

Health Outcomes and Health Spending in the United States and the Nordic Countries

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There is a broad consensus that the Nordic countries spend less on health care but get better health outcomes than the U.S. The study aims to compare health outcomes and health spending and compare the top ten causes and risk factors for disability-adjusted life-years (DALYs) in U.S. and Nordic countries. In both health systems, high body-mass index, high fasting plasma glucose, high blood pressure, and high LDL were found as the leading risk factors contributing to death and disability combined. Ischemic heart disease, Alzheimer's disease, stroke, lung cancer, and COPD are among the top five conditions that cause the most deaths in both health systems. It was found that the Nordic system has lower health costs due to its strong primary care system, more services, universal access to health care without financial barriers, and a generally healthy lifestyle. The study shows that there are many lessons that the U.S. and Nordic countries can learn from each other.

Keywords: Nordic health system, US health system, health outcomes, health expenditures

INTRODUCTION

The Nordic Health System

The Nordic countries consist of Denmark, Norway, Sweden, Finland, and Iceland. All persons living in the Nordic countries are covered by a compulsory social security system and health insurance scheme (Scheele et al., 2017). According to the principle of free, equally accessible health services, everyone residing in these countries can access the health system and services regardless of their social or economic situation (Knudsen et al., 2019). Financing of the system is usually provided through taxes. In these countries, the state is responsible for the quality of health services, the determination of capacity in all regions, and health policies (Magnussen et al., 2009). Central governments determine their countries' health policies, and municipalities and regional authorities offer many health services, including primary care. The common characteristics of the health systems of these countries are as follows (Magnussen et al., 2009; Scheele et al., 2017; Ringsberg and Borup, 2011):

The U.S. Health System

The U.S. health care system is defined as a hybrid system, a combination of public health and private insurance. The U.S. does not have universal health insurance coverage, and only recently has the Affordable Care Act (Obamacare) enacted mandating health insurance for nearly everyone (Page, 2016). About 9.2% of the American people were uninsured in 2019. In 2019, the federal government accounted for 29% of health spending, households accounted for 28%, followed by 19% by private businesses, 16% by state and

local governments, and 7% from other private revenue (CMS, 2021).

The characteristics of the U.S. health system are as follows:

- Funding and Types of Health Insurance:
 - Veterans Administrations (V.A.): Similar to the U.K. National Health Services (NHS), only for military veterans (1.4% in 2019) (CMS, 2021; Shi and Singh, 2015),
 - Medicare: a health insurance program for people age 65 or older, people under 65 with certain disabilities, and people of all ages with end-stage renal disease (14.2% of the U.S. population in 2019) (CMS, 2021; Rowland and Garfield, 2000),
 - Medicaid: health coverage for low-income adults, children, pregnant women, elderly adults, and people with disabilities (19.8% of the U.S. population in 2019) (Rowland and Garfield, 2000; Turner, 2002),
 - Private insurance (49.6% provided by employers, 5.9% non-group) (CMS, 2021)
 - Out of pocket payments.
- Advanced diagnostic and therapeutic technology (Luft, 2006),
- Timely availability of subspecialists and procedures (Turner, 2002),
- Limited access to multiple underserved populations (Baurer et al., 2014),
- High cost with marginal population outcomes (Rushton, 2009),
- Insufficient primary care workforce (Berwick et al., 2008),
- Highly bureaucratic/administrative costs (Page, 2016).

HEALTH OUTCOMES AND HEALTH SPENDING

Table 1 provides general demographic, mortality, life expectancy, and health spending information for both the U.S. and the Nordic countries. The U.S. population was about 328 million, and the Nordic countries' population was about 27 million. Iceland had the fewest people, and Sweden had the highest number of people among the Nordic countries in 2019. The GDP per capita was \$53,535 for the U.S. and \$40,215 and \$63,501 for Finland and Norway, respectively in 2019. The U.S. had a lower educational attainment than Finland, Iceland, Norway, and Sweden.

