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Health Literacy Skills of Aging Populations and Its Impact on the Prevention of Cardiovascular Disease

Peter Gorman
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Health Literacy Skills of Aging Populations and Its Impact on the Prevention of
Cardiovascular Disease

By: Peter Gorman

Spring 2017

SIT Switzerland: Global Health and Development Policy
Academic Director: Dr. Alexandre Lambert

DePauw University
Greencastle, IN
Major: Global Health

Abstract

Cardiovascular disease (CVD) represents a threat to both the economic and social well being of Switzerland. Cardiovascular disease is easily a preventable disease, yet continues to take over the world. One's ability to read and comprehend health information from medical professionals is a vital component of maintaining and improving an individuals' overall health. Health literacy can have an impact on the effectiveness of preventive interventions in health behaviors and the success of health outcomes. Studies have shown that well-educated and financially improved persons have a higher health competence than lower educated persons.¹ Given that cardiovascular disease is the number one cause of death in the developed country of Switzerland, it is evident that the prevention of the disease is affected by health education.

The lifestyle behaviors and foundations of adult health are laid in early life, especially for cardiovascular disease patients. Cardiovascular disease prevention strategies must go beyond addressing the environmental, political and social factors that determine the risk of CVD, but the need to address health education, health literacy, health communication and individual health behaviors.² Health literacy is a necessary ingredient for improved community, greater adherence to cardiovascular treatment regimens, greater ability to engage in appropriate self-care, improve health status, and greater efficiency and cost savings to the health system as a whole.³ In this study, I have examined the relationship between health literacy and health outcomes, especially

¹ Health competency in Switzerland: study draws on a thorough review. (2016, June 7). Retrieved May 03,

² Norrow, D. (2009, May 11). Track 2: Health literacy and health behaviour. Retrieved May 03, 2017, from <http://www.who.int/healthpromotion/conferences/7gchp/track2/en/>

³ Safer, R. S., Cooke, C. E., & Keenan, J. (2006, December). The impact of health literacy on cardiovascular disease. Retrieved May 03, 2017, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994011/>

regarding cardiovascular disease (and its risk factors), to determine if higher health literacy skills in elderly patients are correlated with successful prevention and interventions strategies.

Preface

Health literacy, aging populations and noncommunicable disease like cardiovascular disease (CVD), are of particular interest to me. I'm glad I could originate my independent research project to incorporate all three of these topics. I have had numerous experiences that relate to the different facets of health literacy, health outcomes, health behaviors, aging populations, economically disadvantaged populations, and noncommunicable diseases. I've taken two courses that sparked my interest (Health Communication and Health Psychology) that have exposed me to health literacy and health behaviors. I've traveled internationally with a non-profit, Timmy Global Health, setting up medical clinics to bring quality, consistent healthcare needs to rural communities. Last summer, I was a community health intern for a local non-profit, Gads Hill Center, where I helped develop community health initiatives surrounding health literacy, including public health campaigns around the prevention and intervention of noncommunicable diseases in low-income communities across Chicago.

While abroad, my mother was diagnosed with a moderate amount of heart blockage, resulting in numerous coronary artery problems. With a vast family history of heart problems and low health literacy skills, I have decided to dedicate my time and energy to studying health literacy and its impact on cardiovascular disease patients. As an aspiring medical professional, I am interested in the medical field focused on health, global health, and preventive medicine. I seek to spread both knowledge of quality

healthcare and accessible resources to underserved patients, making sure all patients are health literate. I find it captivating that so many people don't know the preventable health behaviors associated with a lower risk of cardiovascular disease. It is illogical to me that so many people die per year of cardiovascular disease in developing countries because it is a completely preventable disease. I'm interested to explore policies, prevention strategies and other practices to influence how future health service planning must take aging populations into account; and how policies should be tailored to low health literate (and alike) populations.

Acknowledgements

First, I would like to thank the academic program directors, advisors and coordinators at the School for International Training in Nyon and Geneva, Switzerland: Dr. Alexandre Lambert, Dr. Anne Golaz and Ms. Françoise Florens, for all their guidance throughout this paper and the academic program. In addition, I would like to thank Dr. Elisabeth Meur, from the Graduate Institute of Geneva, who offered her expertise and guidance on the direction of my paper and the best research methodology involved. In addition, I would like to thank Dr. Robert Bonvini at the Clinic of Grangettes (Geneva) for a wonderful interview and for providing me with contacts in order to enhance my research. In addition, I would like to thank Dr. Philippe Gilliéron, Family Pediatrician in St. Prex for an informative interview. I would like to acknowledge Dr. Felix Fellmann at the Swiss Agency for Development and Cooperation (SDC) for his insightful interview as well. Finally, I would like to extend my thanks to Dr. Corina Wirth at the Swiss Society for Public Health for dedicating her limited time to responding to questions. I would also like to thank Karin Guldenfels at the Swiss Society of Cardiology, Professor Thierry

Pedrazzini in the Department of Cardiovascular Medicine at the University of Lausanne Medical School for their helpful responses, and lastly, Professor Luc Pellerin in the Department of Physiology at the University of Lausanne for connections to his networks. In addition, I am dedicating this paper and my research to those who suffer from cardiovascular disease and my mother, who continues to be my role model.

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Introduction

The world is on the edge of a momentous demographic milestone. The proportion of elderly people in the population is rising rapidly. Since the beginning of history, young children have outnumbered their elders. The number of people over 65 or older will soon outnumber children under age 5.⁴ In today's developing countries, the rise of chronic noncommunicable diseases (NCDs) such as cardiovascular disease and diabetes reflects changes in lifestyle and diet, as well as aging.⁵ The number of people aged 65 or older is projected to grow from an estimated 524 million in 2010 to nearly 1.5 billion in 2050, with most of the increase in developing countries.⁶ One of the many burdens on public and global health measures in the 21st century is aging populations. Adults and older people impose the greatest burden on global health⁷, having the highest incidence of coronary heart disease (CHD),⁸ among many other noncommunicable diseases.

Elderly populations with chronic diseases are more vulnerable to improving health outcomes.⁹ Aging patient's engagement in preventive health and self-care is often influenced by their health literacy skills. Low health literacy combined with physiological changes of aging put the elderly in the most vulnerable positions.¹⁰ Thus, the impact of low health literacy skills in aging populations can negatively affect health behaviors and

⁴ Beard, J., & Suzman, R. (2011, October). Global health and aging. Retrieved May 3, 2017, from http://www.who.int/ageing/publications/global_health.pdf

⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

⁸ Stewart, S., MacIntyre, K., Capewell, S., & McMurray, J. J. (2014, January 01). Heart failure and the aging population: an increasing burden in the 21st century? Retrieved May 03, 2017, from <http://heart.bmj.com/content/89/1/49>

⁹ Nutbeam, D. (2016, March). Health literacy as a public health goal: A challenge for contemporary health education and communication. Retrieved May 3, 2017, from https://www.researchgate.net/profile/Don_Nutbeam/publication/31229130

¹⁰ Mullen, E. (2013, July 31). Health Literacy Challenges in the Aging Population. Retrieved May 03, 2017, from <http://onlinelibrary.wiley.com/doi/10.1111/nuf.12038/abstract>

health outcomes. Health literacy can have an impact on the effectiveness of preventive interventions in health behaviors and the success of health outcomes. Prevention interventions should be tailored to the patients' literacy levels in order to have successful intervention. This paper will examine health literacy skills of aging populations, specifically elderly patients age 65 and older. The purpose of this research paper is to attempt to assess the relationship between health literacy and health outcomes, especially regarding cardiovascular disease. Through examining health literacy and health outcomes, there will be a better understanding if a higher health literacy skill in elderly patients with cardiovascular disease has an increased likelihood of successful prevention and interventions on health behaviors and health outcomes.

