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ANALIZA PREDVIĐANJA ODABRANIH ZDRAVSTVENIH I EKONOMSKIH INDIKATORA U ZEMLJAMA JUGOISTOČNE EVROPE I BALKANA

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Running title: Health and economy related indicators
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Abstract

Background/Aim. Health indicators provide comparable information relevant for defining the health goals. The aim of this article is to perform forecasting analysis of the selected indicators which could help anticipating the future necessities in health economy and preventing the problems which would predictively grow in the future. Methods. Health indicators are collected from publicly available databases of the World Health Organization and EuroStat. We used quantitative forecasting technique which is commonly used for historical data, for predicting several years in the future concerning selected health and economy related indicators. Results. Total health expenditures as a percentage of Gross domestic product (GDP) by 2025 will increase in the most of 17 surveyed countries. Percentage of household payments from the pocket will decrease in half of the surveyed countries, while values of GDP expressed in US$ will increase significantly compared to the last surveyed year (2017), except in Greece. Infant mortality indicator shows that the numbers will decrease in each surveyed country, while urban population percentage will rise almost in each country, except in Estonia. Life expectancy will increase in each surveyed country. Conclusion. Health- and economy-related indicators must be monitored over time, as they provide significant information concerning the relevant issues in health care system. Moreover, they may indicate changes that should be made in order to accomplish progress in each individual country.

Keywords:
forecasting analysis; health indicators; economy related indicators; South Eastern European countries; Balkan countries; health economy.
Apstrakt

Uvod/Cilj. Zdravstveni indikatori pružaju uporedive informacije relevantne za definisanje zdravstvenih ciljeva. Cilj ovog rada je da izvrši analizu predviđanja odabranih pokazatelja koji bi mogli da pomognu u predviđanju budućih potreba u zdravstvenoj ekonomiji i sprečavanju problema koji bi u budućnosti mogli prediktivno rasti. Metode. Zdravstveni pokazatelji prikupljeni su iz javno dostupnih baza podataka Svetske zdravstvene organizacije i EuroStat. Koristili smo tehniku kvantitativnog predviđanja koja se obično koristi za istorijske podatke, za predviđanje nekoliko godina u budućnost, uzimajući u obzir odabrane indikatore povezane sa zdravstvom i ekonomijom. Rezultati. Ukupni izdaci za zdravstvo kao procenat Bruto domaćeg proizvoda (BDP) do 2025. godine povećaće se u većini od 17 posmatranih zemalja. Procenat plaćanja domaćinstava iz džepa smanjiće se u polovini posmatranih zemalja, dok će vrednosti BDP-a izražene u američkim dolarima, znatno porasti u poređenju sa poslednjom posmatranom godinom (2017), osim u Grčkoj. Pokazatelj mortaliteta novorođenčadi pokazuje da će se brojevi smanjiti u svakoj posmatranoj zemlji, dok će procenat gradskog stanovništva rasti gotovo u svakoj zemlji, osim u Estoniji. Očekivani životni vek će se povećati u svakoj posmatranoj zemlji. Zaključak. Indikatori povezani sa zdravljem i ekonomijom moraju se pratiti tokom vremena, jer pružaju značajne informacije o relevantnim pitanjima u zdravstvenom sistemu. Štaviše, oni mogu ukazivati na promene koje bi trebalo izvršiti kako bi se postigao napredak u svakoj pojedinačnoj zemlji.

Ključne reči: analiza predviđanja; indikatori zdravlja; indikatori povezani sa ekonomijom; Zemlje Jugoistočne Evrope; Balkanske zemlje; zdravstvena ekonomija.
Introduction

A health indicator is a measure used with intention to gather information on a certain priority topics concerning health of the population or activities within the health system\(^1\). Health indicators provide comparable information across different geographical, organizational or administrative territories and can track progress over time. They help monitoring the key performance dimensions described in the Health System Performance Measurement Framework, which provides a common approach to health system management across the country\(^2\).

