

# DEMOGRAPHICS AND SOCIAL FACTORS OF UNMET HEALTH CARE NEEDS AND AVOIDABLE MORTALITY IN EUROPEAN UNION COUNTRIES

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## Abstract

Quality health care is an important factor of health status and mortality in each country. The aim of EU cohesion policy is to reduce health care disparities among EU countries. The importance of good health of the population, functioning health systems, and quality health care now has been significantly strengthened in the context of the global Covid-19 pandemic. The main aim of this article is to assess inequalities in unmet healthcare needs and in treatable and preventable mortality in EU-27 countries for different groups of inhabitants by gender, age, education, and income amount. Graphical methods of descriptive statistics and methods of multidimensional comparison using synthetic variable have been used based on the most up-to-date available data for 2018 and 2019 year. In the future, it will certainly be interesting to compare the results obtained in this article with the results of analogous analyses based on data from the pandemic and the post-pandemic period caused by COVID-19 disease.

**Key words:** unmet healthcare needs, avoidable mortality, demographics factors

**JEL Code:** I11, I14, I18

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## Introduction

Good health is a value to the individual as a major determinant of quality of life and contributes to general social and economic growth. Access to health care is one of the priorities in the European Semester (European Commission, 2020). Member States hold the main responsibility for their health care policies and for organizing their health care systems. However, EU cohesion policy aims to reduce disparities between EU regions, including in terms of the endowment of health services (Eurostat, 2019).

Assessing the quality of health care systems is of increasing importance in the EU-27. Unmet health care needs, defined as the difference between the health care services deemed necessary to deal with a particular health problem and the actual services received, represent a measure of access to health care.

Avoidable' mortality as a measure of death from causes that should not occur in the presence of timely and effective interventions could be considered also as a measure of the quality of health care (Kossarova et al., 2013; Kruk, et al., 2018). Based on the Eurostat definitions, preventable mortality is defined as deaths that could be avoided through public health and prevention interventions, whereas treatable mortality is defined as deaths that could be avoided through effective and timely health care (Eurostat, 2021b). The measure of 'avoidable' mortality is one of many outcome indicators which can be used to evaluate the performance of the health system.

Many research papers and scientific publications are devoted to the topic of unmet health needs and avoidable mortality. The research paper Aragón, et al. (2017) describes a literature review with an objective to understand the available evidence regarding unmet needs. A large part of the literature is concerned with how unmet needs can be characterized and with establishing the relationship between need, access, and especially inequalities in health; across geographic areas, across different socio-economic, gender, or ethnic groups.

The publication Gauld et al. (2014) proposes that the performance of healthcare systems should be measured regularly, objectively, and comprehensively through documentation of unmet healthcare needs as perceived by representative segments of the population.

The concept of 'avoidable' deaths was proposed by Rutstein and colleagues in 1976 (Rutstein et al., 1976). The group outlined the method of measuring the quality of medical care that counts cases of unnecessary disease, disability, and untimely deaths. It was Rutstein's work that provided the basis for the concept and was followed by numerous publications that applied the concept empirically, reviewed the list of conditions, adjusted the definition of medical care and its scope, as well as the age limits.

## **1 Data and Methods**

The data concerning self-reported unmet needs for a medical or dental examination or treatment are derived from EU statistics on income and living conditions (EU-SILC). Self-reported unmet need for medical care concerns a person's own assessment of whether he or she needed examination or treatment for a medical condition but did not have it or seek it because of at least one of the following three reasons: 'financial reasons', 'waiting list' and 'too far to travel'.

Data for the analysis of preventable and treatable causes of mortality are drawn from Eurostat's data collection on causes of death (Eurostat 2020). Indicators on preventable and treatable causes of mortality are calculated and published annually. Annual data on treatable

and preventable deaths are provided in absolute numbers and as standardized death rates according to age and sex. The standardization is based on the revised European Standard Population.

In addition to descriptive statistics and its graphical outputs, multidimensional comparative analysis techniques have been used for data analysis in the article. Multidimensional comparative analysis deals with the methods and techniques of comparing a set of units described by many variables and allows to transform them into one-dimensional space. We can also consider them as methods of the linear ordering of multidimensional objects using a synthetic variable created from the original variables.