Literature Review

I consulted a variety of works of literature for my research. Most of the research conducted was comprised of medical and public health journals covering health literacy, aging populations and noncommunicable diseases, specifically cardiovascular disease. Only high-quality relevant background sources, medical and public health journals, academic journals, research reports, peer-reviewed journals and other key publications in the field of medicine and global health – relevant to the research topic – were consulted. This largely included the World Health Organization (WHO) specific reports, which provided fact sheets, epidemiological data and other relevant information on country specific statistics. The European Society of Cardiology (ESC), the Swiss Society of Cardiology (of the European Society of Cardiology), Swiss Heart Foundation, and the US National Library of Medicine provided general information on cardiovascular disease and other heart conditions, including statistics, rates, definitions and other research reports

around the topics of heart health. The largest source(s) were the Swiss Society of Cardiology (of the European Society of Cardiology), Swiss Society for Public Health and World Health Organization. These organization reports summarized a variety of cardiovascular disease statistics, health programs, prevention policies, and information on aging populations. The largest source written on health literacy was from the US National Library of Medicine, in conjunction with the National Center for Biotechnology Information (NCBI). These databases consisted of unlimited academic, medical and public health journals around health programs, health education, and health literacy in the realm of health communication.

Research Questions

In approaching formal and informal interviews, the mains questions that were asked depended on the organization and/or expertise of the professional that was being interviewed. The purpose of this research paper is to attempt to assess the relationship between health literacy and health outcomes, especially regarding cardiovascular disease. Through examining such relationship, there will be a better understanding if health literacy skills in aging populations have an impact on the prevention of CVD risk factors, treatments and health outcomes.

The following main research question(s) that were attempted to answer with this research paper are as follows:

1. Is there a link between health literacy and health outcomes, especially regarding cardiovascular disease?
2. Are public health strategies that are tailored to a patient's literacy level more effective in successful prevention/intervention of cardiovascular disease?

3. Do effective intervention strategies in Switzerland improve health outcomes for elderly/aging cardiovascular disease patients with low health literacy skills?
4. Do health literacy skills in aging populations impact the prevention and intervention strategies of CVD?

When discussing these questions and other issues with Physicians, Cardiologists in hospitals, and other Swiss organizations such as the Swiss Heart Foundation and the Swiss Society of Cardiology (of the European Society of Cardiology), I asked more general questions regarding prevention and intervention strategies, the impacts of these strategies, and other policies that are catered toward the prevention of CVD. I inquired about specific policies, prevention methods, and how health literacy might impact health outcomes and the prevention of this disease.

Research Methodology

Information gathered to formulate this research paper derives from a wide variety of sources (primary and secondary), including interviews of professionals in the field relevant to the topic being researched. An effort was made to gather sources that tied together different perspectives and data collection technique regarding health literacy and health outcomes among (elderly) cardiovascular disease patients in Switzerland. A great portion of information gathered included secondary sources, such as publications from the World Health Organization (WHO), Non-Governmental Organizations (NGOs), academic journals, scholarly articles, medical science journals (US National Library of Medicine National Institutes of Health and The European Journal of Medical Sciences), and official peer-reviewed reports and statements from health professionals. Primary data was collected in the form of 3 formal interviews and 4 informal interviews to gain

additional perspectives that could not be seen/studied through reading secondary sources of journals and scholarly articles.

Several health professionals were reached out to for interview opportunities, including additional cardiologists, global and public health experts, directors of internal medicine, professors and other health professionals, but unfortunately were unavailable or unresponsive. I specifically reached out to the health minister(s) of the VD canton from the Swiss Conference of the Cantonal Ministers of Public Health (GDK), but they never responded. Nevertheless, the interviews conducted were absolutely incredible to my overall research.

Ethical considerations during the interview process involved receiving every interviewee's consent to interview him/her, take notes of their responses and develop their responses into this independent research report. The interviewee's were explained their rights regarding confidentiality and privacy, having the option to remain anonymous, if they wish. The interviewees' participated on their own free will and was instructed to only share information they were comfortable with. No ethical or conflict of interest dilemmas arose during the development, research, or writing of this independent research paper/report. In addition, the interviewees were notified they could ask for the written, finalized research paper through the interviewer or School for International Teaching.

Analysis

a. Swiss Healthcare System

The Swiss health system is highly complex, characterized by a federalist structure with its federal government, cantons and communes or municipalities each responsible

for different functions.¹¹ Healthcare in Switzerland is universal and is regulated by the Swiss Federal Law on Health Insurance. There are no free state-provided health services, but private health insurance is compulsory for all persons residing in Switzerland. Responsibility for the provision and funding of healthcare lies mainly with the 26 cantons; the cantons maintain and, together with the mandatory health insurance, co-finance and supervise hospitals and nursing homes.¹² The cantons secure healthcare by means of hospital planning, emergency, and rescue services and together, with the federal government and local municipalities, they are responsible for prevention and the promotion of health.¹³ The entire Swiss healthcare system is focused on the general goals of promoting general public health, reducing health financing and costs, and encouraging individual responsibility with their own health. Health spending in Switzerland was 11.4% of GDP in 2015, well above the OECD average of 8.9%.¹⁴

¹¹ "The Swiss healthcare system." Startseite. Retrieved April 03, 2017. <http://www.interpharma.ch/fakten-statistiken/4561-swiss-healthcare-system>.

¹² Ibid.

¹³ Ibid.

¹⁴ Switzerland – OECD, Health: Switzerland's health system is high-performing but must prepare for the future. (2015, October). Retrieved May 03, 2017, from <http://www.oecd.org/switzerland/healthswitzerlandshealthsystemishigh-performingbutmustprepareforthefuture.htm>

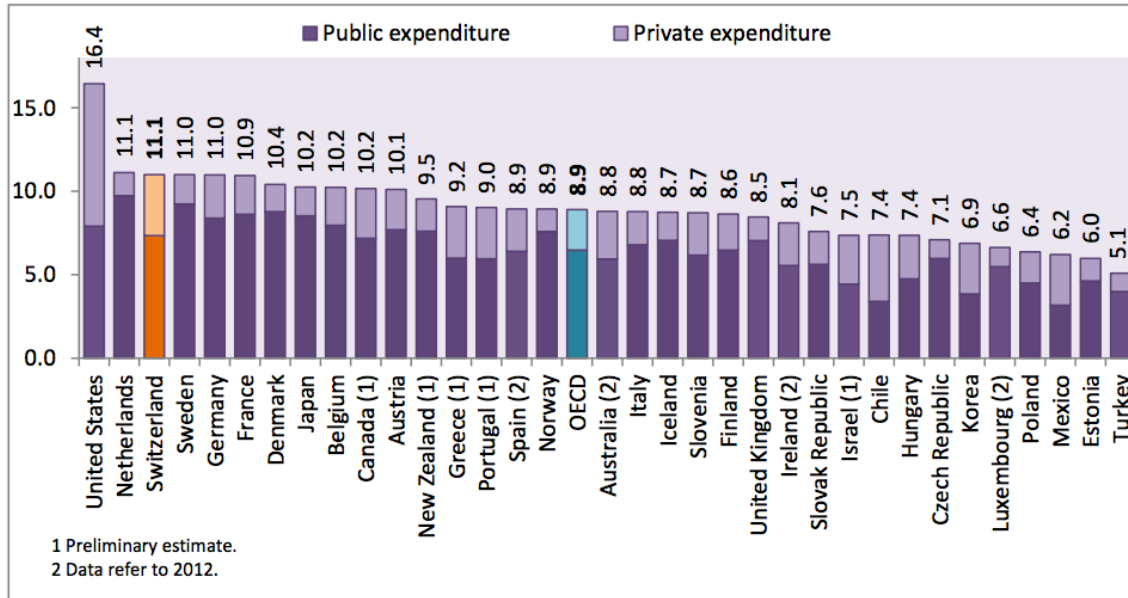


Figure 1.1 The graph above shows the health spending, excluding capital expenditure, as a share of GDP

(Source: OECD Health Statistics, 2015)

Today, around 2.3% of Switzerland's total health expenditure is devoted to preventing disease and promoting good health.¹⁵ More than 500,000 people are employed in the Swiss health sector, with over 30,000 working as doctors.¹⁶ There is a shortage of Switzerland doctors and other health professionals, as around 30% of doctors practicing in Switzerland have foreign qualifications.¹⁷ In their *Review of Switzerland's Health Care System*¹⁸, the OECD and the WHO warn that while the Swiss health system is currently amongst the best in the world, it will need to adapt to deal with increasing costs and

¹⁵ Morgan, D., & Canaud, M. (2015, July 7). How does health spending in Switzerland compare? Retrieved May 3, 2017, from <https://www.oecd.org/switzerland/Country-Note-SWITZERLAND-OECD-Health-Statistics-2015.pdf>

¹⁶ "Suisse – Doctors." Bleedle. March 2014. Retrieved April 03, 2017 from <http://www.bleedle.net/suisse-doctors/>.