TABLE 1
SOCIOECONOMIC AND HEALTH CHARACTERISTICS OF THE COUNTRIES, 2019

	USA	Denmark	Finland	Iceland	Norway	Sweden
Population (2019)	328M	5.8M	5.5M	337.5k	5.3M	10.2M
2019 per capita GDP \$	53,535	45,244	40,215	47,062	63,501	46,388
2019 fertility rate	1.7	1.8	1.5	1.8	1.7	1.8
2019 educational attainment (years)	12.9	12.7	14.5	15.1	13.8	13.0
Life expectancy (observed)						
Females (2017)	81.1	82.7	84.3	85.9	84.2	84.2
Males (2017)	76.1	78.8	78.5	79.8	80.5	80.8
Child mortality (observed)						
Under 1 (2019)	5.5	3.5	1.8	1.5	2.0	2.1
Under 5 (2019)	6.5	3.0	2.2	2.2	2.5	2.6
Health expenditure (USD per person)						
2018	10,271	6,195	4,656	6,307	8,269	6,095
2050	15,825	8,846	7,410	10,390	10,668	8,909

Source: www.healthdata.org

Although the life expectancies at birth were close to each other in the Nordic countries, the U.S. had a lower life expectancy than the Nordic countries in 2019. The economic, social, and cultural developments and improvements in the Nordic countries have significantly contributed to the increased life expectancy from birth (Ringsberg and Borup, 2011). Income inequality is not a significant problem in the Nordic countries, but there are some differences among life expectancies at birth according to their socioeconomic status. The U.S. had higher infant mortality and deaths of children under five compared to the Nordic countries.

TABLE 2
HEALTH INPUTS (2019 OR CLOSEST AVAILABLE YEAR)

Health Inputs	Country Name	Year 2011	Year 2019
Physicians (per 1,000 people)	USA	2.46	2.61
	Canada	2.10	2.61
	Denmark	3.78	4.01
	Iceland	3.46	4.08
	Finland	3.12	3.81
	Norway	2.54	2.92
	Sweden	3.96	3.98
Nurses and midwives (per 1,000 people)	USA	9.47	14.55
	Canada	9.24	9.94
	Denmark	10.14	10.32
	Iceland	15.47	16.21
	Finland	14.49	14.74
	Norway	16.95	18.22
	Sweden	11.76	11.82
Hospital beds (per 1,000 people)	USA	2.97	2.87
	Canada	2.80	2.52
	Denmark	3.13	2.60
	Iceland	3.29	2.83
	Finland	5.52	3.61
	Norway	4.19	3.53
	Sweden	2.70	2.14

Source: World Development Indicators, <https://databank.worldbank.org/>

Table 2 shows the health inputs of the U.S. and Nordic countries in terms of physicians per 1,000 people, nurses and midwives per 1,000 people, and hospital beds per 1,000 people. The availability of healthcare inputs can affect a health system's functioning in various ways, including access to health services, cost of care, and disaster preparedness. The U.S. has more acute care hospital beds per capita than Denmark, Finland, and Norway. Although the U.S. had fewer doctors per capita than the Nordic countries, it had more nurses per capita than Denmark and Sweden in 2019 (World Development Indicators, 2021).

The U.S. and Nordic countries showed differences in burden of diseases, a measurement that considers both longevity and quality of life. Table 3 shows that the burden of disease and health-threatening risk factors of the Nordic countries are similar. Ischemic heart disease is seen as the number one cause for most deaths in both health systems. Alzheimer's disease, stroke, lung cancer, and COPD are among the top five conditions that cause the most deaths in the U.S. and Nordic countries. The respective countries' economic development levels and longer life expectancies contribute to the similarity. The U.S. had more deaths and

cases of coronavirus in 2020, and the burden of disease and health spending in the coming years is expected to increase due to the pandemic. Because of geography and climate, falls were among the top ten causes of death in Canada, Finland, and Norway.