At the beginning of the multidimensional comparative analysis, the type of each original variable must be defined. It is necessary to identify whether the high values of a variable positively influence the analyzed processes (such variables are called stimulants) or whether their low values are favorable (these are called destimulants). The original variables  $X_1, X_2, \dots, X_k$  are usually expressed in different units of measurement and they have a different level of values so it is not possible to simply aggregate them and must be standardized before creating a synthetic (aggregate) variable (Kuc, 2012). Since all variables in this article are of destimulant type, we have used the formula:

$$b_{ij} = \frac{x_{ij} - x_{j,min}}{x_{j,max} - x_{j,min}} \quad (1)$$

After such transformation the values  $b_{ij}$  are normalized value in the range  $(0; 1)$  for  $j$ -th variable on  $i$ -th object.

The synthetic variable  $S$  with values  $s_i$ ,  $i = 1, 2, \dots, n$ , allows to replace the whole set of original variables  $X_1, X_2, \dots, X_k$  by one synthetic (aggregate) variable. There is a variety of methods for creating a synthetic variable. In this article the values  $s_i$  of the synthetic variable  $S$  for each EU-27 country, so  $i = 1, 2, \dots, 27$ , has been calculated as the average of the standardized values  $b_{ij}$ ,  $j = 1, 2, \dots, k$ , by formula

$$s_i = \frac{\sum_{j=1}^k b_{ij}}{k} \quad (2)$$

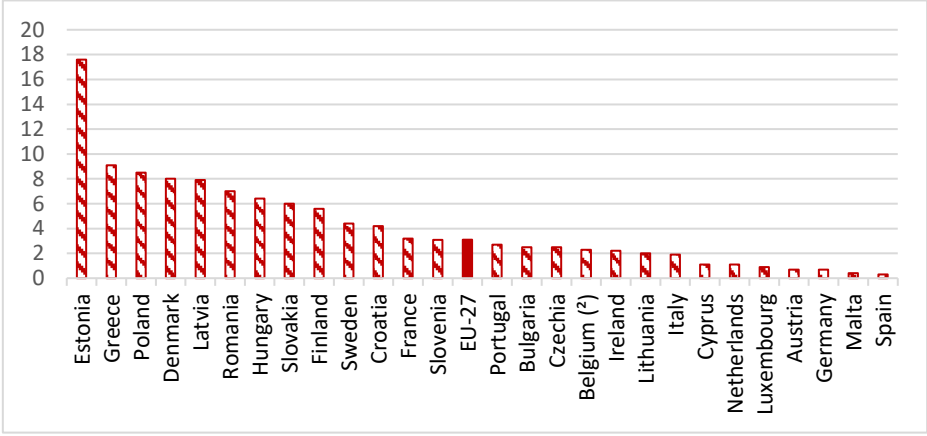
## 2 Results and Discussion

### 2.1 The results of analysis of unmet healthcare needs

According to the latest available data from 2019 in the EU-27 (Eurostat, 2021), 3,1 % of the population aged 16 and over in the EU reported that they had unmet needs for a medical

examination or treatment, a share that ranged from 0,3 % in Spain to 17,6 % in Estonia (see Fig.1).

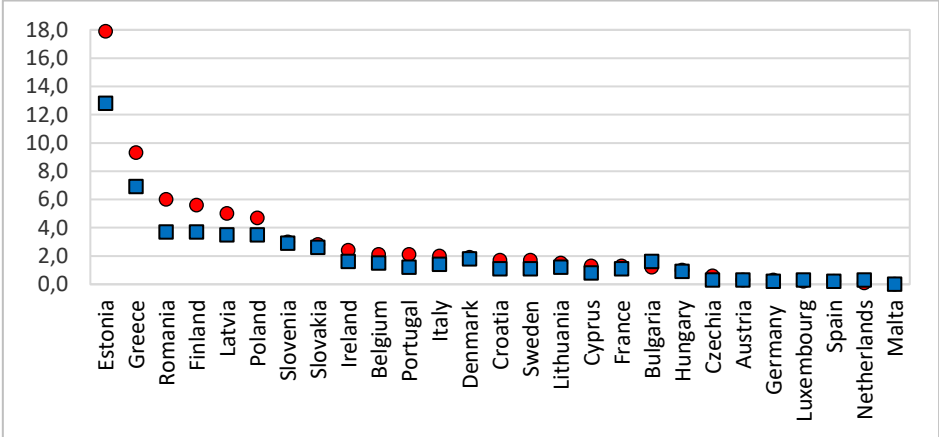
**Fig. 1: Persons reporting unmet needs for medical examination or treatment related to all reasons, EU-27, 2019 (% share of persons aged 16 and over).**