Health indicators try to describe and monitor health status of the population\(^3\). Attributes refer to health characteristics or qualities, while the concept of health itself encompasses physical, emotional, spiritual, environmental, mental and social well-being\(^4,5\).

The reason why indicators are used in public health is to initiate health decisions. The ultimate goal is to improve the health of the population and reduce diseases and gender inequalities\(^6\).

Health systems have a vital and lasting responsibility for human health, throughout the life. They are crucial for the healthy development of individuals, families and societies everywhere\(^7,8\). Real progress in health according the United Nations Millennium Development Goals and other national health priorities vitally depends on stronger health system based on primary health care\(^9,10\), like it was in former Yugoslavia.

Serbia and other Balkan countries share many historical specifics and a common heritage with the countries of Eastern Europe led by the Russian Federation\(^11\). This legacy is often attributed to the fact that the founding of the Semashko health care system was embedded in Bismarck's mixed model, accepted in the former Yugoslavia\(^12,13\). The Bismarck system was established in 1893 in Germany, while the English, Beveridge system, was established in 1911 with many elements taken from the Russian Imperial model\(^14,15\).

In short, indicators play a key role in turning data into relevant information for public health decision makers. Health indicators are relevant for defining the health goals that national health authorities should pursue\(^16\).

Countries chosen to be compered share similar historical background, but still, some of them are more successful than others in managing indicators which are related to different health systems\(^17\). Adapting current health system and introducing the elements from the health system of other countries may be useful from the point of view of the progress\(^18,19\).

The aim of this article was to perform forecasting analysis of the certain indicators which could help anticipating the future necessities in decision making concerning health economy and preventing of the problems which would predictively grow in the future.
Methods

The countries of interest to be surveyed are: Albania, Bosnia and Herzegovina, Bulgaria, Greece, Croatia, Montenegro, Northern Macedonia, Romania, Serbia, Slovenia, Turkey, Russia, Belarus, Lithuania, Latvia, Estonia and Ukraine. Time range of surveyed indicators differs and goes from 1990 to 2019.

Health indicators are collected from publicly available databases of the World Health Organization and EuroStat, which deal with long-term evaluation and monitoring of indicators obtained from national authorities\textsuperscript{20}.

Presented research is an observational epidemiological study based on macro-aggregation data of national populations of entire countries. Since data is anonymous and does not belong to individual citizens, there is no issue of data privacy protection, i.e. the research does not require consideration by the Ethics Committee\textsuperscript{21}.

Following selected health and economy related indicators were taken into account: Total health expenditure as % of gross domestic products (THE % of GDP); Private households’ out-of-pocket payments on health as % of total health expenditure (OOP % THE); Gross domestic product US$ per capita (GDP US$); Estimated infant mortality per 1000 live births (Infant mortality); Estimated life expectancy at birth (Life expectancy); Percent of urban population (% of urban population). These indicators are the most consistent and used in order to follow country progress in health care protection\textsuperscript{22}.

Forecasting is the process of making predictions of the future based on past and present data, most commonly by analysis of trends. Quantitative forecasting technique is used which is commonly utilized for historical data, as is the case in our research and it belongs to medium-termed forecasting analysis, anticipating several years in advance (by the year of 2025). Prediction is similar, but more general term. Both might refer to formal statistical methods employing time series, cross-sectional or longitudinal data, or alternatively to less formal judgmental methods\textsuperscript{23}. Forecasting analysis has been performed by combining excel analysis and SPSS program.

Results are expressed in decimal numbers, showing how many times certain indicator increased or decreased in comparison to the last surveyed year (Table 1).

Results

Forecasting analysis of the THE % of GDP by 2025 shows that this indicator tends to increase in most of the monitored countries, especially in Serbia (by 2.94), while it will decrease in a smaller
number of countries, such as Northern Macedonia, by more than 2.4, comparing with the last surveyed year (Fig. 1, Table 1).