¹⁷ Leybold-Johnson, Isobel. "Addressing the shortage of Swiss doctors." SWI swissinfo.ch. August 11, 2016. Retrieved April 03, 2017. http://www.swissinfo.ch/eng/society/in-need-of-care_explaining-the-shortage-of-doctors-in-switzerland/42332366.

¹⁸ OECD Reviews of Health Systems - Switzerland (2017). (2017, October). Retrieved May 03, 2017, from <http://www.oecd.org/els/health-systems/oecdreviewsofhealthsystems-switzerland.htm>

rising chronic diseases such as cancer, cardiovascular disease and diabetes.¹⁹ At the present, every fourth person in Switzerland suffers from one or more chronic diseases; and NCDs are the most common cause of death;²⁰ they are responsible for half of all fatalities among men and 60 percent among women under the age of 70.²¹

Around 2.2 million people in Switzerland currently suffer from one or more chronic diseases, generating around 80 percent of the country's entire health-related costs,²² of just under 65 billion francs.²³ On top of this comes the estimated indirect cost of lost productivity and absences from work of around 30 billion francs a year.²⁴ Although life expectancy in Switzerland (82.8 years)²⁵ is the highest in Europe (after Iceland) and healthy life expectancy is several years above the Europeans Union (EU) average, nevertheless, a number of challenges remain.

b. Switzerland Aging Population

Over the past 50 years, few European states have experienced as much demographic growth as Switzerland. Like many western European countries (and the world population as a whole), Switzerland faces not only a drastically increasing population, but also an ageing population. Swiss population growth has been steady over

¹⁹ Switzerland – OECD, Health: Switzerland's health system is high-performing but must prepare for the future. (2015, October). Retrieved May 03, 2017, from <http://www.oecd.org/switzerland/healthswitzerlandshealthsystemishigh-performingbutmustprepareforthefuture.htm>

²⁰ Prevention rather than cure: National Strategy for the Prevention of Non-communicable Diseases. (2016, April 6). Retrieved April 24, 2017, from <http://www.spectra-online.ch/en/spectra/topics/prevention-rather-than-cure-national-strategy-for-the-prevention-of-non-communicable-diseases-497-10.html>

²¹ Ibid.

²² Ibid.

²³ Ibid.

²⁴ Ibid.

²⁵ Pietro, C., Sturny, I., Edwards-Garavoglia, S., & Quentin, W. (2015, November 5). Health systems in transition: Switzerland health system review. Retrieved May 3, 2017, from http://www.euro.who.int/__data/assets/pdf_file/0010/293689/Switzerland-HiT.pdf?ua=1

the past half-century, increasing by a least one percent per year.²⁶ The “drivers” of population dynamics that are critical to fully understanding the impacts of an ageing population include fertility rate, net migration and life expectancy. While increased lifespan may seem to be the force behind Switzerland’s ageing population, falling birth rates have much more to do with the change in demographics.²⁷ As the Swiss birth rate stands below the level needed to ensure demographic renewal, the increasing ageing population is soon to outgrow the young.

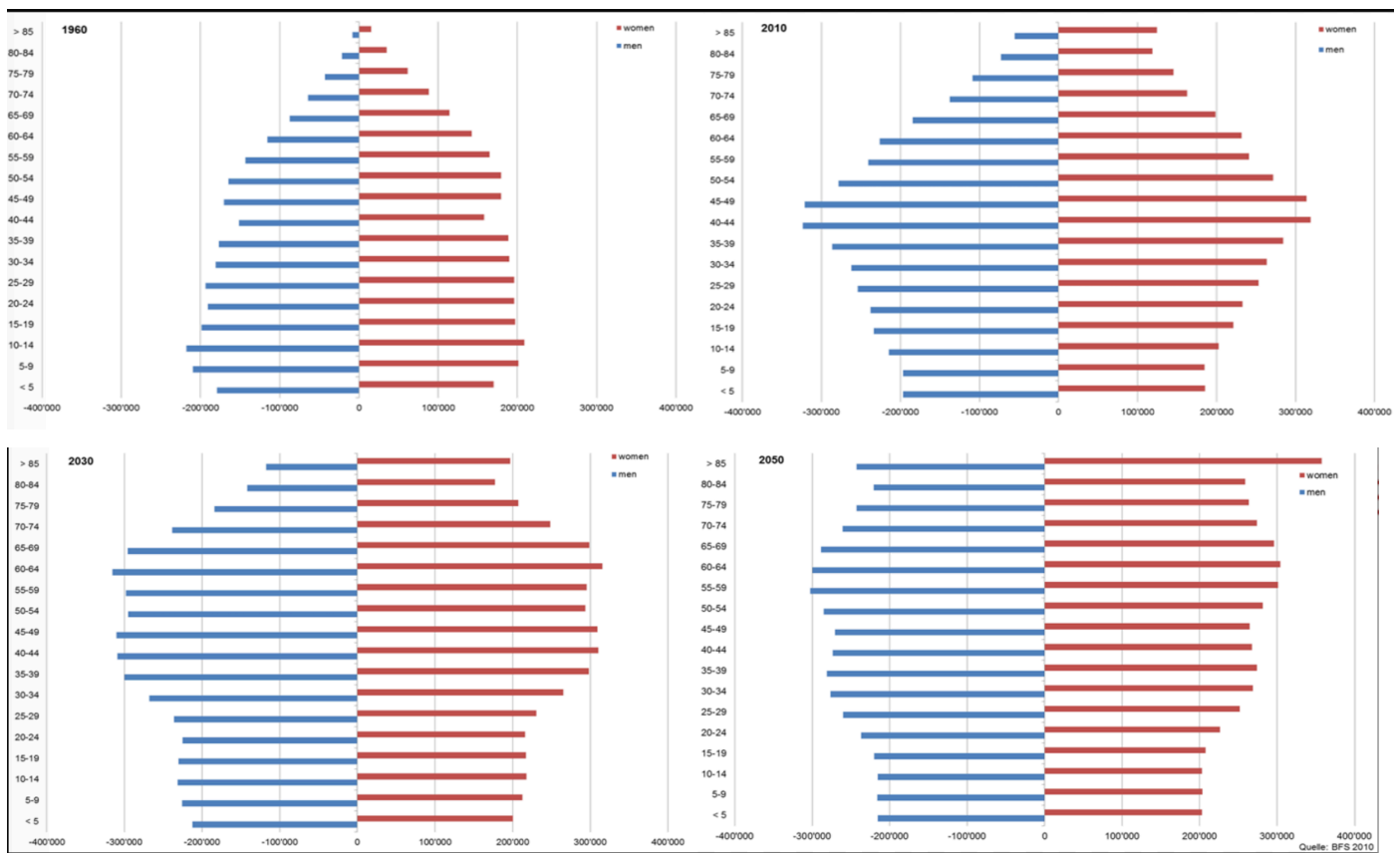


Figure 1.2 The graphs above depict the every-changing shape of populations from 1960 (upper left) and 2010 (upper right); and predictions for 2030 (lower left) and 2050 (lower right) in Switzerland (Source: Federal Statistical Office / swissinfo.ch, 2015).

