
TERRITORIAL IMPACT ASSESSEMENT OF HOSPITAL CLOSURE IN ROMANIA IN 2011. MEASURING THE EFFECTS OF THE TERRITORIAL INEQUALITIES

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Abstract: The paper is motivated by the need to highlight the inequalities induced by the 2011-2012 health reform in the NUTS2 North-East Region and the NUTS2 South-East Region of Romania and to emphasize the effects over the population and territorial coherence of a policy that does not assess the local particularities of a territory.

The methodology used in this analysis identifies the effects of the anti-economic crisis policies at the territorial scale. One of the counter measures taken in the 2011-2012 period consisted in the reduction of the public infrastructure of health care. A number of hospitals and health-care centers were closed in what was called the reform of the health public system. In the regions analyzed, a number of 18 hospitals were closed, from a total of 74 before the crisis starting. The exploratory work I propose measures the spatial consequences of these policies, in terms of basic accessibility to the health regional infrastructure, before and after the crisis. The results of these two models of basic spatial accessibility will be correlated with the age groups structure of the regional population, in order to detect and scale the effects on the growing territorial inequalities.

Key words: *health reform, accessibility, vulnerability, inequality, healthcare system*

The access to health services is considered a fundamental right of the individual, in all civilized countries. Despite these rights settled in accordance with the principles of a modern society, the Romanian healthcare system shows multiple inequalities of access for a large proportion of the population. Although the healthcare system is only one of the determinants of population health status, the relationship between the availability of funding allocated by the government and the health of the population is mediated by many factors. A number of studies show that the countries where financing health services and long term care are at a high level, record low percentage of the population with poor health and life expectancy levels are raised. Instead, the countries with a low share of health expenditure are characterized by a population with higher proportion of poor health and a reduced healthy life expectancy.

Nationally, the gap between regions and between urban and rural areas in infrastructure and medical equipment is huge and creates serious inequalities in access to health services. In urban areas are located 88.8% of all hospitals, 91.7% of all medical offices, 92.3% of diagnostic and treatment centers, 98.1% of specialized offices and 79.5% of all pharmacies. In this background lacking cohesion, the closing of hospitals has exacerbated challenges for the population in accessing healthcare, especially those living in economically undeserved settings or in remote areas.

With direct impact on the population's access to care and health delivery, the subject was widely approached by the scientific community. Closing hospitals as a political measure induced problems in both developed and emerging countries and also in both urban and rural areas. Therefore, rising health care costs at a time of economic stagnation and an obsession with budget deficits at all levels of government have contributed to a sense of urgency to reform the health care system (Amanda M. James: "Closing rural hospitals in Saskatchewan: on the road to wellness?"). One of the main outcomes of hospital closure is the decreasing access to the nearest medical center. The increased distance to the closest hospital increases death from heart attacks and unintentional injuries (Thomas C. Buchmueller: "How far to the hospital? The effect of hospital closures on access to care"). The closing of hospitals has exacerbated challenges for older adults in accessing healthcare, especially those living in economically disadvantaged communities (Malamo Countouris, Sandra Gimore: "Exploring the impact of a community hospital closure on older adults: A focus group study").

The main purpose of this analysis is to highlight the inequalities induced by the 2011 health reform in Romania, Macroregion 2 (the NUTS2 North-East Region and the NUTS2 South-East Region of Romania). A number of hospitals and health-care centers were closed in what was called the reform of the health public system. In the regions we analyze (the NUTS2 North-East Region and the NUTS2 South-East Region of Romania) a number of 18 hospitals were closed, from a total of 74 before the crisis starting. I also want to emphasize the effects of a health policy that does not consider the local particularities and how the outcome affects the territorial coherence. The indicators used in this study were: the stable population in 2011 at LAU 2 unit by age group and sex (The stable population consists of people living in that locality, with residence in the locality at that time, data source: National Institute of Statistics, 2011), the number of hospitals before and after the 2011 health reform (data source: The Ministry of Health¹).

