MEDICINE, LAW & SOCIETY
Vol. 15, No. 2, pp. 241–252, October 2022

NATIONAL DETERMINANTS OF HEALTH: A CROSS-NATIONAL AGGREGATE ANALYSIS

Accepted
10. 6. 2022

Revised
10. 7. 2022

Published
28. 10. 2022

DAVID SCHULTZ
Hamline University, Department of Political Science, Legal Studies, Environmental Studies, Saint Paul, Minnesota, United States of America
dschultz@hamline.edu

CORRESPONDING AUTHOR
dschultz@hamline.edu

Abstract Research indicates that many factors impact individual health. These factors include genetics, lifestyle choices, and access to health care or health care insurance. Some of these factors are beyond the control of individuals, such as genetics or congenital circumstances. In addition, some factors, although beyond individual control, are certainly malleable, such as public policy choices made by governmental bodies. This article undertakes a preliminary analysis to assess macro national variables that impact individual health. It amasses a cross-national aggregate database of key indicators of health and compares them to macro "environmental" variables to assess the impact they globally have on health. The goal here is to determine what impact, if any, factors not traditionally thought of as health-related impact the well-being of individuals. The conclusion is that the political structure of a state, along with several policies related to crime, pollution, and ethnic conflict can impact health. The implication of research is that many policies generally thought to be exogenous to health can actually impact it and therefore states need to think more broadly beyond simply access to health care or insurance in seeking to improve the health and well-being of its people.

Keywords
health outcomes, cross-national, environmental factors, democracy, crime

https://doi.org/10.18690/mls.15.2.241-252.2022

University of Maribor Press

1 Introduction

Research indicates that many factors impact individual health (McGinnis & Foege, 2004). They include genetics, lifestyle choices, and access to both health care and health care insurance (Adler & Rehkopf, 2008). Some of these factors are beyond the control of individuals, such as genetics and congenital circumstances (McGinnis & Foege 1993; McGinnis & Foege, 2004). While personal lifestyle choices matter (Green, et al., 2008), some factors, although beyond individual control, are certainly malleable, such as public policy choices made by governmental bodies (Marmot, 2005). Public policy choices such as nutrition programs (Wen, Browning & Cagney, 2003) and access to insurance and affordable health care (Wen, Tsai & Chung, 2008) often can be effected by government policy. Moreover, health can be impacted by other structural factors that are within the control of society, such as the level of crime, pollution, and even the political structure of a county (Yen & Syme, 1999). These macro policy choices are critical components impacting individual health and may well be as important, if not more important, than what might be considered micro choices made by individuals.

This article undertakes a preliminary analysis to assess macro national variables that impact individual health. It amasses a cross-national aggregate database of key indicators of health and compares them to macro "environmental" variables to assess the impact they globally have on health. The goal here is to determine what impact, if any, factors not traditionally thought of as health-related influence the well-being of individuals.

2 Factors Impacting Individual Health

Studies indicate that several factors influence personal health (McGinnis & Foege, 1993). We can classify them as genetics, which are beyond individual control, lifestyle choices such as tobacco, alcohol, or illegal drug usage, and more structural or societal factors which, although controllable, are not easily malleable by individuals but instead are often the consequence of public policy choices. Research suggests that approximately 20 percent of the determinants of individual health are genetically related and therefore presumably beyond individual control. While perhaps in the future more genetic research may be able to affect genetics in vitro development, or perhaps alter genetic codes that affect health, at least for now individuals are

presumed to have little control over their genetic makeup. Approximately 80 percent of the factors impacting individual health are somewhat controllable.

One can make several distinctions among factors that are controllable. The first is between micro and macro choices. Micro choices are decisions made by individuals, such as whether to consume alcohol, tobacco, or illegal drugs (McGinnis & Foege, 2004). Micro choices might also extend to decisions relating to exercise. Most research contends these are factors under individual control, although issues surrounding addiction and mental health are less clear cut, as there is debate concerning whether individuals have control over them.