Forecasting analysis of the OPP % THE by 2025 shows that this indicator will decrease mostly in Bosnia and Herzegovina (by 19.5), as well as in Albania (by 14.8) while it tends to increase mostly in Russian Federation, by almost 17, when comparing with the last surveyed year (Fig. 2, Table 1). It is interesting to find that this indicator for Slovenia is noticeably constant for the entire observed period, from 1995 to 2014, with the very similar projection until 2025.

In general, the values of GDP, compared to the first surveyed year increased significantly (Fig. 3, Table 1). Forecast analysis of the value of GDP US$ by 2025 shows that this indicator will decrease only in Greece (by $1085), while this sum of money will increase in the rest of the surveyed countries, mostly in Russian Federation (by $6867) and Estonia (by $6545) in comparison to the last surveyed year.

Projection of infant mortality shows that it will decrease in each surveyed country in South Eastern Europe and Balkan peninsula by 2025 (Fig. 4, Table 1). There will be a large reduction of infant mortality per 1000 live births in Albania (by 12.0, respectively) in comparison to the last surveyed year, with the largest decrease in Turkey (by 15.3).

Estimated life expectancy at birth will increase in each surveyed country by the year of 2025, with the largest increment in Russian Federation and Belarus (by 6.7 and 3.9, respectively), while the smallest one will be in Macedonia and Greece (by 1.2 and 1.4) (Fig. 5, Table 1). This indicates that the number of elderly people will continue to grow in this region.

Percentage of urban population until 2025 will rise almost in every country, except in Estonia, which will has a slight decrement (by 0.6) (Fig. 6, Table 1). The largest enhancement of the urban population, expressed in percentages, is estimated to take place in Albania (by 13.5) and Turkey (by 7) in comparison to the last surveyed year. There are no data concerning Northern Macedonia urban population during the whole surveyed period.

**Discussion**

Global aging becomes more and more realistic, as times goes on. Progression both in the medical and non-medical area, such as development of drug industry, medical technologies and industry development, as a whole, explains by itself the fact that elderly people become the leading age group nowadays. The share of the world population aged 65 and older, will double, and the fast-growing group of people over the age of eighty will become four times larger until 2040. The expected years of life would change in parallel with all previously mentioned developments in human society. All of this makes even more important addressing the issue of healthcare investments. All people must be
treated equally by the health sector, regardless of age, gender and ethnicity. Large percentage of older people is living in the developing countries, and by 2025 it will even increase. Moreover, globally, the percentage of people living in the urban areas will grow, what is in line with the predictions from our research. In parallel with the demographic and economic transition, investments in the health sector are expected to grow, even sharply. The forecasting analysis shows increased investments in health, according to the obtained economic indicators. Namely, the ability to predict what impact these changes will have on the overall health care costs, both in the public and private health sectors, is of key importance.

Health spending per capita for 2015 to 2030 period is projected to grow more than 4% per year in the Slovak Republic, Turkey and Korea. On the contrary, in Lithuania, Chile, Latvia, growth rates are projected to be over two percentage points lower than historical rates. OECD countries reported some of the highest growth rates in health spending per capita from 2000 to 2015. Our research also shows some variation concerning per capita spending.

Health expenditure as a share of GDP in the world is projected to rise to 10.2% by 2030, in comparison to 8.8% in 2015. The only countries for which a slight decrease is expected to happen are Latvia, Hungary and Lithuania. Most countries are expected to experience moderate increase in health expenditure, as a share of GDP. Based on the results of our research, it can be concluded that several countries are likely to have reduced percentage of investment by the year of 2025, like Northern Macedonia, Albania and Bosnia and Herzegovina but countries such as Serbia are expected to have large increment.

People with the same health issues may end up spending differently due to different type of insurance, socio-economic status, or comorbid diseases that can make treatment unsuccessful. According to the data from The World Bank in 2018, Ukraine had 49.35% of OOP spending on health; Albania 44.58; Russia and Serbia 38.31%, and the least among all surveyed countries - Slovenia and Croatia with 12%. Our forecast analysis showed that the most of the surveyed countries will experience drop in percent of OOP share on health, especially Albania and Bosnia and Herzegovina, what is not the case with Russian Federation. This means that health systems differ and some countries are coping better with health expenditures than others.