¹Government Emergency Ordinance No. 32/2011

The exploratory work I propose measures the spatial consequences of these policies, in terms of basic accessibility to the health regional infrastructure, before and after the crisis. The results of these two models of basic spatial accessibility will be correlated with the age groups structure of the regional population, in order to detect and scale the effects on the growing territorial inequalities.

In terms of methodology, the access to the nearest hospital is calculated in minutes by road, at a spatial level of LAU2 units. To mark the inequity level of access to health care in the area selected, it was mapped both the access before and after the reform. Also, for better observe the local impact of the policy, the last map describes the added distance in minutes to the closest hospital after the reform.

The basic accessibility model we propose is formalized as follows:

$$A_i = \min_{\geq 0} D_{ij}, \text{ where :}$$

A_i = basic accessibility index

D_{ij} = time distance on the road network between each LAU2 centroid and the j the nearest hospital

The road distances were calculated by approximating the time needed to reach a hospital using the road quality as a weighting function. In this case, for the local roads (DC or communal infrastructure) an average speed of 25km/h was allocated, the county roads (DJ) received 45 km/h and the national roads (DN) 60km/h average speed.

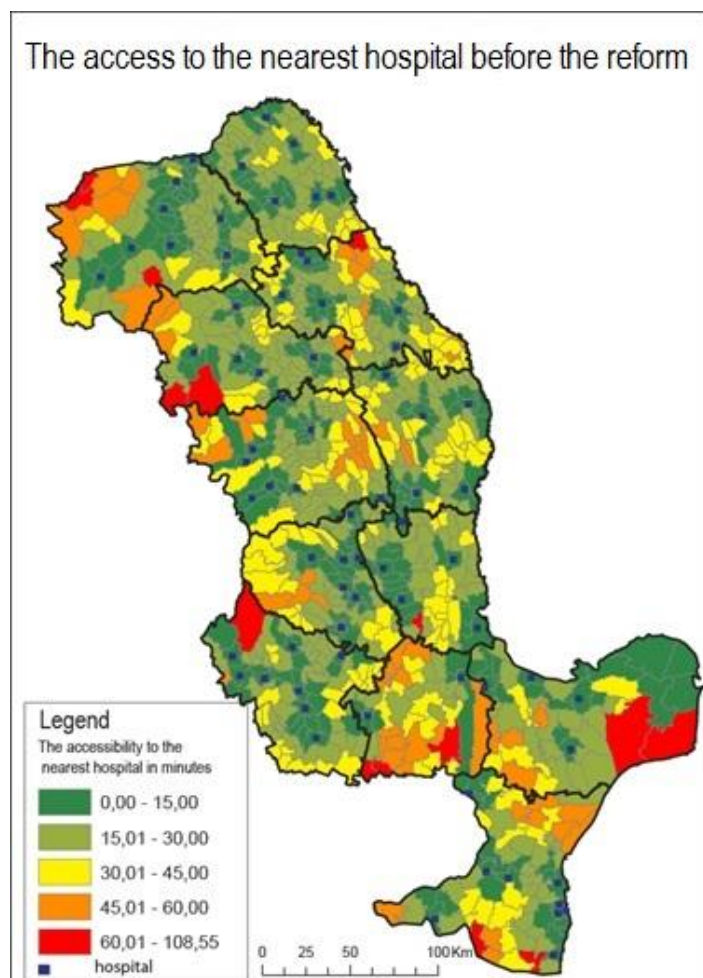
The calculation of the time distances allowed me to build two matrix of basic accessibility (933 by 933 LAU2) and to identify what local administrative units were penalized by the hospitals' closure. Comparing the results of the two models (before and after the reform) shows that the effects of the policies, in terms of territorial cohesion and spatial inequalities, are substantial. Almost a half-million persons living in the studied area were forced to allocate more time to reach the nearest hospital, ranging from a moderate penalty (10 minutes) to severe ones (about 60 minutes in some remote or peripheral LAU2). In theory, the potential of interaction between the users and the health infrastructure is defined by the report between the sizes of the hospitals and the distance that separate the user of this facility. As the time distances increased, the probability of interaction decays proportionally to the time penalties (Grasland, TRACC).