²⁶ Mariani, D., & Nguyen, D. (2014, November 27). Swiss population getting larger, older, more diverse. Retrieved May 03, 2017, from https://www.swissinfo.ch/eng/society/digging-into-data_swiss-population-getting-larger--older--more-diverse/41129138

²⁷ Mariani, D., & Nguyen, D. (2014, November 27). Swiss population getting larger, older, more diverse. Retrieved May 03, 2017, from https://www.swissinfo.ch/eng/society/digging-into-data_swiss-population-getting-larger--older--more-diverse/41129138

As the graphs show, in 1860, there were 12 Swiss aged 20 to 64 years old for every person aged 65 and over; today, this ratio is only 3.4:1,²⁸ meaning the ratio of older people to people of working age has risen to 26.1 per 100. Society is ageing; life expectancies are rising; and advances in medical technologies and medical services make premature death less likely. As population growth curbs, the percentage of elderly people increases. In July 2015, the Swiss Federal Office of Statistics published a projection estimating that by 2045, the ratio of residents over the retirement age of 65 would climb to 48.1 per 100 residents between 20 and 64 years old, and possibly as high as 50.0 in the highest case.²⁹ These statistics prove remarkable improvements in life expectancy over the past century, but an aging population means the rise of chronic noncommunicable diseases such as CVD, heart disease, cancer and diabetes. The potential economic and societal costs of NCDs rise sharply with age and have the ability to affect economic growth.³⁰ Overall, an aging population shows that premature death is less likely, but the world is unable to keep up with the demands of an aging population. Thus, ensuring good child health will be key for the future of Switzerland, as studies show that adult and older-age health problems are rooted in early life experiences and living conditions.

As Dr. Philippe Gilliéron, a pediatrician in St. Prex, Switzerland mentions, ensuring good child health can yield benefits for problems with older people in generations to come. He mentions that as generations of children and young adults grow up in ill health in Switzerland, they will be entering old age in the coming decades,

²⁸ Ibid.

²⁹ Kohli, Raymond (June 2015). *Szenarien zur Bevölkerungsentwicklung der Schweiz 2015–2045 (Report)*. Swiss Federal Statistical Office. Retrieved 14 July 2016.

³⁰ Beard, J., & Suzman, R. (2011, October). Global health and aging. Retrieved May 3, 2017, from http://www.who.int/ageing/publications/global_health.pdf

potentially increasing the health burden on the Swiss healthcare system in the near future. The fact is that ageing drastically impacts the physical and mental health of a population, and Swiss society needs to keep up with the demands of them.

c. Cardiovascular Disease and Risk Factors in Switzerland

The heart is a vital, muscular organ. With every heartbeat, the heart pumps blood that carries oxygen and nutrients to all parts of the body. When complications arise, the heart is unable to fully function. Cardiovascular disease (CVD) is a major cause of disability and premature death throughout the world. The underlying pathology is atherosclerosis, which develops over many years and is usually advanced by the time symptoms occur, generally in middle/older age individuals.³¹ Cardiovascular diseases refer to the class of diseases that may involve the heart, the blood vessels and the circulation system.³² Cardiovascular diseases belong to the non-communicable diseases, with slow progression and long duration, but certainly preventable. The different types of CVDs includes ischemic heart disease or coronary artery disease, angina and myocardial infarctions (e.g heart attack), cerebrovascular disease (e.g. stroke), congenital heart disease, rheumatic heart disease, and cardiomyopathies.³³ CVDs are the number one cause of death globally³⁴: more people die annually from CVDs than from any other cause. CVDs are responsible for an estimated 17.5 million deaths per year.³⁵

³¹ Prevention of cardiovascular disease: pocket guidelines for assessment of cardiovascular risk. (2007, April 7). Retrieved May 3, 2017, from http://www.who.int/cardiovascular_diseases/guidelines/PocketGL.ENGLISH.AFR-D-E.rev1.pdf

³² Ibid.

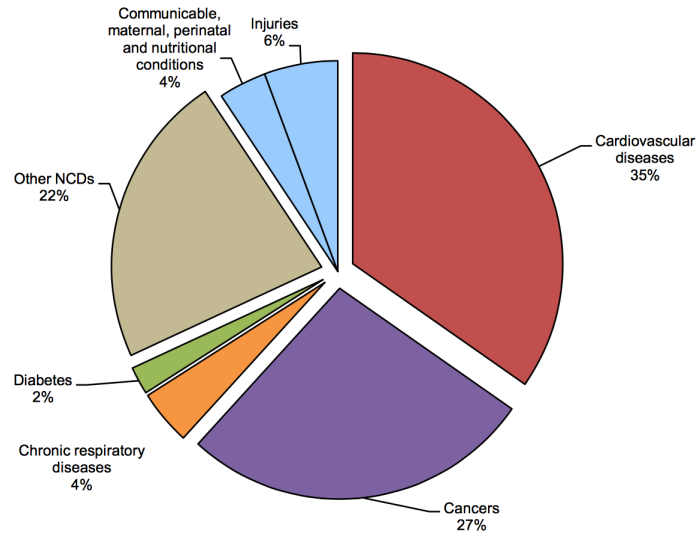
³³ Ibid.

³⁴ Cardiovascular diseases (CVDs). (2016, September). Retrieved May 03, 2017, from <http://www.who.int/mediacentre/factsheets/fs317/en/>

³⁵ Ibid.

Percentage of population living in urban areas: 73.7%
 Population proportion between ages 30 and 70 years: 54.5%

Proportional mortality (% of total deaths, all ages, both sexes)



Total deaths: 62,000
NCDs are estimated to account for 91% of total deaths.

Figure 1.3 The graph above shows the proportional mortality of all ages and sexes in Switzerland. NCDs are estimated to account for 91% of total deaths, CVD making up 35% of total deaths. (Source: World Health Organization – Noncommunicable Diseases (NCD) Country Profiles, 2014).

Specifically, CVD causes more than half of all deaths across the European Region.³⁶ As the figure above shows, NCDs are estimated to account for 91% of total deaths in Switzerland – CVD making up around 35%. When up to 90% of cardiovascular diseases may be preventable if established risk factors are avoided, governments must strictly practice measures to prevent CVD and other NCDs.

There are many risk factors for CVDs in Switzerland: age, gender, tobacco use, physical inactivity, excessive alcohol consumption, unhealthy diet, obesity, genetic predisposition and family history of cardiovascular disease, hypertension (high blood pressure), hyperlipidemia (high blood cholesterol), psychosocial factors, stress, poverty

³⁶ Data and statistics for the regional office for Europe. (2017, April 19). Retrieved May 03, 2017, from <http://www.euro.who.int/en/health-topics/noncommunicable-diseases/cardiovascular-diseases/data-and-statistics>

and low educational status (low health literacy).³⁷ A key thing to note is that some of these risk factors such as age, gender, genetic predisposition and/or family history are unchangeable; these are risk factors that an individual can't change. However, many important cardiovascular risk factors are modifiable by changing health behaviors, habits and lifestyles.

What risk factors drive the most death and disability combined?

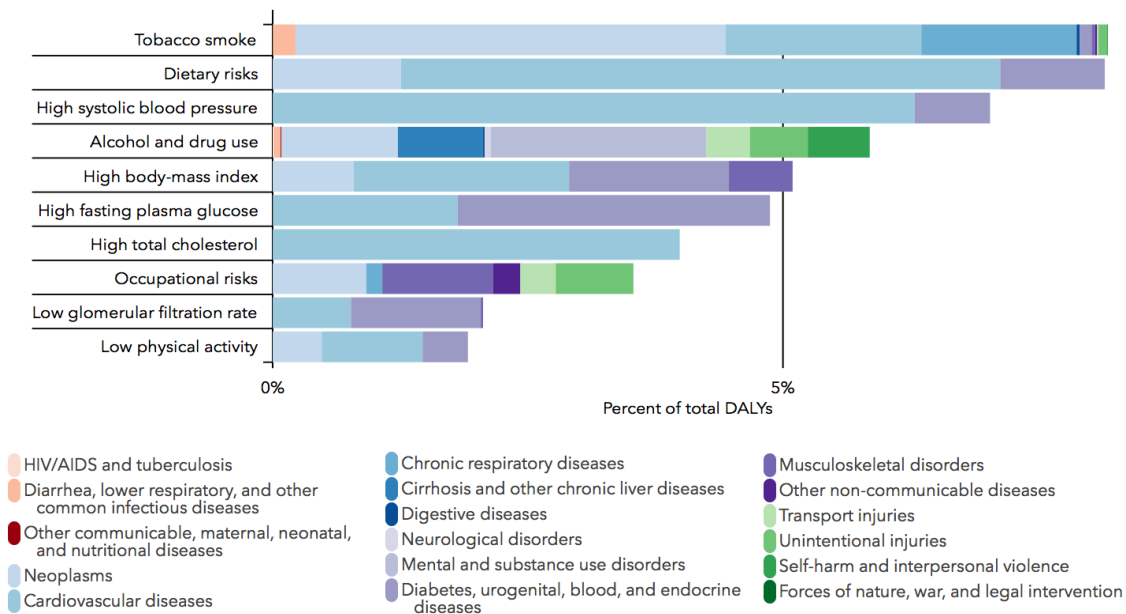


Figure 1.4 The graph above shows the risk factors that drive the most death and disability in Switzerland (Source: Institute for Health Metrics and Evaluation, Country Profiles, 2016).