Source: Eurostat (online data code: hlth\_silc\_08)

As shown in Fig.2, in most EU-27 countries, the proportion of women who reported unmet health care needs in 2019 is higher than the proportion of men. There were significant gender differences in six EU-27 countries, namely Estonia, Greece, Romania, Finland, Latvia, and Poland.

**Fig. 2: Persons reporting unmet needs for medical examination or treatment, by sex, EU-27, 2019 (% share of persons aged 16 and over)**

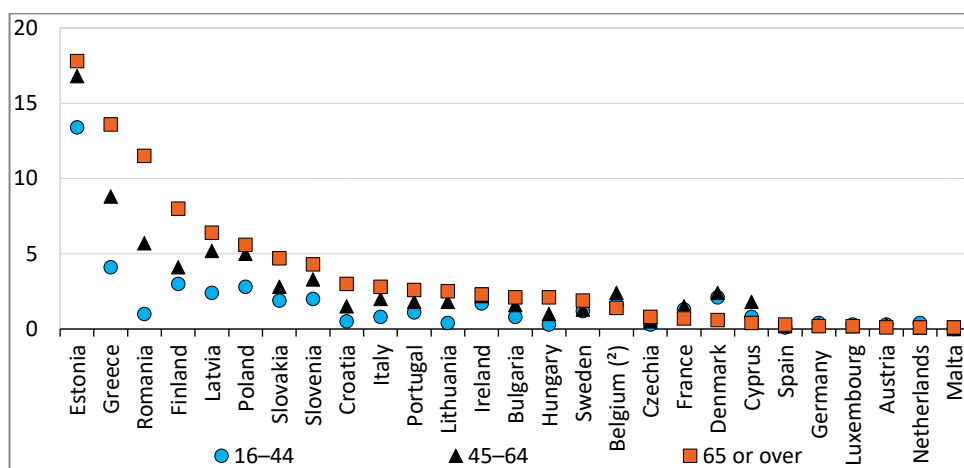


Source: Eurostat (online data code: hlth\_silc\_08)

Differences also exist between age groups (Fig. 3). In 2019, the share of people reporting unmet care needs was 1,1 % among people aged 16 to 44, 1,9 % among people aged 45 to 64, and 2,5 % among people aged 65 or over (Eutostat, 2021). The biggest differences in the unmet health care need assessment between age groups were in Romania and Greece. Surprising is the

higher dissatisfaction with medical care in the lower age categories in the countries Belgium, Cyprus, Denmark, and France.

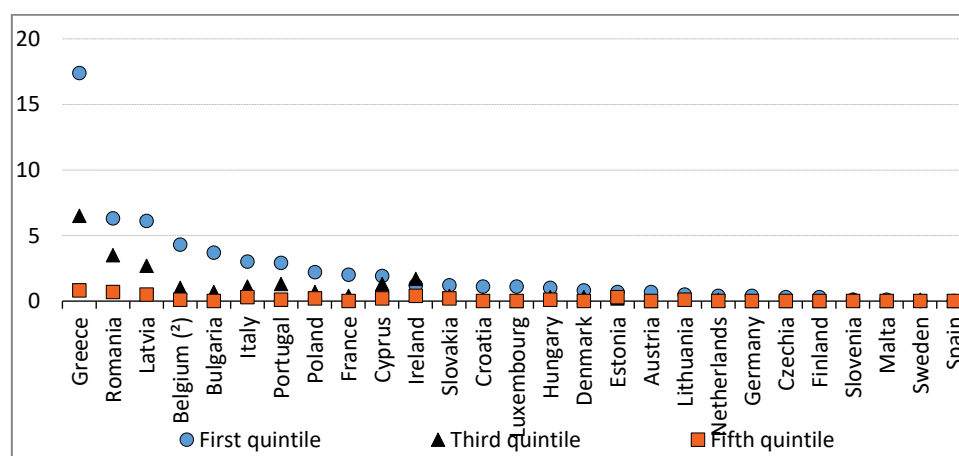
**Fig. 3: Persons reporting unmet needs for medical examination or treatment by age, EU-27, 2019 (% share of persons aged 16 and over)**



Source: Eurostat (online data code: hlth\_silc\_08)

Many articles confirm the significant impact of socio-economic conditions, especially income, on health (Pacáková and Kopecká, 2018; Pickett and Wilkinson, 2015). People's income surely has a distinct impact on the accessibility of medical care.