Time penalty in minutes	max-30	30-15	15-10	Total
Number of LAU2 affected	28	63	34	125
Population penalized (2011)	104000	229000	164000	497000
Total area population				3332000
Number of LAU2 in the studied area				933

Tab. Synthetic results - territorial effects of the public health care system reform in the NUTS1 Macro-region East of Romania

In this situation, closing the hospitals in Romania had as effect a possible lower interaction between the potential patients and the health care infrastructure, with unknown effects on the general state of health of the population. Moreover, crossing the results concerning the loss of accessibility with the age structure indicates that the most penalized age groups are the young and the elder. These two groups are extremely vulnerable, from a medical point of view and the interaction with the health care infrastructure should theoretically be more frequent.

The next steps will identify the aggregate potential accessibility functions, before and after the reform took place. For example, for the elder age group (>65 years), before the reform 50 % of the elder population was situated at less than 13 minutes to the closest hospital. After the implementation of the reform, this distance increased to 15 minutes. The difference might look insignificant, but replicated at regional scale, this loss of accessibility affects a considerable amount of aged people. These aggregated functions will be the quantitative tools that will help measure better the increasing inequalities in Romania, during the reforming period related to the economic crisis.

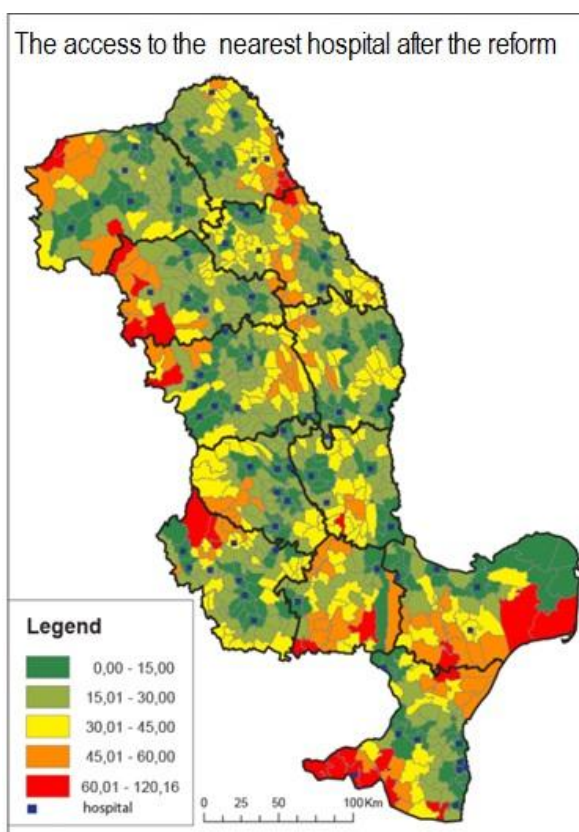


Map1: The access to the nearest hospital before the health reform

As can be seen in the first cartographic material (“The access to the closest hospital before the health reform”), the access to health care services was quite deficient in Macroregion 2 even before the reform. First areas that stand out are mountainous, hilly and the Danube Delta, where the access is hampered due to road conditions, resulting inequalities induced by the road network. Thereby, inequalities of access can be seen, more than half of the LAU2 units being located at a distance of less than 30 minutes from the nearest hospital. Considering that the main affected areas are rural areas, the first thing that stands out is the big difference between the two. Thus, an advantage have the administrative units located on a high rank communication path, European or at least national, with access up to 15 minutes to the first hospital. In this category stands out regions characterized by high access to hospital services, such as the corridors Radauti – Campulung Moldovenesc – Gura Humorului – Vatra Dornei, in Suceava district, along a national road. With the same description stands out the corridor Adjud – Panciu – Odobesti – Focsani – Dumbraveni, along the E85 European road, in Vrancea district, or the central area of Buzau district.