As the above graph shows, CVDs highest risk factors that drive the most death and disability in Switzerland are tobacco smoke, dietary risks, high blood pressure, high total cholesterol and low physical activity. According to data from the European Society of Cardiology Atlas of Cardiology, the overall mortality due to CVD (% of total deaths) is equal to 35%, with 1,515 per million people deaths due to ischemic heart disease and

³⁷ Bridget B. Kelly; Institute of Medicine; Fuster, Valentin (2010). *Promoting Cardiovascular Health in the Developing World: A Critical Challenge to Achieve Global Health*. Washington, D.C: National Academies Press. ISBN 0-309-14774-3.

832 due to stroke.³⁸ In 2013, in the 45-64 age group cardiovascular mortality represent 20.6% for men and 12.9% for women; in the 65-85 age group this rose to 29.2% for men and 28.1% for women; figures for the over 85 year-olds were 42% for men and 44.2% for women.³⁹ These risk factor statistics show that cardiovascular disease mortality risks increase in individuals – especially women – as they age. According to the European Association of Preventive Cardiology (EAPC), and many other sources, hypertension and diabetes are the two most important risk factors that can identify pre-cardiovascular disease symptoms. Dr. Bonvini mentions that roughly 1 out of every 3 patients he sees has diabetes, hypertension or is overweight/obese. CVD patients don't understand the impact these modifiable risk factors have on their overall health, especially when it involves heart health.⁴⁰

Hypertension

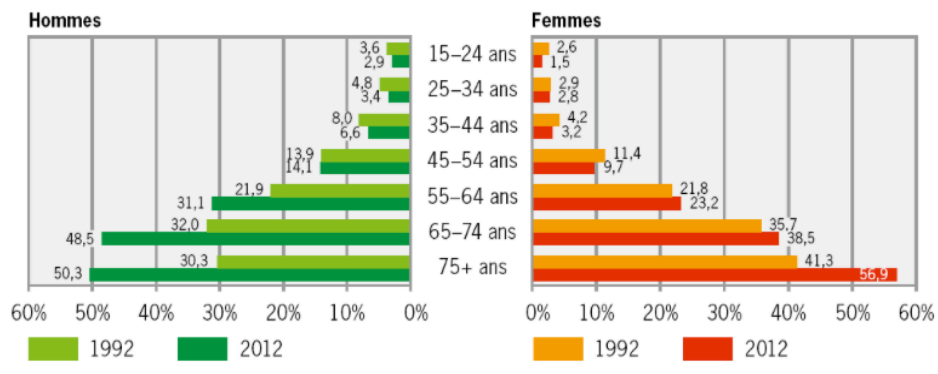


Figure 1.5 Prevalence of hypertension as a risk factor for CVD in males and females from 1992 to 2012 (Source: OFS – Enquete Suisse sur la santé (ESS), 2015)
Legend: Hommes = men / Femmes = women / ans = years

³⁸ Carballo, D., & Mach, F. (2016, October 1). ESC Sub-Specialty Communities. Retrieved May 03, 2017, from [https://www.escardio.org/Sub-specialty-communities/European-Association-of-Preventive-Cardiology-\(EAPC\)/Prevention-in-your-country/country-of-the-month-switzerland](https://www.escardio.org/Sub-specialty-communities/European-Association-of-Preventive-Cardiology-(EAPC)/Prevention-in-your-country/country-of-the-month-switzerland)

³⁹ Ibid.

⁴⁰ Interview with Dr. Robert Bonvini

Diabetes

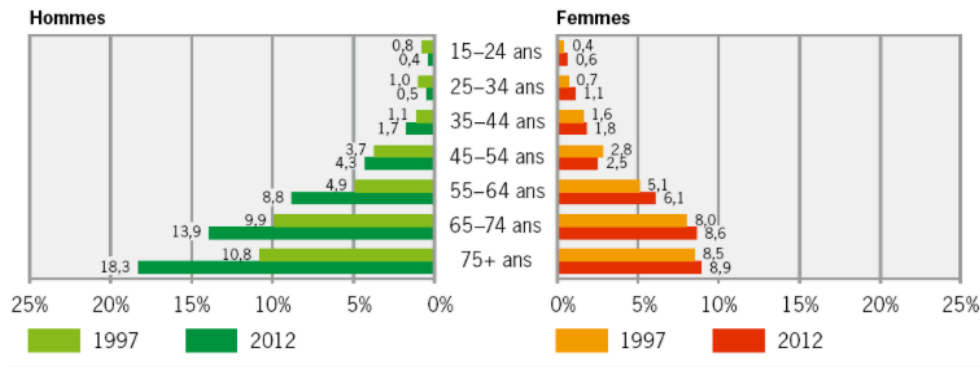


Figure 1.6 Prevalence of diabetes as a risk factor for CVD in males and females from 1992 to 2012. (Source: OFS – Enquête Suisse sur la santé (ESS), 2015)
Legend: Hommes = men / Femmes = women / ans = years

As shown in the figures above, hypertension and diabetes risk factors from 1992 to 2012 have drastically increased in aging populations over 55 years old for both sexes. Thus, preventive measures in regards to weight, diet and physical activity must be increased in early stages of young adults to make sure they are not developing hypertension or diabetes when they get older. It's critical to note smoking and tobacco consumption are also vital risk factors in the prevention of CVD, but there is a substantial decrease from 2002 to 2015 of the prevalence of smoking in young adults. Over three quarters of CVD deaths take place in low- and middle-income countries and deaths from CVD decreased in high-income countries over the last decade, yet it still remains as the main cause of death in Switzerland; addressing the prevention of modifiable risk factors is a must in Switzerland.

d. Switzerland CVD Programs, Policies and Strategies for Prevention

As the Swiss health care system is confronted with major challenges around noncommunicable diseases, the Swiss government and cantons have approved a national strategy for preventing and combating noncommunicable diseases. The objective of the

National Strategy for the Prevention of Non-communicable Diseases is to prevent or delay the development of conditions such as cancer, cardiovascular diseases and diabetes and to mitigate their consequences.⁴¹ This national strategy was created in response to the upcoming challenges in November 2013 when the National Health Policy – the Joint Platform of the Federation and the cantons for health policy issues – called for a partnership development, including its “Health 2020 agenda.” It is based on past and existing prevention approaches and brings together the resources of all the actors involved. In its overall “Health 2020” strategy agenda, the Swiss government defined the National Strategy for the Prevention of Non-communicable Diseases 2017-2024 (NCD Strategy) as a health-policy priority and made it a key issue of the 2016-2019 legislative period.⁴² The vision of the partnership-based NCD Strategy is “more people remain healthy or have a high quality of life despite chronic illness, with fewer people suffering from preventable non-communicable diseases or dying prematurely. Independent of their socio-economic status, people are enabled to maintain a healthy lifestyle in a health-promoting environment.”⁴³

The Swiss Tropical and Public Health Institute (known as Swiss TPH), is a world-leading global health institution in health research, training and services. Researchers are committed to improving and promoting health of individuals and societies all around the globe. Swiss TPH is focused on primary prevention strategies to fight the NCD epidemic by developing and applying cutting-edge epidemiological, biostatistical and modeling