The infant mortality rate is considered as one of the indicators for describing both demographic conditions and socio-economic well-being of a country. The Millennium Development Goal 4 (MDG 4) of United Nations had set the goal for reducing high rates of infant mortality by two thirds, to be reached by 2015, by using 1990 as the benchmark year. Institut national d’études démographiques (INED) calculated infant mortality rate (per 1000 live births) in Europe and other developed OECD countries. The results from 2018 showed that the largest infant mortality had Mexico, Colombia, Kosovo and Albania (8.9 per 1000); Romania (6) and Bulgaria.
(5.8) had moderate values, while Estonia (1.6), Slovenia (1.7) and Liechtenstein with no child mortality, and were at the bottom of the list. By analysis of the last available data of infant mortality indicator, Estonia and Slovenia were the countries that had the smallest numbers in infant mortality (1.6 and 2.1 per 100,000). All surveyed countries in our research are expected to reduce infant mortality by 2025.

Population aging is increasing not only in low-mortality industrialized countries, but also in several Eastern European countries, including Russia. These countries have a slower pace of mortality improvement in several stages of the life span compared to low-mortality countries, which delayed the aging problem. Due to the evolved medical and pharmacy technology, as well as more accessible medical care, the life expectancy should be prolonged. Our forecast analysis indicated that life expectancy would rise in each of the surveyed country, and the longevity will be the highest in Russian Federation and Belarus.

In 2015, the UN reported that 54% of the global population lived in urban areas. Level of Europe urbanisation is expected to increase to approximately 83.7% in 2050. By 2030, built-up areas are expected to expand a lot. The highest growth in percentage of build-up areas, around 6%, is expected in Romania and Belgium. Urban construction will certainly affect the relocation of residents from rural to urban areas, therefore it is expected that the percentage of people living in urban areas will rise. Our forecast showed that this might happen, and that in 2025 the growth in percentage of urban population in each surveyed country is realistic, except Estonia. The largest increment in percentage of growth can be expected in Albania and Croatia. All age groups move to urban areas, the younger ones in order to get proper education, the middle age group are looking for a job, the older ones are often placed in nursing homes. All of this brings problems for the authorities and the population, as well, that need to be solved.

Conclusions

Seventeen selected South Eastern European and Balkan countries we compared showed similar pathway in the progress of selected indicators, but some of them are expected to have more success than the others. Total health expenditures as a percentage of GDP by 2025 will increase in the most of the surveyed countries. Percentage of household payments from the pocket will decrease in half of them, while values of GDP expressed in US$ will increase significantly compared to the last surveyed year (2017), except in Greece. Infant mortality indicator shows decrement numbers in each surveyed country by 2025, while estimated life expectancy at birth will increase by the same year. Our forecast also showed that the growth in percentage of urban population in each surveyed country is realistic, except Estonia.
Therefore, health- and economy-related indicators should be surveyed over time, as they enable significant and relevant information concerning the contemporary issues in health systems, also indicating where changes should be made and allowing further progress in the health care of the individual country.