Areas with average accessibility to the nearest hospital are in close proximity to existing units located up to 30 minutes to the nearest hospital, served at least by a communal road. Areas with very low accessibility are isolated at the administrative borders, served by impassable roads².

Excluding from the analysis the 18 closed hospitals, the map changes completely. The most affected areas are those that had medium and low (30 - 45 minutes, 45 - 60 minutes) access. For example, by closing Babadag hospital, near the intersection of Tulcea and Constanta districts (the hospital served also the population from the northern county of Constanta) emerged a minimum hospital



Map 2: The access to the nearest hospital after the health reform

²Particular cases are Insula Mare a Brailei and Delta, areas characterized by low access to the nearest hospital because for this cartographic material were taken into account only road distance, excluding the river access.

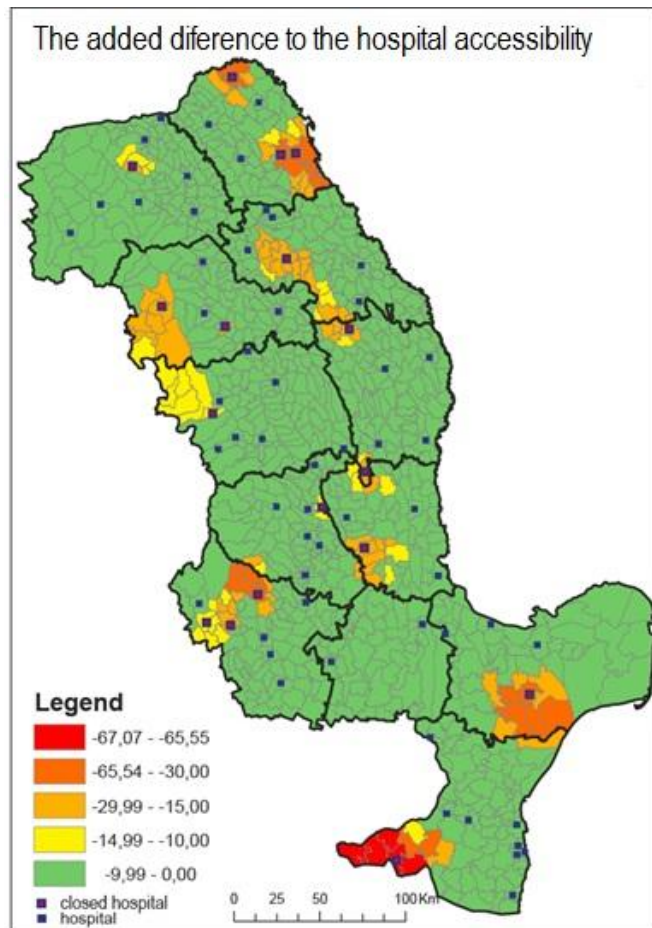
access area, a vulnerable area. Another situation is shown by the closing of Baneasa hospital, in southeastern Constanta. After the health reform in 2011, this area recorded the greater time-distance to the nearest hospital, up to 120 minutes³.

On a foundation still characterized by major discontinuities of access to hospital services, the reform widened the initial imbalances. The areas with minimal access to the

nearest hospital, with isolated, punctual character before the reform, were turned into fluid corridors of low access. Those areas are parallel with high access areas, located along the European road E85.

The most affected were the rural areas without access to the national road, the medium time - distances changing completely.

Comparing both the post and after reform situations, we can say that the initially limited access areas were most affected by the 2011 health reform. The existing inequalities have widened resulting “hot” areas, characterized by low access and high need to medical care. For example, before the reform, the greatest distance to the nearest hospital was 63 minutes



Map 3: The added difference in minutes after the health reform.