⁴¹ Prevention of cardiovascular disease: pocket guidelines for assessment of cardiovascular risk. (2007, April 7). Retrieved May 3, 2017, from http://www.who.int/cardiovascular_diseases/guidelines/PocketGL.ENGLISH.AFR-D-E.rev1.pdf

⁴² National strategy for the prevention of non-communicable diseases. (2017, April 20). Retrieved May 03, 2017, from <https://www.bag.admin.ch/bag/de/home/themen/strategien-politik/nationale-gesundheitsstrategien/strategie-nicht-uebertragbare-krankheiten.html>

⁴³ Ibid.

methods to advance the broad field of public health according to the institute's strategy of innovation, validation and application.⁴⁴ The Swiss TPH Department of Non-Communicable Diseases and Department of Epidemiology and Public Health EPH, focuses on understanding the relevance of environmental and lifestyle risk factors in NCD etiology and progression.⁴⁵ This includes several programs that bring awareness of the globalization of lifestyles and changing environments that contribute to an increase in NCDs. In addition, they conduct research to determine and strengthen the effectiveness of interventions and health systems. Through its support platform of providing research to policy experts in the field, policy activities evaluate the potential of structural prevention in slowing down the NCD epidemic.⁴⁶ Overall, the Swiss TPH and Department of NCDs and EPH are tirelessly working to develop and apply health impact assessment tools to provide information about the public health relevance of policies, strategies, decisions and/or projects to improve health and policy making in Switzerland, Europe and in low- and middle-income countries in Africa, Asia and the Americas.⁴⁷

When interviewing Dr. Bonvini, he mentioned both the NCD and Health 2020 strategy, and the Swiss Tropical and Public Health Institute when asked if he knew of any prevention strategies being taken in Switzerland. Dr. Bonvini, a cardiologist and angiology specialist at the Clinic of Grangettes (Geneva), highlighted that the Switzerland healthcare system was designed primarily to care for the acutely ill, so it is only partially equipped to deal with the steady rise in chronically ill patients.⁴⁸ Dr.

⁴⁴ Probst-Hensch, N. (2017, April 25). EPH - Epidemiology and Public Health. Retrieved May 03, 2017, from <https://www.swisstph.ch/en/about/eph/>

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ Interview with Dr. Robert Bonvini

Bonvini continued to say that general practitioner physicians mainly provide primary cardiovascular prevention, while cardiologists and health care providers such as nurses and physiotherapists provide secondary cardiovascular prevention.^{49 50} Primary cardiovascular prevention is when no CVD is present or there are a “few” risk factors that are prevalent in the patient’s history or lifestyles, such as a family history of CVD, overweight/obese, or the elderly. Secondary cardiovascular prevention is when CVD is already present, and the prevention is targeted at trying to avoid a new event from arising.

e. Health Literacy and Health Outcomes

When an individual has to make a doctors appointment, seek medical care or treatment, measure their medication, understand nutrition labels or calculate their cholesterol, it requires a capacity to process and understand basic health information and services. This capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions⁵¹ is health literacy. Health literacy has been defined as the cognitive and social skills that determine the motivation and ability of an individual to gain access to, understand and use information in ways which promote and maintain good health.⁵² Although health literacy is a major international public health concern, there are few studies and research done on health literacy and health outcomes in Switzerland. According to Dr. Felix Fellmann from the Swiss Agency for Development and Cooperation (SDC)⁵³, health literacy has become an increasingly

⁴⁹ Interview with Dr. Robert Bonvini

⁵⁰ Carballo, D., & Mach, F. (2016, October 1). ESC Sub-Specialty Communities. Retrieved May 03, 2017, from [https://www.escardio.org/Sub-specialty-communities/European-Association-of-Preventive-Cardiology-\(EAPC\)/Prevention-in-your-country/country-of-the-month-switzerland](https://www.escardio.org/Sub-specialty-communities/European-Association-of-Preventive-Cardiology-(EAPC)/Prevention-in-your-country/country-of-the-month-switzerland)

⁵¹ Ratzan, S. (2010, February 23). Quick guide to health literacy: fact sheet. Retrieved April 21, 2017, from <https://health.gov/communication/literacy/quickguide/factsbasic.htm>

⁵² Norrow, D. (2009, May 11). Track 2: Health literacy and health behaviour. Retrieved May 03, 2017, from <http://www.who.int/healthpromotion/conferences/7gchp/track2/en/>

⁵³ Interview with Dr. Felix Fellmann

important skill for individuals to have to make health relevant decisions in modern societies. Health literacy is more than just being able to read brochures, flyers or make an appointment with a physician. Health literacy is becoming far more complex as navigation in the Swiss health care system gets more and more complex for patients – especially when patients are older. But when individuals are faced with issues regarding their own health, they must access health care services on their own. This makes them vulnerable to the health care system. Adding aging populations (elderly) and people who are health illiterate with low socioeconomic and educational status, you have the most vulnerable group of people dealing with the complex Swiss health system.

There are many individual and systemic factors that are dependent on health literacy. One of the many systemic factors that are dependent on health literacy is if a government or health care system takes action towards a health literacy concept. In 2005, the Swiss Federal Office of Public Health started a conceptual and strategy process on health literacy.⁵⁴ In 2007, the Swiss Federal Government adopted the “e-Health Strategy Switzerland” in which health literacy is central in regards to the electronic medical record. In Switzerland’s 2013 “Health 2020” agenda, the Swiss government defined the NCD Strategy as a health-policy priority. In addition to NCDs, health literacy is central in the “Health 2020” strategy too. Increasing self-competence in health issues, empowering insures and patients, increasing patients’ involvement in health policy, improving self-management skills, reinforcing individual responsibility and equality of opportunity for all individuals are the key health promotion pillars to achieve by 2020.

⁵⁴ Placella, E. (2017, February 27). Health literacy in Switzerland. Retrieved April 29, 2017, from http://who.int/global-coordination-mechanism/working-groups/swiss_cc.pdf?ua=1

Defined in the “Health 2020”, health literacy is the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions.⁵⁵ Communication skills of patients and professionals, professional knowledge of health topics, social and culture influences, demands of the healthcare systems and demands of the situation/context must be recognized in the role of health literacy measurement.⁵⁶ Switzerland doesn’t necessarily study or measure health literacy, but since health literacy is a cornerstone of the National Strategy for Prevention of NCDs (2017-2024),⁵⁷ Switzerland continues to take the necessary steps to improve their overall population health literacy.

f. Actions to Address Health Literacy in Switzerland

Through the WHO and Swiss Confederation efforts, numerous preliminary actions have been implemented to address health literacy in Switzerland. Strategies to address these problems were identified by the Health Literacy 2015 Population Survey with two strategic plans: 1) reduce the percentage of people with low health literacy and 2) optimize the Swiss healthcare system.⁵⁸ Through the “Health 2020” agenda, assuring greater accountability, enhancing the health education system, enhancing access to more clear and understandable information and empowering consumers and patient organizations⁵⁹ are all in place for Swiss cantons. As the table below shows, the six steps to enhancing understanding among patients with low health literacy are easy to follow.

⁵⁵ Ratzan, S. (2010, February 23). Quick guide to health literacy: fact sheet. Retrieved April 21, 2017, from <https://health.gov/communication/literacy/quickguide/factsbasic.htm>

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Placella, E. (2017, February 27). Health literacy in Switzerland. Retrieved April 29, 2017, from http://who.int/global-coordination-mechanism/working-groups/swiss_cc.pdf?ua=1

⁵⁹ Ibid.

- Slow down and take time to assess patients' health literacy skills.
 - Use “living room” language instead of medical terminology.
 - Show or draw pictures to enhance understanding and subsequent recall
 - Limit information given at each interaction and repeat instructions
 - Use a “teach back” or “show me” approach to confirm understanding. This approach involves having clinicians take responsibility for adequate teaching by asking patients to demonstrate what they have been told (ie, teach back to you how to take their medications) to ensure that education as been adequate.
 - Be respectful, caring, and sensitive, thereby empowering patients to participate in their own health care.
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Table 1.1 The many steps physicians in Switzerland can take to improve communication with their patients – especially CVD patients.
(Source: The Society of Teachers of Family Medicine, 2006).