TABLE 3
TOP 10 CAUSES OF DEATH IN THE U.S. AND THE NORDIC COUNTRIES IN 2019, ALL AGES

USA	Canada	Denmark	Finland	Iceland	Norway	Sweden
Ischemic heart disease	Ischemic heart disease	Ischemic heart disease	Ischemic heart disease	Ischemic heart disease	Ischemic heart disease	Ischemic heart disease
Lung cancer	Lung cancer	Alzheimer's disease	Stroke	Lung cancer	Stroke	Alzheimer's disease
COPD	Stroke	Lung cancer	Alzheimer's disease	Alzheimer's disease	Alzheimer's disease	Stroke
Stroke	Alzheimer's disease	Stroke	Lung cancer	Stroke	COPD	Lung cancer
Alzheimer's disease	COPD	COPD	Colorectal cancer	Self-harm	Lung cancer	COPD
Chronic kidney disease	Colorectal cancer	Lower respiratory infections	COPD	COPD	Lower respiratory infections	Colorectal cancer
Colorectal cancer	Lower respiratory infect	Colorectal cancer	Hypertensive heart disease	Colorectal cancer	Colorectal cancer	Lower respiratory infections
Lower respiratory infections	Chronic kidney disease	Prostate cancer	Falls	Lower respiratory infections	Prostate cancer	Atrial fibrillation
Diabetes	Diabetes	Breast cancer	Pancreatic cancer	Pancreatic cancer	Falls	Prostate cancer
Cirrhosis	Falls	Diabetes	Prostate cancer	Prostate cancer	Pancreatic cancer	Breast cancer

Sources: 1- Murray, C.J.L., Aravkin, A.Y., Zheng, P., Abbafati, C., Abbas, K.M., Abbasi-Kangevari, M., ... & Lim, S.S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* (London, England), 396(10258), 1223-49.

2-www.healthdata.org

Table 4 shows the top 10 risks contributing to death and disability defined as disability-adjusted life years (DALYs), which is the sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability. Cardiovascular diseases and cancers are at the forefront of the disease burden rankings in both the U.S. and Nordic countries. For this reason, it is essential to focus on what causes these diseases. Attempts to reduce tobacco and alcohol use will significantly reduce these diseases' incidence (see Table 4). Table 4 shows that the U.S. and Nordic countries face significant dietary risks. Both government and industry should focus on healthy life choices in their countries (Knudsen et al., 2019). The U.S. and Nordic countries' administrations should create programs for proper nutrition. These programs could include access to nutritious foods, labeling of food products, and tax incentives.

In both health systems, high body-mass index, high fasting plasma glucose, high blood pressure, and high LDL were other factors leading to death and disability (Murray et al., 2020). These risk factors were related to the people's dietary habits and physical activity in both health systems. Tobacco and alcohol use are among the top five risk factors. The statistics show that smoking and alcohol use cause chronic ailments

and deaths in both health systems (Knudsen et al., 2019). The non-optimal temperature, an aggregate of the burden attributable to low and high temperatures, was reported as a risk among Denmark's and Sweden's top 10 risk factors. Occupational risks had been reported as top risk factors by all countries. These risk factors include occupational injuries, ergonomic factors, and exposure to particulate matter, fumes and gases, carcinogens, noise, and asthmagens (Murray et al., 2020).

TABLE 4
TOP 10 RISKS CONTRIBUTING TO DEATH AND DISABILITY COMBINED (DISABILITY ADJUSTED LIFE YEARS (DALYS) IN THE U.S. AND THE NORDIC COUNTRIES IN 2019, ALL AGES

USA	Canada	Denmark	Finland	Iceland	Norway	Sweden
Tobacco	Tobacco	Tobacco	High blood pressure	Tobacco	Tobacco	Tobacco
High body-mass index	High body-mass index	High blood pressure	Tobacco	High body-mass index	High blood pressure	High blood pressure
High fasting plasma glucose	High blood pressure	Alcohol use	High fasting plasma glucose	High blood pressure	High fasting plasma glucose	Dietary risks
High blood pressure	High fasting plasma glucose	Dietary risks	Dietary risks	Dietary risk	Dietary risks	High fasting plasma glucose
Dietary risks	Dietary risks	High fasting plasma glucose	High body-mass index	High fasting plasma glucose	High body-mass index	High body-mass index
Drug use	Alcohol use	High body-mass index	Alcohol use	High LDL	High LDL	Alcohol use
Alcohol use	Occupational risks	Occupational risks	High LDL	Alcohol use	Alcohol use	High LDL
High LDL	High LDL	High LDL	Occupational risks	Occupational risks	Occupational risks	Occupational risks
Kidney dysfunction	Drug use	Kidney dysfunction	Kidney dysfunction	Drug use	Drug use	Kidney dysfunction
Occupational risks	Kidney dysfunction	Non-optimal temperature	Drug use	Kidney dysfunction	Kidney dysfunction	Non-optimal temperature