Other research lists obesity, high blood pressure, and perhaps diabetes (Type II) as within the realm of micro lifestyle choices affecting health. However, structural poverty and occupational choices beyond one's individual control, as well as race and ethnicity, may affect health but are not a matter of individual choice. These factors should more appropriately fall into the macro factors category.

A second distinction is between factors that are normally associated with health and those that fall outside the traditional healthcare system and yet impact individual well-being. In the former category are issues such as access to insurance, as well as to doctors, clinics, and other medical services (Adler & Rehkopf, 2008). The latter might include social policies or factors such as social capital, residential segregation, racism, pollution, or neighborhood characteristics (Aysola, Orav & Ayanian, 2011; Chang, 2006; Chen et al., 2007; Gaskin et al., 2009; Lipscomb et al., 2006; Schwartz, 1964).[1] We may think of these latter structural factors as environmental factors falling outside of traditional health care policy that impact health.

These micro and macro factors produce health disparities. Health disparities refer to differences in health outcomes as measured by gender, race, ethnicity, education, income, disability, geographic location, or sexual orientation. Disparities can either be the product of disparate accesses to health care or alternatively as a result of background conditions such as racism, sexism, or economic status (Aysola, Orav &

[1] **Napaka! Le za glavni dokument.**See also: Commission on Social Determinants of Health. Closing the Gap: Policy into Practice on Social Determinants of Health. Final Report of the World Conference on Social Determinants of Health. Rio de Janeiro. World Health Organization (2011); Robert Wood Johnson Foundation, Social Determinants of Health Factsheet. Princeton, NJ: Commission to Build a Healthier America (2008).

Ayanian, 2011; Chang, 2006; Chen et al., 2007; Gaskin et al., 2009; Lipscomb, et al., 2006).

Generally, disparities are examined within a country or region (Doorslaer, Van Masseria, Koolman, & OECD Health Equity Research Group, 2006; Frieden, 2013; Döpke et al., 2017). Yen and Syme in reviewing epidemiological literature, argue that the neighborhoods people live in and the places they work comprise a social environment that can impact health (Yen & Syme, 1999) However, several studies have also examined disparities internationally or across states. Prüss-Üstün et al. examined the environmental burden of disease for 192 countries (Prüss-Üstün et al., 2008). They examined three risk factors: unsafe water, sanitation and hygiene, and indoor air pollution. They found that between 13 percent and 37 percent of the countries' disease burden could be prevented by environmental improvements. Hertz, Hebert, and Landon conducted an international comparison study of infant and maternal mortality rates and life expectancy at birth using United Nations data (Hertz, Hebert & Landon, 1994). They found a positive relationship between these two variables and the quantity of animal products consumed, the percent of households without safe water, excess calories consumed as fat, and the total literacy level.

Lena and London examined 50 to 84 peripheral and noncore nations, and concluded that countries with high levels of democracy and strong left-wing regimes are associated with positive health outcomes, while countries with strong right-wing regimes have populations with lower life expectancies and higher levels of various measures of mortality (Lena & London, 1993). When examining the relationship between social capital, life expectancy, and mortality, Elling found similar cross-national aggregate results (Elling, 1980), as did Kennelly, O'Shea, and Garvey (Kennelly, O'Shea & Garvey, 2003).

All of these studies support the thesis that some variables having a macro, cross-national character impact health. While these studies are good, either their N - how many states or countries examined were limited - or the research was outdated and required updating. This article builds upon and updates these earlier studies. A primary objective was to determine how and to what extent cross-national aggregate macro factors impact individual health. Specifically, in states and countries across the world are there some variables or conditions that are associated or correlated with traditional measures of health? If so, this would suggest that addressing

problems or issues not normally associated with health care policy might be critical variables in managing health. In effect, government policies outside the sphere of the health care apparatus might impact health.