References

1. Larson J. The measurement of health: concepts and indicators. New York: Grenwood Press; 1991.
2. Larson C, Mercer A. Global health indicators: An overview. CMAJ. 2004;171(10):1199-1200.
3. Smith P, Mossialos E, Papanicolas I, Leatherman S. Performance Measurement for Health System Improvement. Health Economics, Policy And Management. Available from: https://www.euro.who.int/__data/assets/pdf_file/0004/135976/E94887_Part_VI.pdf
4. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: Part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. Circulation. 2001;104:2746-53.
5. National Health Service (NHS). NHS Institute for Innovation and Improvement. Available from: https://www.england.nhs.uk/improvement-hub/publication/the-good-indicators-guide-understanding-how-to-use-and-choose-indicators/
6. World Health Organization. Study Group on the Measurement of Levels of Health & World Health Organization, 1957. Measurement of levels of health: report of a study group [meeting held in Geneva from 24 to 28 October 1955]. Available from: https://apps.who.int/iris/handle/10665/40394
7. Stefko R, Gavurova B, Ivanka V, Rigelsky M. Gender Inequalities in Health and Their Effect on the Economic Prosperity Represented by the GDP of Selected Developed Countries—Empirical Study. Int J Environ Res Public Health 2020;17(10):3555.
8. World Health Organization. Health and the Millennium Development Goals. Geneva, 2005. Available from: https://www.who.int/hdp/publications/mdg_en.pdf?ua=1
9. Saltman R, Rico A, Boerma W. Primary health care in the driver’s seat: organizational reform in European primary care. Maidenhead, England, Open University Press, 2006.
10. Clancy CM, Uchendu US, Jones KT. Excellence and Equality in Health Care. Am J Public Health 2014; 104 Suppl 4(Suppl 4):S527-8.
11. White-Means S, Gaskin DJ, Osmani AR. Intervention and Public Policy Pathways to Achieve Health Care Equity. Int J Environ Res Public Health. 2019;16(14):2465.
12. Koehring M. Modernising health systems in the Balkans. EUI Perspectives, 2016. Available from: https://eiuperspectives.economist.com/healthcare/modernising-health-systems-balkans
13. *Jakovljevic MB, Vukovic M, Fontanesi J*. Life expectancy and health expenditure evolution in Eastern Europe-DiD and DEA analysis. Expert Rev Pharmacoeco... 2015;16(4):537-46.

14. *Rancic N, Jakovljevic M*. Long Term Health Spending Alongside Population Aging in N11 Emerging Nations. East Eur Bus Econ J. 2016;2:2-26.

15. *Jakovljevic M, Potapchik E, Popovich L, Barik D, Getzen TE*. Evolving health expenditure landscape of the BRICS nations and projections to 2025. Health economics. 2017;26(7):844-52.

16. *Stevens GA, Alkema L, Black RE, Boerma JT, Collins GS, et al*. Correction: Guidelines for Accurate and Transparent Health Estimates Reporting: the GATHER statement. PLOS Medicine 2016;13(8):e1002116.

17. *Marmot M*. Social determinants of health inequalities. Lancet 2005;365(9464):1099-104.

18. *Politzer E, Shmueli A, Avni S*. The economic burden of health disparities related to socioeconomic status in Israel. Isr J Health Policy Res. 2019;8(1):46.

19. World Health Organization. WHO Regional Office for Europe. Available from: http://www.euro.who.int/__data/assets/pdf_file/0006/199536/Health2020-Short.pdf?ua=1

20. World Health Organization. European health information gateway. Available from: https://gateway.euro.who.int/en/hfa-explorer/#2zvCNKfyac

21. World Health Organization. WHO Regional Office for Europe. Available from: https://www.who.int/medicines/areas/quality_safety/safety_efficacy/gcp1.pdf

22. World Health Organization. WHO Regional Office for Europe. Available from: https://www.euro.who.int/__data/assets/pdf_file/0009/251775/Health-2020-Targets-and-indicators-version2-ENG.pdf

23. *Lawrence KD, Klimberg RK, Lawrence SM*. Fundamentals of Forecasting Using Excel. Industrial Press, New York, United States. 2008.

24. *Stepovic M*. GDP Growth and Health Care Expenditures Worldwide. The Open Pharmacoconomics & Health Economics Journal. 2019;7:9-18.

25. *Stepovic M, Rancic N, Vekic B, Dragojevic-Simic V, Vekic S, Rakovic N, et al*. Gross Domestic Product and Health Expenditure Growth in Balkan and East European Countries—Three-Decade Horizon. Front. Public Health 2020;8:492.