**Fig. 4: Persons reporting unmet needs for medical examination and treatment by income quintile group, EU-27, 2019 (% share of the persons aged 16 and over)**

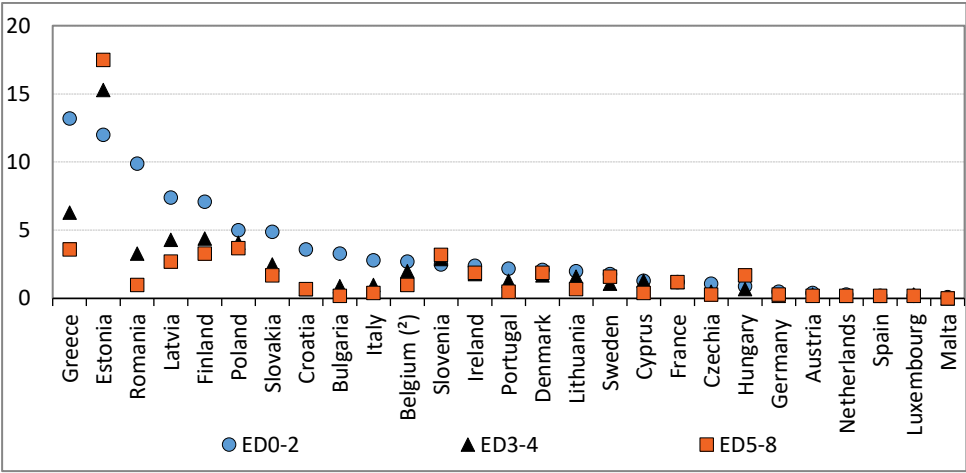


Source: Eurostat (online data code: hlth\_silc\_08)

Countries EU-27 in Fig. 4 are arranged in descending order according to the occurrence of unmet health care needs due to being too expensive in a group of persons with income lower than the 1st quintile. The results are shown for the lowest (First quintile), middle (Third quintile), and the highest income group (Fifth quintile). The biggest differences between these

income groups were found in Greece, Romania, and Latvia. We can see minimal differences in the incidence of unmet needs by income in Spain, Sweden, Malta, and Slovenia. The differences between income groups were minimal in all countries with very low unmet health care needs.

**Fig. 5: Persons reporting unmet needs for medical examination and treatment by level of education, EU-27, 2019 (% share of the persons aged 16 and over)**



Source: Eurostat (online data code: hlth\_silc\_08)

The general pattern of increasing unmet needs with decreasing educational attainment was observed in the majority of the EU Member States, clear examples being Greece, Romania, Latvia, and Finland. In Estonia, Slovenia and Hungary were the reverse situation was observed with the highest share among people having completed tertiary education and the lowest among people having completed lower secondary education. In Slovenia and Hungary, however, opposed to Latvia were minimal differences by level of education.

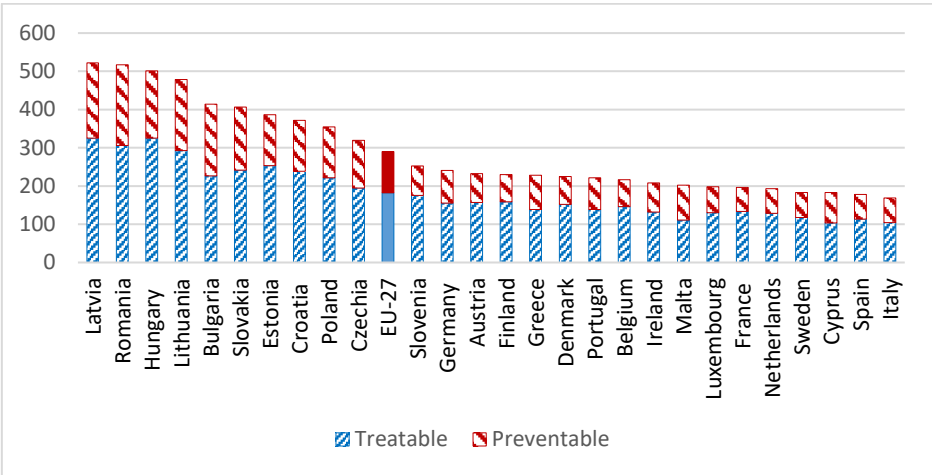
**2.2 The results of analysis of avoidable mortality**