3 Methodology

This study seeks to examine the impact of several macro or environmental factors upon health. To do that the study constructed an Excel database to draw correlations between two traditional measures of health and several macro variables. The two traditional measures of health we examined are life expectancy (in years) and material death (per 100,000 at birth) (Johnson, Stoskopf & Shi, 2008). We obtained these statistics respectively from the World Health Organization[2] and World Bank.[3]

These two traditional measures of health were used because of the availability of large-scale data that included all, or nearly all, the states in the world that are members of the United Nations, plus some other states. Thus, the database for some variables included up to 202 states and other disputed regions. These two databases were combined with several others. The first was Freedom House, which generates an annual index of the level of democracy and political freedom in a state.[4] The second was Transparency International, which undertakes an annual survey of perceptions of political corruption within a country.[5] The third was data from the World Bank, which analyzed the percentage of a country's national parliament or legislature composed of women. The fourth was data from Numbeo, which measures perceptions of the degree of crime or the lack of safety within a country.[6] The fifth was the perception of levels of pollution in a country based on Numbeo survey data,[7] and the final was language diversity with a country, drawing upon National Geographic Society data.[8] In assembling this database it was often difficult

[2] **Napaka! Le za glavni dokument.**World Health Organization. Life Expectancy and Health Life Expectancy 2019. Located at
https://apps.who.int/gho/data/node.main.688 (May 31, 2022).
[3] **Napaka! Le za glavni dokument.**World Bank. Maternal Mortality Ratio 2019. Located at https://data.worldbank.org/indicator/SH.STA.MMRT (May 31, 2022).
[4] **Napaka! Le za glavni dokument.**Freedom House. Freedom in the World 2022. Located at https://freedomhouse.org/countries/freedom-world/scores (May 31, 2022).
[5] **Napaka! Le za glavni dokument.**Transparency International. Corruption Perception Index. Located at https://www.transparency.org/en/cpi/2021 (May 31, 2022).
[6] **Napaka! Le za glavni dokument.**Numbeo. Safety Index by Country 2020. Located at
https://www.numbeo.com/crime/rankings_by_country.jsp?title=2020&displayColumn=1 (May 31, 2022).
[7] **Napaka! Le za glavni dokument.**Numbeo. Pollution Index by Country 2022. Located
https://www.numbeo.com/pollution/rankings_by_country.jsp. (May 31, 2022).
[8] National Geographic Society. Language Diversity Index. Located at

to find direct measures of comparative data on items such as crime, pollution, or discrimination, requiring use of surrogates as measures. Data across the various measures and variables were matched as close as possible to the same year.

The combination of the data from these different databases yielded several hypotheses.

Life expectancy should increase in states which are more democratic, less corrupt, have more women represented in the national legislature, are safer, are less polluted, and less linguistically diverse. Conversely, maternal mortality should decrease in states which are more democratic, less corrupt, where more women are represented in the national legislature, where the country is safer, less polluted, and less linguistically diverse.

What are these six variables overall that we sought to measure? If regime type matters, then democracies should produce better health care outcomes. If regimes are less corrupt, they too should produce better outcomes. The variable examining the percentage of women in national legislatures is a measure for sexism. Crime and pollution look at the impact of public safety (criminal justice) and environmental policies upon health. Linguistic diversity is a measure of diversity or perhaps ethnic conflict within a state.

We thus have twelve hypotheses to test.

- H1: Life expectancy increases with democracy.
- H2: Life expectancy increases as a percentage of good government (lack of corruption) increases.
- H3: Life expectancy decreases as pollution increases.
- H4: Life expectancy decreases as crime increases.
- H5: Life expectancy decreases as language diversity increases.
- H6: Life expectancy increases as the percentage of women in the national legislature increases.
- H7: Maternal mortality decreases with democracy.

https://education.nationalgeographic.org/resource/language-diversity-index = 1 (May 31, 2022).

- H8: Maternal mortality decreases as a percentage of good government (lack of corruption) increases.
- H9: Maternal mortality increases as pollution increases.
- H10: Maternal mortality increases as crime increases.
- H11: Maternal mortality increases as language diversity increases.
- H12: Maternal mortality decreases as the percentage of women in the national legislature increases.

