandic diet of salted and cured meat and fish products over to fresh and frozen foods. According to the Directorate of Health the salt consumption decreased by 5% from 2002. A survey from 2010-2011 showed that the mean daily consumption for males was 9.5 g and for females it was 6.5 g. The mean systolic blood pressure was 126.3 mmHg in 1981, but dropped by 4% to 121.2 mm Hg in 2006. This 5.1 mmHg change in blood pressure explains 22% of the drop in CHD mortality between 1981 and 2006. More recently the mean systolic blood pressure among men has been rising up until 2010 when it was 126.1 mmHg compared to 125.2 mm Hg in 2006. (4)

D: Physical inactivity

The data on physical activity stem from self reported leisure time activity levels in a large epidemiology study, the Reykjavík study. In 1981 76.8% reported little or no physical

activity and in 2006 the rate had decreased by 30% to 53.8%. This change accounts for 5% of the decrease in CHD mortality between 1981 and 2006. (4)

E: Obesity and Diabetes

Adverse trends were found for obesity and diabetes during the period 1981-2006. The mean BMI level rose from 25.0 to 27.0 during the period. Subsequent increase in the prevalence of diabetes rose from 1.7% to 3.6%. These risk factors contribute a negative trend in CHD mortality rates by 4% and 5% respectively. (1) Icelanders have become the most obese among European countries ranking sixth world-wide. In 2009, 21% of the nation was obese and 43% overweight, leaving only 36% of the population under 25 in BMI. (4)

F: Percutaneous coronary intervention (PCI)

There is only one PCI center in Iceland, located at Landspitali the University Hospital in Reykjavík. It provides 24 hour PCI service for the treatment of acute ST elevation myocardial infarctions (STEMI). The number of PCI centers per 1 million inhabitants is therefore 3.1. The median door to balloon time for PCI treatment of STEMI was 52 minutes in 2012 with 62.4% of cases treated within 60 minutes of hospital arrival. The 30 day mortality rate of myocardial infarction was 5.6% in 2012, 9.8% for STEMI and 2.9% for NSTEMI. (6)

III. Main actors and prevention methods

General Physicians and Cardiologist

In 2010 there were 373 physicians per 100 000 inhabitants (EU average: 332) working in the health care system. There are altogether 70 GPs and 6 cardiologists per 100 000 inhabitants. Most of the GPs are employed by the state provided primary health care system. About 90% of cardiologists work part time in private practice outside the hospital but the majority of their work is hospital based and provided by the state driven health care system. Per capita visits to cardiologist were 12800 per 100 thousand inhabitants. There is no gatekeeping system and the proportion of outpatient visits to specialists is the highest among Nordic countries, 47%.

The Icelandic Heart Association (IHA)

The IHA runs a risk evaluation clinic with open access for the public, providing risk profiling and counselling on an individual basis. The main activities of the IHA are research and epidemiology. The IHA has constructed a comprehensive population wide database on cardiovascular (CV) risk factors and epidemiology that has been following risk factor development in the country for nearly 40 years. This is a source of numerous publications and prevention activities every year. Numerous research projects are ongoing, among them a large collaboration with the National Institute of Aging in Bethesda, USA that provides data on diverse fields of CV medicine and aging.

Nurse-based programs

There are 1585 nurses per 100.000 inhabitants in Iceland. Home based nursing services are provided for persons with disabilities and for the elderly. There is a nurse based secondary prevention service intended for patients recently discharged from hospital after myocardial infarction, PCI or CABG. Also a nurse based heart failure clinic at the University Hospital.

University-Hospitals and other Hospitals - PCI and CV-surgery resources

There is only one University hospital in Iceland providing complete cardiology services for the whole country. In addition one local hospital treats cardiac patients within a general medicine ward. The single catheterization laboratory in Reykjavik (approximately 3 facilities per 1 million inhabitants) performed 2360 PCI procedures per million inhabitants. The door-to-balloon time in 2012 was 52 minutes with 62.4% of patients treated within 60 minutes of arrival. The 30 day mortality of STEMI was 9.8%. Participation in an outpatient cardiovascular prevention clinic is provided for all MI, PCI and CABG patients.

Rehabilitation Hospitals

There are 2 rehabilitation hospitals that offer residential cardiovascular rehabilitation. In addition several smaller units, mostly staffed by physiotherapists provide cardiac training programs.

Insurance companies

All citizens are covered by the state driven health care system that is financed through taxes. In addition, several private insurance companies offer health insurance policies that cover diverse disease or disability claims. These are, however, not intended to cover the direct cost of health care or hospital fees but rather to compensate for absence from work in addition to the period that would normally be covered by the general social

security system. The ministry of health regularly issues a policy document and action plan on health and welfare issues, next for the period of 2010-2020.