26. *Rancic N, Kovacevic A, Dragojevic-Simic V*. Long term health expenditure changes in selected Balkan countries. Front Public Health 2015;3:152.

27. *Jakovljevic M*. Population ageing alongside health care spending growth. Srpski Arhiv. 2017;145:534-9.
28. Lichtenberg FR, Tatar M, Çalışkan Z. The effect of pharmaceutical innovation on longevity, hospitalization and medical expenditure in Turkey, 1999–2010. Health Policy, Elsevier. 2014; 117(3): 361-373.

29. Jakovljevic MB. Resource allocation strategies in Southeastern European health policy. Eur J Health Econ. 2013;14(2):153.

30. Kovačević A, Rancic N, Segrt Z, Dragojevic-Simic V. Pharmaceutical expenditure and burden of non-communicable diseases in Serbia. Front Pharmacol. 2016;7:373.

31. Neumann PJ, Ganiats TG, Russell GD, Siegel JE. Cost Effectiveness in Health and Medicine. Oxford Scholarship Online 2016; doi: 10.1093/acprof:oso/9780190492939.001.0001.

32. Lorenzoni L, Marino A, Morgan D, James C. Health Spending Projections to 2030: New results based on a revised OECD methodology. OECD Health Working Papers 2019; No. 110, OECD Publishing. Available from: https://www.sipotra.it/wp-content/uploads/2019/06/Health-Spending-Projections-to-2030-New-results-based-on-a-revised-OECD-methodology.pdf

33. OECD. Projections of health expenditure. OECD Publishing. doi: https://doi.org/10.1787/3d1e710c-en

34. Marino A, Morgan D, Lorenzoni L, James C. Future trends in health care expenditure: A modelling framework for cross-country forecasts. OECD Health Working Papers 2017; No. 95. doi: https://doi.org/10.1787/247995bb-en

35. OECD. OECD Publishing. doi: https://doi.org/10.1787/9789264233386-en

36. James C, Berchet C, Mair T. Addressing operational waste by better targeting the use of hospital care, in: OECD, Tackling Wasteful Spending on Health. OECD Library 2017; doi: https://doi.org/10.1787/9789264266414-en

37. OECD. Available from: https://www.euro.who.int/__data/assets/pdf_file/0009/355986/Health-Profile-Latvia-Eng.pdf?ua=1

38. Tandon A, Cashin C. Health, Nutrition, and Population Family. The World Bank 2021. Available from: http://documents1.worldbank.org/curated/en/333671468330890417/pdf/560530WP0Box341penditureFiscalSpace.pdf

39. Fuhrer R, Shipley MJ, Chastang JF, Schmaus A. Socioeconomic position, health, and possible explanations: a tale of two cohorts. Am J Public Health. 2002;92(8):1290-4.

40. Merlo J, Gerdtham U, Lynch J, Beckman A, Norlund A, Lithman T. Social inequalities in health—do they diminish with age? Revisiting the question in Sweden 1999. Int J Equity Health. 2003;2(1):2.

41. Cho HE, Wang L, Chen JS, Liu M, Kuo CF, Chung KC. Investigating the causal effect of socioeconomic status on quality of care under a universal health insurance system - a marginal structural model approach. BMC Health Services Research. 2019;19(1):987.
42. Cutler D, Wikler E, Basch P. Reducing administrative costs and improving the health care system. N Engl J Med. 2012;367(20):1875-8.

43. The World Bank. Available from: https://data.worldbank.org/country/UA

44. Hsaio WC, Shaw PR. Social Health Insurance for Developing Nations. World Bank Publications, 2017; 6860. Available from https://econpapers.repec.org/bookchap/wbkwbpubs/6860.htm

45. Hsaio WC, Shaw PR. Social Health Insurance for Developing Nations. World Health Organization for the Western Pacific Region 2007; Available from: https://openknowledge.worldbank.org/bitstream/handle/10986/6860/411710PAPER0So101OFFICIALUSE0ONLY1.pdf?sequence=1&isAllowed=y

46. Gonzalez RM, Gilleskie D. Infant Mortality Rate as a Measure of a Country’s Health: A Robust Method to Improve Reliability and Comparability. Demography. 2017;54(2):701-20.