The analysis focused on the correlations among life expectancy and maternal mortality and the other six variables. In performing simple correlation analysis, this article employed standard rules of thumb for interpreting relationships. If 0. indicates no relationship and 1.0 and -1.0 indicate a total positive and negative relationship between two variables, this article employed the following measures.

<.2 = slight or no relationship
.2–.5 = low but definite relationship
.4–.7 = moderate/substantial correlation
.6–.9 = high relationship
>.8 = very high relationship

4 Results

Table I presents the correlation results testing the twelve hypotheses.

Table 1: Health Indicators and Environmental Factors

	Democracy	Corruption	Pollution	Crime	Language Diversity	Female Legislature
Life Expectancy	0.5066	0.7027	-0.5559	-0.5266	-0.4618	0.2742
Mother Mortality	-0.3944	-0.4915	0.353	0.3996	0.3747	-0.1642

Source: own.

For life expectancy, there are moderate to substantial correlations between democracy and percepts of corruption. More specifically, regimes that are classified as more free or more democratic generally have populations that experience longer

life expectancies. But there is an even stronger relationship between corruption and life longevity. The less corrupt a state is perceived to be the longer the life expectancy. Similarly, there is little surprise that higher levels of pollution and crime correlate to lower life expectancy. There was also a moderate inverse relationship between language diversity and life expectancy. The more linguistically diverse a state the lower the life expectancy. Finally, and somewhat surprisingly, there was a low relationship between the percentage of women in the national legislature and life expectancy.

Concerning mother birth mortality, the relationships were similar, but weaker. Mortality is less in states that are more democratic, perceived as less corrupt, less polluted, with less crime, and with less language diversity. Surprisingly, there was very little relationship between the percentage of women in a national legislature and mother birth mortality. One would have thought that having more women in the national legislature would have translated into more policies to help women medically, including addressing birthing health. Yet with a correlation of only -0.1642, that relationship is weak.

In addition to performing these correlations, this article also performed two T-tests as a way of corroborating some of the results. Specifically, Freedom House classifies states as free, partially free, and not free. Using free and not free as surrogates for democratic and non-democratic states, T-Tests were performed to see if democratic (free) and non-democratic (non-free) states differ in terms of life expectancy and mortality.

For life expectancy in free versus non-free states the t-value is 7.15073. The p-value is $< .00001$. The result is significant at $p < .05$.

For mothers' mortality in free versus non-free states the t-value is -5.43601. The p-value is $< .00001$. The result is significant at $p < .05$. In both cases, democratic states are associated with better health outcomes than non-democratic states.

5. Discussion and Conclusion

Traditional discussions or analyses regarding the determinants of health generally focus on issues such as access to health care, availability of health care insurance, or even the quality of care one receives. Focusing on such issues is important, but fails

to account for several of the other factors that have a significant bearing of how healthy individuals or a nation are. If the focus is simply on health care policy as revolving around access to health care, insurance, or quality of care, then there are significant gaps regarding other factors that may similarly affect health, thus providing insufficient data for governments and other stakeholders to modify public and social policies so as to both improve health and decrease mortality rates.

This article identified two common measures of health - life expectancy and maternal birth mortality - and correlated them with social and environmental variables not normally associated with health or health care policy. The article carried out this analysis in a cross-national aggregate manner by combining several datasets. The results suggest that several variables are significant. Clearly, the nature of political regimes matters. States that are more democratic, that have a greater percentage of women represented in national legislatures, and which are viewed as less corrupt, have better indications of health. Similarly, states with lower crime, less ethnic conflict, and which are less polluted also enjoy better health outcomes.

What the results suggest is that public and individual health could be improved by making changes in other social policies in the areas of criminal justice and environmental policy. The results also suggest that improvements in democratic governance can facilitate good health. Perhaps the latter does so because democratic regimes are better able to address issues and policy areas that impact health. Governance matters in itself in terms of improving health, but it might also foster the conditions that allow for the adoption of other policies that can accomplish the same.