The measure of ‘avoidable’ mortality is one of many indicators which can be used to evaluate the performance of the health system. This indicator can be disaggregated into treatable and preventable mortality, providing policy relevant information on the performance or quality of the health care system. This indicator is also suitable for comparing the quality of health care in the health systems of the EU-27 countries.

The lowest death rate for people aged less than 75 years from avoidable diseases in 2018 was 168,97 per 100 000 inhabitants in Italy. At the other end of the spectrum, with the highest rates of avoidable mortality, were Latvia, Romania, and Hungary with rates above 500 per 100 000 inhabitants; the highest rate of all was 521,88 per 100 000 inhabitants in Latvia.

Among EU-27 Member States, the lowest rates of death of people aged less than 75 years from treatable diseases in 2018 were recorded in Cyprus, Italy, and Malta (all under 110 per 100 000 inhabitants). The highest death rate for treatable diseases was 325,59 per 100 000 inhabitants in Hungary, while Latvia and Romania also recorded rates over 300 per 100 000 inhabitants.

**Fig. 6. Standardized death rates for avoidable mortality, persons aged less than 75 years, EU-27, 2018 (per 100 000 inhabitants)**



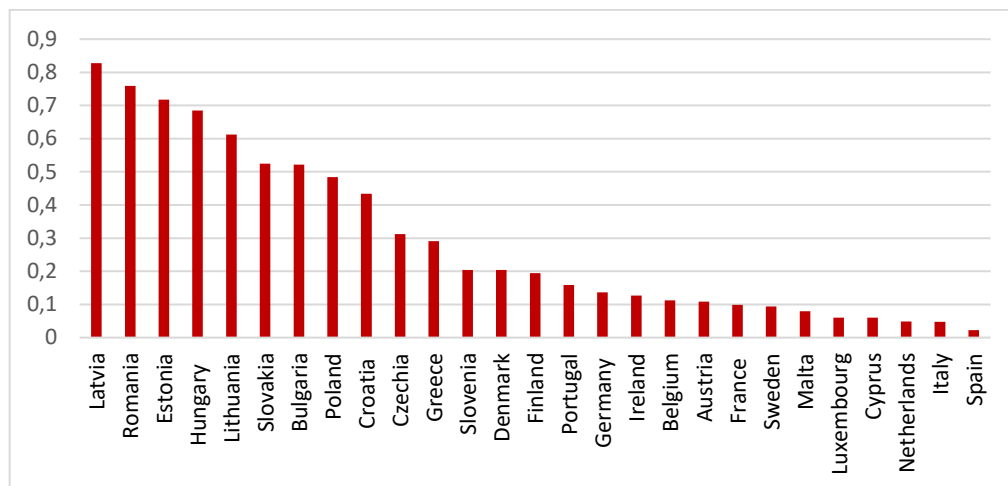
Source: Eurostat, 2020

In 2018, the preventable mortality rate was above the EU-27 average in all new Member States except Slovenia. The old Member States of EU-27, including Slovenia, report rates between 62,55 and 91,77 per 100 000 inhabitants.

**2.3 Inequalities according to the synthetic variable**

A comprehensive picture of inequalities in the quality of health care in the EU-27-member states can be provided by a synthetic variable. This variable has been created as an average of the normalized values according to formula (2) of three indicators - destimulants, namely ‘Share of the persons aged 16 and over reporting unmet health care needs for all reasons related to health systems (%)’, ‘Standardized deaths rates for treatable mortality’ and ‘Standardized deaths rates for preventable mortality, both per 100 000 inhabitants. The synthetic variable can be considered as a synthetic indicator of the quality of health care in the EU-27 countries, and the lower its value, the higher the quality of health care. The EU-27 countries, sorted according to the values of the synthetic variable presented Fig. 7.