Specifically for aging populations, the IROHLA (Intervention Research on Health Literacy of the Ageing Population) project, funded by the EU, seeks to develop evidence-based guidelines for policy and practice for approaches to improve health literacy of the ageing population.⁶⁰ This is critical in Switzerland because the percentages of residents in Switzerland who are having low health literacy are over 65 years old.⁶¹ Specifically for aging populations, improving usability of health services will be key in the near future as older patients will be less likely to use health services when needed. Improving usability of health forms/instructions and improving accessibility of social support systems, will strengthen and empower older persons with low health literacy according to the IROHLA.⁶²

⁶⁰ Placella, E. (2017, February 27). Health literacy in Switzerland. Retrieved April 29, 2017, from http://who.int/global-coordination-mechanism/working-groups/swiss_cc.pdf?ua=1

⁶¹ See previous chart

⁶² Placella, E. (2017, February 27). Health literacy in Switzerland. Retrieved April 29, 2017, from http://who.int/global-coordination-mechanism/working-groups/swiss_cc.pdf?ua=1

g. Health Literacy and Cardiovascular Disease

Advances in medical technologies and medical services require adequate health literacy from patients in order to improve quality of life. However, health literacy is inadequate in many places and instances, especially in the elderly living in Switzerland. One of the major barriers to improving patient knowledge of CVD is that the education material has not always been produced at appropriate reading levels. The challenge of effectively delivering health information to patients is rooted in patient-caregiver communication, but that includes the poor health literacy skills of the patient. As mentioned, there are a multitude of factors that influence the health literacy of a patient, and sometimes that is out of a physician's control. A research paper from the National Institute on Aging examined education and coronary heart disease risk from the New England Family Study. The study showed that education is inversely associated with CVDs.⁶³ A major risk factor for CVDs is low education status. The potentially causal relationship between socioeconomic position (e.g. education, income occupation) and health is shown to be inversely associated with cardiovascular diseases, specifically in coronary heart disease (CHD).⁶⁴ The evaluation of associations of educational attainment with individual modifiable CHD risk factors are particularly strongly associated with education, as cited by the researchers.

Specialized cardiovascular risk factor education programs and smoking cessation programs are available in most University hospital settings, but never as a holistic population tactic. Dr. Bonvini and the Swiss Heart Foundation both hint that the

⁶³ Loucks, E. B., Buka, S. L., Rogers, M. L., Liu, T., Kawachi, I., Kubzansky, L. D., . . . Gilman, S. E. (2012, April). Education and Coronary Heart Disease Risk Associations May Be Affected by Early Life Common Prior Causes: A Propensity Matching Analysis. Retrieved May 03, 2017, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3327475/>

⁶⁴ Ibid.

prevention strategies such as tobacco cessation as a population strategy, will be ineffective; it will either be ignored or promote tobacco use. Prevention activities have been mainly centered around cantonal anti-smoking legislation, local primary prevention programs, health programs aimed at preventing and treating obesity as well as its direct consequences on health and morbidity and academic center based secondary prevention programs such as the structure secondary prevention program.⁶⁵ Prevention for cardiovascular disease and other NCDs are never focused on addressing risk factors specifically, and making sure individuals in society are educated. Through looking at the Swiss Heart Foundation and Swiss Society for Public Health, Switzerland prevention programs and policies rarely take in account educational attainment such as health education, health literacy, income and educational status of their targets. Individuals who are living unhealthy lifestyles are more likely to be health illiterate or have lower education status compared to those who are well educated and healthy.⁶⁶ However, even though there are Swiss prevention practices in place, it only matters if the populations are empowered when targeted through these programs.

h. Switzerland Health Literacy 2015 Population Survey: Case Study

A study commissioned by the Swiss Federal Office of Public Health (FOPH) Health Strategies Division states the extent of the problem of limited health literacy in Switzerland is broad, but not deep.⁶⁷ Broad means that in Switzerland a relatively large number of residents have problematic health literacy (45%),⁶⁸ in which problematic

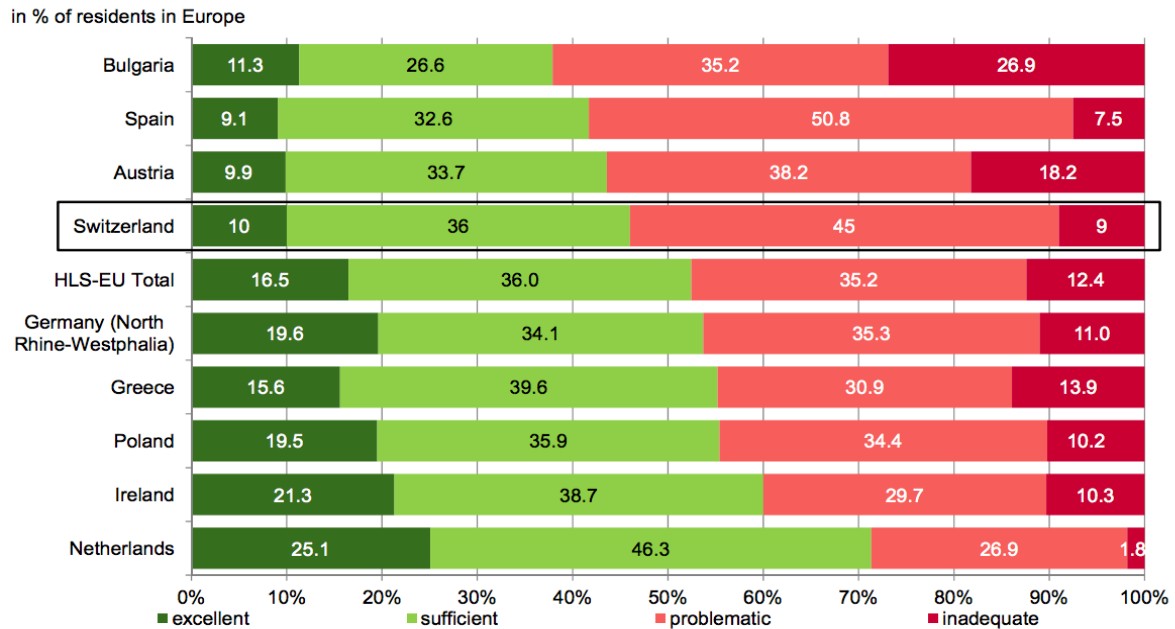
⁶⁵ Carballo, D., & Mach, F. (2016, October 1). ESC Sub-Specialty Communities. Retrieved May 03, 2017, from [https://www.escardio.org/Sub-specialty-communities/European-Association-of-Preventive-Cardiology-\(EAPC\)/Prevention-in-your-country/country-of-the-month-switzerland](https://www.escardio.org/Sub-specialty-communities/European-Association-of-Preventive-Cardiology-(EAPC)/Prevention-in-your-country/country-of-the-month-switzerland)

⁶⁶ <https://www.ahrq.gov/professionals/education/curriculum-tools/population-health/zimmerman.html>

⁶⁷ Bieri, U., & Kocher, J. (2016, May 18). Health literacy 2015 population survey. Retrieved May 3, 2017, from www.http://152131_GesKomp_SB_def_Zusfas_eng.pdf

⁶⁸ Ibid.

health literacy is a more frequent occurrence in Switzerland than in most other countries as shown in the figure below. 10% of the residents have excellent health literacy, while around 9% have inadequate health literacy.



Health Literacy Switzerland 2015, November 2015 (N = 1107)

Figure 1.7 General health literacy levels threshold for countries in % of residents in Europe (Source: Health Literacy Switzerland, 2015).