Certainly, this article is not the last word on the subject. This article only examined two measures of health along with five variables. Other measures such as infant mortality and rates of infectious disease could also be examined. In addition, analyzing the role that income, wealth distribution, and housing policies, among others, plays might yield useful information on how other policy areas not normally associated with health might nonetheless impact the overall health of individuals. Simply put, other assumed to be exogenous policies and factors might in fact be more critical to health than previously thought and should be considered part of a broader package of state structures and policies that contribute to the health and well-being of individuals.

Note

Paper originally presented at Medicina, pravo in družba, Maribor, 25. in 26. marec 2022 Univerza v Mariboru, Slomškov trg 15, 2000 Maribor, Slovenija.

References

Adler, N. E. & Rehkopf, D. H. (2008). U.S. Disparities in Health: Description, Causes, and Mechanisms. *Annual Review of Public Health*, 29, 235-239. doi: 10.1146/annurev.publhealth.29.020907.090852.

Ahern, M. M. (2003). Social Capital and Trust in Providers. *Social Science and Medicine*, 57 (7), 1195–1203. doi: 10.1016/s0277-9536(02)00494-x.

Aysola, J., Orav, E. J. & Ayanian, J. Z. (2011). Neighborhood Characteristics Associated with Access to Patient-Centered Medical Homes for Children. *Health Affairs*, 30(11), 2080–2089. doi: 10.1377/hlthaff.2011.0656.

Chang, V. W. (2006). Racial Residential Segregation and Weight Status Among US Adults. *Social Science and Medicine*, 63(5), 1289–1303. doi: 10.1016/j.socscimed.2006.03.049.

Chen, J. Y., Fox, S. A., Cantrell, C. H. et al. (2007). Health Disparities and Prevention: Racial/ethnic Barriers to Flu Vaccinations. *Journal of Community Health*, 32(1), 5–20. doi: 10.1007/s10900-006-9031-7.

Commission on Social Determinants of Health (2011). *Closing the Gap: Policy into Practice on Social Determinants of Health*. Final Report of the World Conference on Social Determinants of Health. Rio de Janeiro: World Health Organization.

Doorslaer, E., Van, Masseria, C., Koolman, X., & OECD Health Equity Research Group (2006). Inequalities in access to medical care by income in developed countries. *Canadian Medical Journal*, 174(2), 177-183. doi: 10.1503/cmaj.050584.

Döpke, J., Knabe, A., Lang, C. & Maschke, P. (2017). Multidimensional Well-being and Regional Disparities in Europe. *JCMS: Journal of Common Market Studies*, 55(5), 1026-1044. doi: 10.1111/jcms.12551.

Elling, R. H. (1980). *Cross-National Study of Health Systems: Political Economies and Health Care*. New Brunswick: Transaction Books.

Freedom House (2022). Freedom in the World 2022. Retrieved from https://freedomhouse.org/countries/freedom-world/scores (May 31, 2022).

Frieden, T. R. (2013). Centers for Disease Control and Prevention (CDC). CDC Health Disparities and Inequalities Report – United States, 2013. Foreword. *Morbidity and Mortality Weekly Report MMWR Suppl.*, 62(3), 1-2.

Gaskin, S. J., Price, A., Brandon, D. T. & LaVeist, T. A. (2009). Segregation and Disparities in Health Services Use. *Medical Care Research and Review*, 66 (5), 578–589. doi: 10.1177/1077558709336445.

Green, A. et al. (2008). Barriers to Screening Colonoscopy for Low-Income Latino and White Patients in an Urban Community Health Center. *Journal of General Internal Medicine*, 23(6), 834-840. doi: 10.1007/s11606-008-0572-6

Hertz, E., Hebert, J. R. & Landon, J. (1994). Social and environmental factors and life expectancy, infant mortality, and maternal mortality rates: Results of a cross-national comparison. *Social Science & Medicine*, 39(1), 105–114. doi: 10.1016/0277-9536(94)90170-8.