**Fig. 7. The rank of the EU-27 countries by synthetic variable**



Source: Own calculation

The countries there are divided clearly into two groups according to the values of the synthetic variable of the quality of health care. One group consists of the former socialist countries, including Greece, with high values of synthetic indicator and so with poor health care quality, and the other one consists the old EU member states, including Slovenia, with low values of this variable, so with a good or very good level of health system performance. Significant differences in the values of the synthetic variable also have been observed between countries in each of these groups that indicate significant inequalities in the quality of health care within them.

## Conclusion

The article confirms demographics factors sex and age and social factors education level and income as determinants of unmet healthcare needs and avoidable mortality in EU-27 countries according to the most recent available data for 2019 and 2018. Presents also inequalities in unmet healthcare needs and in treatable and preventable mortality for different groups of inhabitants in the monitored countries. It also demonstrates the utility of using a synthetic variable in spatial comparison according to several indicators and the use of a linear arrangement of monitored multidimensional objects to identify causal relationships.

The concept of ‘unmet health care needs’ and ‘avoidable mortality’ despite many limitations, can provide valuable information for improving the quality of health care. The COVID-19 pandemic seems to affect unmet health care needs and avoidable mortality and will be a new topic of research studies in this area in the near future.



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## References

- Aragón, M. Ch., Chalkley, M., Goddard, M. (2017). *Defining and measuring unmet need to guide healthcare funding: identifying and filling the gaps*. Centre for Health Economics, University of York, CHE Research Paper 141.  
[https://eprints.whiterose.ac.uk/135415/1/CHERP141\\_need\\_healthcare\\_funding.pdf](https://eprints.whiterose.ac.uk/135415/1/CHERP141_need_healthcare_funding.pdf)
- European Commission (2020) *The European Semester*. [https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester\\_en](https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester_en)
- Eurostat (2019) *Sustainable development in the European Union*.  
<https://ec.europa.eu/eurostat/documents/3217494/9940483/KS-02-19-165-EN-N.pdf/1965d8f5-4532-49f9-98ca-5334b0652820>
- Eurostat (2020). Treatable and preventable mortality of residents by cause and sex (online data code: HLTH\_CD\_APR).  
[https://ec.europa.eu/eurostat/databrowser/view/hlth\\_cd\\_apr/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/hlth_cd_apr/default/table?lang=en)
- Eurostat (2021). Unmet health care needs statistics. Statistics Explained.  
[https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Unmet\\_health\\_care\\_needs\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Unmet_health_care_needs_statistics)
- Gauld R, Raymont A, Bagshaw PF, Nicholls MG, Frampton CM. (2014) The importance of measuring unmet healthcare needs. *N Z Med J*. 2014 Oct 17;127(1404):63-7. PMID: 25331313.
- Kossarova, L., Holland, W., & Mossialos, E. (2013). Avoidable mortality: a measure of health system performance in the Czech Republic and Slovakia between 1971 and 2008. *Health Policy and Planning*, Volume 28, Issue 5, 508 - 525.
- Kruk, M. E. et al. (2018). Mortality due to low-quality health systems in the universal health coverage era: a systematic analysis of amenable deaths in 137 countries. *The Lancet*, Volume 392, 2203-12.
- Kuc, M. (2012). The Implementation Of Synthetic Variable For Constructing The Standard Of Living Measure In European Union Countries. *Oeconomia copernicana*, 3(3), 5-19.  
<https://doi.org/10.12775/OeC.2012.012>
- Pacáková, V. & Kopecká, L. (2018). Inequalities in Health Status Depending on Socio-economic Situation in the European Countries. *E&M Economics and Management*, XXI (2), 4–20. <https://dx.doi.org/10.15240/tul/001/2018-2-001>

Pickett, K. E. & R. G. Wilkinson (2015). Income Inequality and Health: A Causal Review, *Social Science and Medicine*, Vol. 128, pp. 316-326.

Rutstein D, Berenberg W, Chalmers T, Child C, Fishman A and Perrin E (1976) Measuring the quality of medical care: a clinical method. *N Eng J Med* 294, 582-588.

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