47. Gupta S, Verhoeven M, Tiongson ER. Public spending on health care and the poor. Health Economics. 2003;12(8):685-96.

48. World Health Organization. WHO Library Cataloguing-in-Publication Data. Available from: https://apps.who.int/iris/bitstream/handle/10665/43444/9241563206_eng.pdf?sequence=1

49. Department of Economic and Social Affairs of the United Nations. Available from: https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf

50. The French Institute for Demographic Studies. Available from: https://www.ined.fr/en/everything_about_population/data/europe-developed-countries/birth-death-infant-mortality/

51. Department of Economic and Social Affairs, Population Division. Available from: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf

52. Raleigh V. Trends in life expectancy in EU and other OECD countries: Why are improvements slowing? OECD Health Working Papers 2019; No. 108. OECD Publishing. https://doi.org/10.1787/223159ab-en

53. Kinsella K, Velkoff V. An Aging World: 2001. U.S. Government Printing Office 2001; Available from: https://www.census.gov/prod/2001pubs/p95-01-1.pdf

54. Ogura S, Jakovljevic M. Health financing constrained by population aging – an opportunity to learn from Japanese experience. Serbian J Exp Clin Res. 2014;15:175-81.

55. United Nations, Department of Economic and Social Affairs, Population Division. Available from: https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf

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56. European Commission. Available from: https://knowledge4policy.ec.europa.eu/foresight/topic/continuing-urbanisation/developments-and-forecasts-on-continuing-urbanisation_en

57. Seto KC, Güneralp B, Hutrya LR. Global forecasts of urban expansion to 2030. Proceedings of the National Academy of Sciences. Proc Natl Acad Sci USA. 2012;109(40):16083-8.

58. The World Bank. Available from: https://www.worldbank.org/en/country/romania/overview

59. Our World In Data. Available from: https://ourworldindata.org/urbanization
| Country    | % of GDP | % OOP | GDP US$ | Infant mortality | Life expectancy | % Urban pop. |
|------------|----------|-------|---------|-----------------|----------------|-------------|
| Albania    | 5.90     | 4.69  | -1.20   | 14.98           | 15.45          | 13.5        |
| Bulgaria   | 8.44     | 9.11  | 0.67    | 44.2            | 53.90          | 4.7         |
| Bosnia     | 9.57     | 11.20 | 1.62    | 27.9            | 8.45           | 3.3         |
| Belarus    | 5.69     | 4.64  | -1.05   | 32.0            | 39.10          | 5.4         |
| Greece     | 8.08     | 9.99  | 1.91    | 34.9            | 23.71          | 4.6         |
| Croatia    | 7.80     | 9.10  | 1.30    | 11.2            | 9.18           | 5.1         |
| Macedonia  | 6.48     | 4.03  | -2.44   | 36.7            | 27.60          | /           |
| Montenegro | 6.42     | 5.28  | -1.14   | 42.8            | 53.37          | 3.1         |
| Romania    | 5.57     | 6.90  | 1.34    | 18.9            | 17.62          | 3.2         |
| Russia     | 7.07     | 8.16  | 1.09    | 45.8            | 62.69          | 1.6         |
| Serbia     | 10.37    | 13.30 | 2.94    | 36.6            | 45.33          | 2.2         |
| Slovenia   | 9.23     | 10.34 | 1.11    | 12.1            | 12.42          | 0.5         |
| Turkey     | 5.41     | 6.54  | 1.12    | 17.8            | 6.53           | 7.0         |
| Estonia    | 6.38     | 7.30  | 0.92    | 20.7            | 22.78          | -0.6        |
| Latvia     | 5.88     | 5.91  | 0.03    | 35.1            | 26.51          | 0.2         |
| Lithuania  | 6.55     | 7.53  | 0.97    | 31.3            | 33.12          | 0.5         |
| Ukraine    | 7.10     | 8.54  | 1.44    | 46.2            | 47.43          | 3.4         |

* Last refers to the last available year of observation. *Predict refers to predicted value in the year of 2025. *dif. refers to difference between predicted and last year available, showed as negative or positive difference.