Johnson, J., Stoskopf, C. & Shi, L. (2008). *Comparative Health Systems: A Global Perspective*. Burlington, MA: Jones & Bartlett Learning.

Kennelly, B., E, O'Shea, E. & Garvey, E. (2003). Social capital, life expectancy and mortality: a cross-national examination. *Social Science & Medicine*, 56(12), 2367-2377. doi: 10.1016/s0277-9536(02)00241-1.

Lena, H. F., & London, B. (1993). The Political and Economic Determinants of Health Outcomes: A Cross-National Analysis. *International Journal of Health Services*, 23(3), 585–602. doi: 10.2190/EQUY-ACG8-X59F-AE99.

Lipscomb, H. J., Loomis, D., McDonald, M. A., Argue, R. A. & Wing, S. A. (2006). A Conceptual Model of Work and Health Disparities in the United States. *International Journal of Health Services*. 36(1), 25-50. doi: 10.2190/BRED-NRJ7-3LV7-2QCG.

Marmot, M. (2005). Social Determinants of Health Inequalities. *Lancet*, 365, 1009

McGinnis, J. M. & Foege, W. H. (1993). Actual Causes of Death in the United States. *Journal of the American Medical Association*, 270(18), 2207-2212.

McGinnis J.M. & Foege, W.H. (2004). The Immediate vs the Important. *Journal of the American Medical Association*, 291(10), 1263–1264. doi: 10.1001/jama.291.10.1263.

National Geographic Society (No date). *Language Diversity Index*. Retrieved from https://education.nationalgeographic.org/resource/language-diversity-index =1 (May 31, 2022).

Numbeo. *Safety Index by Country 2020*. Retrieved from https://www.numbeo.com/crime/rankings_by_country.jsp?title=2020&displayColumn=1 (May 31, 2022).

Numbeo. *Pollution Index by Country (2022*). Retrieved from https://www.numbeo.com/pollution/rankings_by_country.jsp. (May 31, 2022).

Prüss-Üstün, A., Bonjour, S. & Corvalán, C. (2008). The impact of the environment on health by country: a meta-synthesis. *Environmental Health,* 7, 7. doi: 10.1186/1476-069X-7-7.

Robert Wood Johnson Foundation. (2008). *Social Determinants of Health Factsheet*. Princeton, NJ: Commission to Build a Healthier America.

Schwartz, J. (1964). Air Pollution and Daily Mortality: A Review and Meta Analysis. *Environmental Research*, 64(1), 36–52. doi: 10.1006/enrs.1994.1005.

Transparency International. *Corruption Perception Index. (2022)*. Retrieved from https://www.transparency.org/en/cpi/2021 (May 31, 2022).

Wen, C. P., Tsai, S. P., & Chung, W. S. I. (2008). A 10-year experience with universal health insurance in Taiwan: measuring changes in health and health disparity. *Annals of internal medicine*, 148(4), 258–267. doi: 10.7326/0003-4819-148-4-200802190-00004.

Wen, M., Browning, C. R. & Cagney, K. A. (2003). Poverty, Affluence, and Income Inequality: Neighborhood Economic Structure and Its Implications for Health. *Social Science Medicine.* 57(5), 843–860. doi: 10.1016/s0277-9536(02)00457-4.

World Bank. *Maternal Mortality Ratio (2019)*. Retrieved from https://data.worldbank.org/indicator/SH.STA.MMRT (May 31, 2022).

World Bank. *Proportion of Seats Held by Women in National Parliaments. (2019)*. Retrieved from https://data.worldbank.org/indicator/SG.GEN.PARL.ZS (May 31, 2022).

World Health Organization. (2019). *Life Expectancy and Health Life Expectancy 2019*. Retrieved from https://apps.who.int/gho/data/node.main.688 (May 31, 2022).

Yen, U. H. & Syme, S. L. (1999). The Social Environment and Health: A Discussion of the Epidemiological Literature. *Annual Review of Public Health, 20*, 287–308. doi: 10.1146/annurev.publhealth.20.1.287.