Guidelines

The ESC-Guidelines (9) are generally endorsed by the Icelandic Society of Cardiology. There are separate guidelines issued by the Directorate of Health on specific topics but these are sporadic and not updated on a regular basis.

IV. Main prevention activities

Campaigns

- World Heart Day. Icelandic Heart Association has taken part in the WHD from the beginning in 2000 with various activities, i.e. time measured run, walks, health checks and education. http://www.hjarta.is/upplysingatorg/hjartadagurinn (Icelandic)
- Go Red for women. Icelandic Heart Associaion has participated since 2009 with various activities in February. Including: health checks, education, lectures, fashion show, dance and music for example. http://www.hjarta.is/upplysingatorg/gored-fyrir-konur (Icelandic)
- Motion for life (Lífshlaupið) – Motivational project for children and adults to be more physically active. Highlights in February as a "competition" but is ongoing all year. http://lifshlaupid.is/ (Icelandic)
- Cycle to work. The main objective of the project is to raise awareness of cycling as a healthy, environmentally friendly and cost-effective transport method. Held in May and has been since 2003. http://hjoladivinnuna.is/ (Icelandic)
- I walk to school. International programme for schoolchildren. http://www.gongumiskolann.is/ (Icelandic)
- The Icelandic Women´s Run is organized all over Iceland in June. The goal is to encourage and support women of all ages to be more active which leads to better health. http://www.isi.is/almenningsithrottir/kvennahlaupid/ (Icelandic)

Projects

- Risk Calculator (Icelandic Heart Association). Calculates risk of coronary heart disease in next ten years. Gives the opportunity to see how much a change in lifestyle and/or known risk factors (i.e. weight, exercise, smoking, cholesterol, hypertension) can reduce the likelihood of coronary heart disease. http://risk.hjarta.is/risk_calculator/v2/index.php (Icelandic / English)
- Regulation of maximum levels of trans fats in food 2010. http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/1045-2010 (Icelandic)
- Ban of smoking in public places 2007. http://www.althingi.is/altext/stjt/2006.083.html (Icelandic)
- Interactive website for people who need help to quit smoking http://www.reyklaus.is/ (Icelandic)
- The Icelandic National Health Plan to 2020 (draft) http://www.velferdarraduneyti.is/media/frettatengt2012/Drog_ad_heilbrigdisaaetlun.pdf (Icelandic)
- Health promotion and prevention in schools (age 6-20) run by Directorate of Health. http://www.landlaeknir.is/heilsa-og-lidan/verkefni/item12346/Heilsueflandi_grunnskoli (Icelandic) / http://www.landlaeknir.is/heilsa-og-lidan/verkefni/item12345/Heilsueflandi_framhaldsskoli (Icelandic)
- Hreyfitorg -interactive website, designed to promote physical activity of the Icelandic population. The role of the website is to bridge the gap between those who seek services for themselves and those who offer the service. http://www.hreyfitorg.is/ (Icelandic)
- Icelandic Heart Association and The national federation of bakers joined forces in 2012 to promote healthier consumption of bread. The aim of the cooperation is to

draw attention to the health of wholemeal bread and the importance of reducing intake of salt and sugars.

- Implementation of the Nordic Keyhole nutrition label 2013. Makes it easier for consumers to choose food that contains less fat, salt and sugar and more whole grain and fibre. The Keyhole is a voluntary scheme for food producers, but products labelled with the symbol must conform to nutritional regulations in different food groups. http://www.norden.org/en/nordic-council-of-ministers/council-of-ministers/council-of-ministers-for-fisheries-and-aquaculture-agriculture-food-and-forestry-mr-fjls/keyhole-nutrition-label (Icelandic / English)
- The European Heart Health Charter implemented 2007 in collaboration between the Ministry of Health, The Icelandic Society of Cardiology and The Icelandic Heart Association.
- Landspitali University Hospital: a Smoke free hospital. A project under the Directorate of Health prohibiting all form of tobacco use in the hospital buildings and grounds. Started 2013 and will cover all hospital premises within the next few years.

Education

Prevention is a part of the curriculum of internal medicine, family medicine and rehabilitation at the University of Iceland, School of Health Sciences. There is no formal postgraduate training.

V. Cardiac Rehabilitation in Iceland

Formal CV rehabilitation has been available since 1982. There are three levels of secondary cardiovascular prevention provided.