** % of GDP - Total health expenditure as % of GDP; % OOP - Private households’ out-of-pocket payments on health as % of total health expenditure; GDP US$ - Gross domestic product (GDP), US$ per capita; Infant mortality - Estimated infant mortality per 1000 live births; Life expectancy - Estimated life expectancy at birth; % of urban pop. - Per cent of urban population.
Fig. 1: Total health expenditures % of GDP for observed countries, forecasting analysis by 2025
* Albania - ALB, Bosnia and Herzegovina - BIH, Bulgaria - BGR, Greece - GRC, Croatia - HRV,
Montenegro - MNE, Northern Macedonia - MKD, Romania - ROU, Serbia - SRB, Slovenia - SVN, Turkey - TUR, Russia - RUS, Belarus - BLR, Lithuania - LTU, Latvia - LVA, Estonia – EST, Ukraine - UKR.
Fig. 2: Private households’ out-of-pocket payments on health as % of total health expenditure for surveyed countries, forecasting analysis by 2025

* Albania - ALB, Bosnia and Herzegovina - BIH, Bulgaria - BGR, Greece - GRC, Croatia - HRV, Montenegro - MNE, Northern Macedonia - MKD, Romania - ROU, Serbia - SRB, Slovenia - SVN, Turkey - TUR, Russia - RUS, Belarus - BLR, Lithuania - LTU, Latvia - LVA, Estonia – EST, Ukraine –UKR.
Fig. 3: Gross domestic product (GDP), US$ per capita for surveyed countries, forecasting analysis by 2025
* Albania - ALB, Bosnia and Herzegovina - BIH, Bulgaria - BGR, Greece - GRC, Croatia - HRV, Montenegro - MNE, Northern Macedonia -MKD, Romania - ROU, Serbia - SRB, Slovenia - SVN, Turkey - TUR, Russia - RUS, Belarus - BLR, Lithuania - LTU, Latvia - LVA, Estonia – EST, Ukraine -UKR.
Fig. 4: Estimated infant mortality per 1000 live births for surveyed countries, forecasting analysis by 2025
* Albania - ALB, Bosnia and Herzegovina - BIH, Bulgaria - BGR, Greece - GRC, Croatia - HRV, Montenegro - MNE, Northern Macedonia - MKD, Romania - ROU, Serbia - SRB, Slovenia - SVN, Turkey - TUR, Russia - RUS, Belarus - BLR, Lithuania - LTU, Latvia - LVA, Estonia – EST, Ukraine – UKR.
Fig. 5: Estimated life expectancy at birth for surveyed countries, forecasting analysis by 2025
* Albania - ALB, Bosnia and Herzegovina - BIH, Bulgaria - BGR, Greece - GRC, Croatia - HRV, Montenegro - MNE, Northern Macedonia -MKD, Romania - ROU, Serbia - SRB, Slovenia - SVN, Turkey - TUR, Russia - RUS, Belarus - BLR, Lithuania - LTU, Latvia - LVA, Estonia – EST, Ukraine -UKR.
Fig. 6: Percent (%) of urban population for surveyed countries, forecasting analysis by 2025
* Albania - ALB, Bosnia and Herzegovina - BIH, Bulgaria - BGR, Greece - GRC, Croatia - HRV, Montenegro - MNE, Northern Macedonia -MKD, Romania - ROU, Serbia - SRB, Slovenia - SVN, Turkey - TUR, Russia - RUS, Belarus - BLR, Lithuania - LTU, Latvia - LVA, Estonia – EST, Ukraine -UKR.

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