The greater problem in Switzerland is when it comes to assessing and understanding information about disease prevention.⁶⁹ The key points of the health literacy population survey are that the strongest driver of low health literacy is financial deprivation; people who have difficulties finding the money to pay their bills, medical bills or pay for medication have lower health literacy. There is a clear connection between health literacy and exercise: individuals who rarely or never exercise have lower health literacy. Overall, there are further, weaker influential factors: with increasing age,

⁶⁹ Bieri, U., & Kocher, J. (2016, May 18). Health literacy 2015 population survey. Retrieved May 3, 2017, from www.http://152131_GesKomp_SB_def_Zusfas_eng.pdf

people tend to have lower health literacy.⁷⁰ Therefore, the results of the survey show that the proportion of individuals with inadequate health literacy in particular is highest in the oldest cohort. An interesting find is that many middle-aged individuals have problematic health literacy. Simply put, Swiss residents' health literacy levels start to become problematic at middle age, so efforts must be taken to increase health literacy in middle-aged residents; which in turn, would decrease the inadequate health literacy percentage of the population in the long run. Especially since the risk of NCDs and other chronic diseases has a higher prevalence in middle-aged and older individuals, health literacy can significantly affect health risks.

Form this survey, the consequences of inadequate health literacy results in individuals with lower health literacy get significantly less exercise than individuals with higher health literacy; individuals with lower health literacy consider the state of their health to be poorer than higher health literate people; individuals with lower health literacy tend to have a higher likelihood of suffering from one or more long-term, chronic illness; the lower an individual's health literacy, the more likely he or she is to have been hospitalized in the past or to have used emergency services; and lastly, individuals with low health literacy are more likely to be smokers.⁷¹ These survey results specifically demonstrate that inadequate health literacy in Switzerland is correlated with health outcomes (likelihood of exercise, following doctor orders, using emergency services, etc.).

⁷⁰ Ibid.

⁷¹ Bieri, U., & Kocher, J. (2016, May 18). Health literacy 2015 population survey. Retrieved May 3, 2017, from www.http://152131_GesKomp_SB_def_Zusfas_eng.pdf

i. Nutrition and Health Literacy

When accessing CVD patients, nutrition is an area which physicians often expect individuals to make considerable changes in order to prevent obesity, hypertension, diabetes and high cholesterol.⁷² As seen in a study assessing the impact of health literacy on cardiovascular disease from the National Institutes of Health, the health literacy consideration built within nutrition programs can make a difference in the outcomes of their participants. Patient education, empowerment and health literacy training is often optimal for helping low health literacy populations make the necessary dietary changes – putting them at a lower risk for CVD.

Dr. Fellmann spoke about food and nutrition literacy. He mentions that being nutrition literate – understanding the importance of good nutrition – prevents individuals from making uninformed decision concerning food and their diets. Being health literate concerning your nutritional diets and foods decreases your risk for being overweight, obese, diabetes, hypertension, high cholesterol, etc., eventually leading to a lower risk of CVD. A study from the National Institutes of Health, *Journal of Health Communication* examined the relationship between health, education and health literacy from adult literacy and life skills survey.⁷³ Health literacy was found to partially mediate the association between low education and low self-reported health status. As such, improving health literacy was a useful strategy for reducing disparities in health related to education, as health literacy appears to play a role in explaining the underlying

⁷² Ibid.

⁷³ Safeer, R. S., Cooke, C. E., & Keenan, J. (2016, December). The impact of health literacy on cardiovascular disease. Retrieved May 03, 2017, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994011/>

mechanism driving the relationship between low level of education and poor health.⁷⁴

The scientific literature study assessed whether health literacy was a mediator in the relationship between education and health, the association between health literacy and each of the health outcomes (i.e. self-reported general health, physical health and mental health), and the direct effect of education on health. The results indicated that health literacy mediates the associations between education and self-reported general health, self-reported physical health, and self-reported mental health.⁷⁵

The results confirmed that low education is a predictor of having low self-reported health. In addition, the researchers concluded that the present study confirms that low education is associated with low health literacy. Of course, future research is needed on the relative importance of the mediating role of health literacy among different levels of education, but this case study shows that nutrition and health literacy in relation to enhancement of an individuals' awareness of the importance of a healthy diet plays a large role among those with lower education than among those with higher education. Health literacy seems to be a more important pathway for lower secondary educated than for primary educated. Many scientific literatures on health inequalities have repeatedly demonstrated a strong association between lower levels of education and poorer health outcomes.⁷⁶

Although many low health literacy skilled patients do not understand the best way to take care of themselves and prevent NCDs like CVD. Some may not even be aware

⁷⁴ Safer, R. S., Cooke, C. E., & Keenan, J. (2016, December). The impact of health literacy on cardiovascular disease. Retrieved May 03, 2017, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994011/>

⁷⁵ Ibid.

⁷⁶ Heide, I. V., Wang, J., Droomers, M., Spreeuwenberg, P., Rademakers, J., & Uiters, E. (2013, December). The Relationship Between Health, Education, and Health Literacy: Results From the Dutch Adult Literacy and Life Skills Survey. Retrieved May 03, 2017, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3814618/>

that CVD and other heart diseases are preventable. The effect of poor health literacy on the prevention of CVD and other heart diseases is well exemplified in the area of tobacco use, hypertension, and diabetes.⁷⁷ When looking at tobacco cessation programs, nutrition programs and other prevention programs that lower the risk factors for CVD, it is more difficult to get individuals who have unhealthy eating habits, smoke or who are overweight/obese with low health literacy skills to even enter a cessation program, nutrition program or obesity prevention program – let alone educating them to do it on their own. When higher health literacy skilled individuals encounter the risk factors and prevention programs, they have a higher chance of successful health outcomes or a change in health behaviors.⁷⁸

Conclusion

With evidence-driven strategies, experts can use tailored interventions to provide better health education that meets patients needs and improves health outcomes. Switzerland must recognize that health literacy is a critical determinant of health. Health literacy not only promotes better health, but also is founded on inclusive and equitable access to quality education⁷⁹ and life-long learning. It comes to show that CVD prevention strategies must go beyond addressing the environmental, political and social factors that determine the risk of CVD, but the need to address health education, health literacy, health communication and individual health behaviors.⁸⁰ As a medical

⁷⁷ Bieri, U., & Kocher, J. (2016, May 18). Health literacy 2015 population survey. Retrieved May 3, 2017, from www.http://152131_GesKomp_SB_def_Zusfas_eng.pdf

⁷⁸ Ibid.

⁷⁹ Placella, E. (2017, February 27). Health literacy in Switzerland. Retrieved April 29, 2017, from http://who.int/global-coordination-mechanism/working-groups/swiss_cc.pdf?ua=1

⁸⁰ Norrow, D. (2009, May 11). Track 2: Health literacy and health behaviour. Retrieved May 03, 2017, from <http://www.who.int/healthpromotion/conferences/7gchp/track2/en/>

community, we must consider delivering patient education in mediums other than paper, and provide accessible and appropriate resources to older populations that need it.

The impact of inadequate health literacy skills on the prevention of CVD and health outcomes in CVD patients is significant as shown through local case studies, research, and interviews with professionals committed to the prevention of NCDs like CVD. Health literacy is a necessary ingredient for improved community, greater adherence to cardiovascular treatment regimens, greater ability to engage in appropriate self-care, improve health status, and greater efficiency and cost savings to the health system as a whole.⁸¹ In future research and policies, Switzerland needs to utterly address the health literacy problem in aging populations in order to make the next great advance in postponing (and possibly eradicating) cardiovascular disease all together.

⁸¹ Safeer, R. S., Cooke, C. E., & Keenan, J. (2016, December). The impact of health literacy on cardiovascular disease. Retrieved May 03, 2017, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994011/>

Abbreviation List

- Cardiovascular Disease (CVD)
- Coronary Heart Disease (CHD)
- Non-Communicable Disease (NCD)
- European Union (EU)
- World Health Organization (WHO)
- European Society of Cardiology (ESC)
- United Nations (UN)
- IROHLA (Intervention Research on Health Literacy of the Ageing Population)
- SDC (Swiss Agency for Development and Cooperation)
- Swiss TPH (Swiss Tropical and Public Health Institute)
- EAPC (European Association of Preventive Cardiology)
- OECD (Organization for Economic Cooperation and Development)
- NGO (Non-governmental Organization)

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