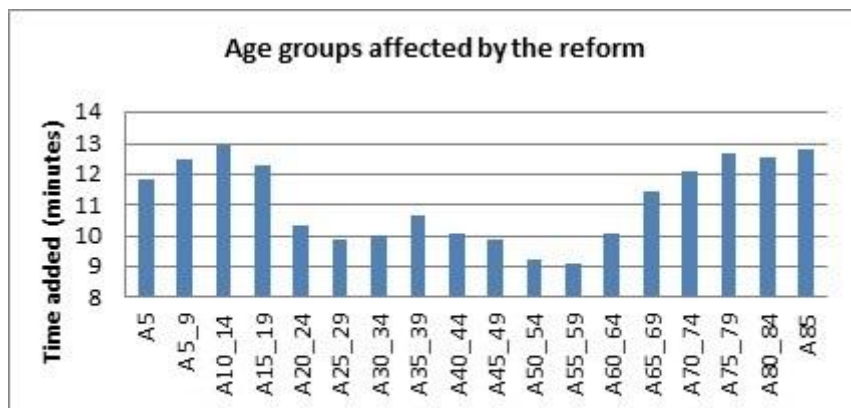
(excepting the Danube Delta where the access is limited due to the lack of terrestrial connections, the primary means of access being the river), the time-distance doubling after the hospital closure.

Through the third map (“The added difference in minutes after the 2011 reform”) can be observed the real territorial impact of the new policy. Maybe 10 or 20 minutes is not much, but added to a initial distance of about the same, can lead to disasters. This was the situation resulted by the closing of Baneasa hospital, in Constanta district. Before 2011 the time-distance to the nearest hospital was almost 65 minutes, and doubled after the reform.

³Fortunately, following pressure from the population, the hospital was reopened in 2012.

As can be seen, in contrast, there have been situations where hospital closure has not led to major problems, like Roznov hospital.

According to the demographic profile of the affected population, the young and the elderly are the most vulnerable groups. Susceptible to a high need for health services, they already were characterized by



Graph: Age groups affected by the health reform

low access to hospital services. The age group profile in the affected areas resembles the demographic profile of rural areas, resulting that the most affected is the rural population. Although the average to the nearest hospital is about 11 minutes, combined with susceptible demographic profile of the affected areas, can sometimes lead to dramatic results.

Even if 26 years have passed since the events of 1989, social policies in Romania are still inconsistent, inadequate, offer ad-hoc solutions to specific crises, have conflicting objectives, lack of vision and strategic approach. Institutional arrangements that would have to be determined by a coherent long-term strategic vision, were determined by internal political interests of the moment.

With great importance in the quality of live and life expectancy, the access to the closest hospital is a conclusive indicator of a strong health system. Affected by ageing and deep demographic problems, the region was profoundly affected by the 2011 health reform. Thus, by statistical and mapping methods, I've conducted an analysis of the affected population and mapped arising inequalities in vulnerable areas, study that can provide a basis for further approaches.

BIBLIOGRAPHY

1. Buchmueller, Thomas C., Jacobson, Mirele. *“How far to the hospital?: The effect of hospital closures on access to care”*, Journal of Health Economics, Volume 25, Issue 4, July 2006, Pages 740–761.
2. Countouris, Malamo, Gilmore, Sandra, Yonas, Michael. *“Exploring the impact of a community hospital closure on older adults: A focus group study”*, Health & Place, Volume 26, March 2014, Pages 143–148.
3. James, Amanda M., *“Closing rural hospitals in Saskatchewan: on the road to wellness?”*, Social Science & Medicine, Volume 49, Issue 8, October 1999, Pages 1021–1034.
4. Liu, Liyan, Hader, Joanne, Brossart, Bonnie. *“Impact of rural hospital closures in Saskatchewan, Canada”*, Social Science & Medicine, Volume 52, Issue 12, June 2001, Pages 1793–1804.
5. Mohan, John F., *“Explaining geographies of health care: A critique”*, Health & Place, Volume 4, Issue 2, June 1998, Pages 113–124.
6. Tudora, Daniel, Muntele, Ionel, *“Distribuția spațială a indicilor stării sociale a populației rurale în Moldova apuseană”*, Editura Universității „Alexandru Ioan Cuza”, Iasi, 2012.
7. *** Government Emergency Ordinance No.32/2011.