Stage 1 is a 2-4 week program provided to all patients hospitalized for acute coronary syndromes, post PCI and coronary artery bypass surgery (CABG). It is a hospital based service starting during the initial hospital stay and continuing as an outpatient service that includes physiotherapy, risk factor management, information and motivation to the patient and family members. Typically, patients attend the outpatient prevention clinic twice a week. Each session includes physiotherapy on individual basis with monitoring of blood pressure (BP), pulse, electrocardiography (ECG) and Borg level during increasing level of work load. There is a nurse-based outpatient clinic working in collaboration with cardiologists which focuses on risk factor management, smoking cessation programs, adherence to medication and return to work. The program adheres to the ESC Guidelines on CVD Prevention. This part of the rehabilitation is mostly funded by the state driven social security system.

Stage 2 is a 4-6 week secondary stage prevention program intended for those who have completed stage 1 and are capable of performing a maximal exercise tolerance test. There are two options here, either an outpatient based clinic with one hour visits twice a week or an inpatient rehabilitation clinic Reykjalundur, located 20 km outside Reykjavik. Here there is a more comprehensive holistic approach working with stress reduction, lifestyle modification and health education in addition to a formal physical therapy program.

Stage 3 rehabilitation is an option providing life-long guidance and support in an open outpatient setting. Here a physical training program is constructed on an individual basis and the patient placed in an appropriate group accordingly.
The participation in stage 2 rehabilitation is 90% among CABG patients, 19% among PCI patients including both patients recovering from acute coronary syndromes as well as stable coronary artery disease.

Primary cardiovascular prevention programs are provided in all health care centres under the control of general practitioners and nurses. Most cardiologists in private practice offer such service as well. The Icelandic Heart Association provides a formal Cardiovascular Risk Assessment Clinic which is open to the public with no referral needed. It is a non-profit organisation financed almost exclusively on attendance fees. Most of the charge is refundable through employers or workers unions. The risk assessment utilises a risk calculator based on a population based risk factor survey which has been running for almost 40 years and providing accurate data on cardiovascular risk factors in Icelanders. It has been proven to be very accurate and correlates well with the European SCORE risk chart system. This service adheres to the European Guidelines on cardiovascular disease prevention in clinical practice (9). The emphasis is on personalised counselling and treatment of risk factors provided when appropriate.

VI. The future

Abundant data is now available that confirm the main players in cardiovascular disease development. There is no question about where the number one killer of the world comes from. The vast majority, probably 80-90% of all cardiovascular disease mortality stems from a handful of risk factors that have been well known for decades. Tobacco smoking, unhealthy diet and physical inactivity, leading to elevated blood pressure, high cholesterol, obesity and diabetes. (7) All of these are directly related to lifestyle and habits, factors which we should be able to control. There is also solid evidence that the majority of the change in cardiovascular mortality in recent years, 55-75% can be explained by secular trends of these risk factors in the population.

Therefore, we need to identify how these risk factors can be modified on a population level. Population based prevention strategies have been shown to be cost effective and reduce cardiovascular morbidity and mortality.

In order to apply this knowledge to the benefit of the population and translate it into lives saved we need to approach policy makers many of whom have limited insight into the processes that cause the development of disease. Simple and cheap regulatory interventions such as taxation, smoking ban in public places, restriction of point of sale advertisement of tobacco, restriction in salt, sugar and trans-fat content of processed foods will result in decreased disease burden and mortality. Therefore, knowledge of the main players in each region is of paramount importance. In Western Europe obesity and diabetes are the main future risk factors, while Eastern European countries are still struggling with a very high prevalence of cigarette smoking, a risk factor that has been successfully addressed in many Western countries such as Iceland.

Through decades we have watched the tobacco and food industry apply very effective marketing methods that have appealed to our intuition, emotions and subconscious fast decision making, as defined by Nobel Laureate Daniel Kahneman´s System 1. (8) On the other hand, preventive interventions have often used the much less effective method of providing information on nutritional content of processed foods and the harmful effects of tobacco smoking, a thought process that is slower and demands attention and deliberation and is ascribed to System 2. It is high time that population based public health interventions make use of the theory of Behavioural Economics. The effective System 1 can be utilised in preventive interventions by restricting access to and visibility of unhealthy processed food choices and tobacco and promote instead more wholesome selections such as fruit and vegetables. The main obstacles here are obviously the financial interests of the food and tobacco industry. Also, we as health care providers need to reach the attention of policy makers and secure health in all policies and legislation.

In the next five years we will have to focus the socioeconomically deprived, mentally ill and minors who are especially susceptible to marketing of the tobacco and fast food industry. The alarming trend of increasing obesity and diabetes will have to be met with deliberate and focused interventions.
Finally, we should aim at a smoke-free country by year 2040.

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