Sources: 1- Murray, C.J.L., Aravkin, A.Y., Zheng, P., Abbafati, C., Abbas, K.M., Abbasi-Kangevari, M., ... & Lim, S.S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* (London, England), 396(10258), 1223-49.
 2-www.healthdata.org

Table 5 shows the health expenditures in 2020, 2030, and 2050 in both the U.S. and the Nordic countries. The U.S. and the Nordic countries spend considerably more on health care than many developing countries, while the U.S. spends more on healthcare than the Nordic countries. In the U.S., per capita health spending was \$11,267 in 2020, a number that is expected to rise to \$12,734 in 2030 and \$17,233 in 2050. Norway had the highest per capita health spending among the Nordic countries, estimated to be \$8,306 in 2020; this expenditure will grow to \$9,148 in 2030 and \$10,624 in 2050. Other Nordic countries' per capita health spending appear to be close to each other (Micah et al., 2020).

DISCUSSION

Statistics show that the Nordic countries have better healthcare than the U.S. for less money. There are many reasons for these differences. First, Nordic countries have a unique set of policies and procedures for arranging doctors and specialists, as well as distribution of hospitals and clinics (Magnussen et al., 2009). Second, the economic case for a single-payer health insurer is strong; private insurance is an expensive way to fund health care in Nordic countries (Rushton, 2009). Third, Nordic countries have strong primary care and referral systems where people can easily access essential health services without any barrier. In the U.S., the primary care system is extremely pluralistic, and service costs more than in Nordic countries (Berwick et al., 2008). Fourth, financing and control of the health system is decentralized to the county or community level (Magnussen et al., 2009; Scheele et al., 2017). Fifth, physicians and other health professionals are not highly paid in the Nordic countries (Rushton, 2009). Sixth, the Nordic people's health literacy levels are high, and their physical culture is better than in the U.S. (Kokko et al., 2018). Seventh, the Nordic governments have strong health promotion and education policies and higher taxes on tobacco, sugar, etc. (Ringsberg and Borup, 2011). Finally, the U.S. political system has a two-party system, which is perceived to create a 'winner take all' mentality (Page, 2016). The Nordic multiparty system leads to coalitions and consensus.

TABLE 5
HEALTH EXPENDITURES
(2019 U.S. PURCHASING-POWER PARITY-ADJUSTED DOLLARS PER CAPITA)

	Year	Total health spending	Government health spending	Out-of-pocket health spending	Prepaid private health spending
USA	2020	11 267	5 968	1 246	4 053
	2030	12 734	7 095	1 235	4 405
	2050	17 233	9 688	1 455	6 091
Canada	2020	5 683	4 212	788	683
	2030	6 159	4 642	784	72
	2050	7 301	5 534	878	89
Denmark	2020	5 656	4 770	761	126
	2030	5 911	5 018	760	133
	2050	6 815	5 837	820	158
Finland	2020	4 450	3 410	906	134
	2030	4 796	3 722	929	146
	2050	6 192	4 952	1 048	192
Iceland	2020	4 638	3 780	778	79
	2030	4 780	3 908	790	82
	2050	5 653	4 666	888	100
Norway	2020	8 306	7 107	1 170	30
	2030	9 148	7 960	1 156	32
	2050	10 624	9 459	1 127	38
Sweden	2020	6 268	5 283	906	80
	2030	7 455	6 412	950	94
	2050	9 633	8 422	1 088	123

Source: Micah, A.E., Su, Y., Bachmeier, S.D., Chapin, A., Cogswell, I.E., Crosby, S.W., ... & Dieleman, J.L. (2020). Health sector spending and spending on HIV/AIDS, tuberculosis, and malaria, and development assistance for health: progress towards Sustainable Development Goal 3. *Lancet* (London, England), 396(10252), 693-724.

CONCLUSION

As in all developed countries, the U.S. and Nordic countries' health systems face similar disease burdens and health outcomes, but their solutions vary due to the difference in health financing and different geography. This research shows the difficulty of reaching Nordic countries' level in terms of health outcomes, despite the U.S.'s higher per capita health spending. The Nordic system has lower health costs, more health services, universal access to health care without any financial barriers, and superior health status. The Nordic countries also have longer life expectancies and lower child mortality rates than Americans. There are many lessons that the U.S. and Nordic countries can learn from each other.

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