

THE DEGREE OF ACCESSIBILITY TO HEALTH CARE – ISSUES CONCERNING THE NORTH-EASTERN POPULATION OF ROMANIA

ALINA MARECI

*Department of Geography, Bucharest University, Nicolae Bălcescu Av., 1, 010041, Bucharest, Romania
e-mail: alinamareci@gmail.com*

This study is analysing the population accessibility to the sanitary infrastructure in the North-East region of Romania, namely the six component counties of Bacău, Botoşani, Iaşi, Neamţ, Suceava and Vaslui. Due to lack of basic sanitary infrastructure when it comes to regional general medical centres (called dispensaries), the population is forced to travel large distances in order to benefit of medical assistance. The hospital infrastructure is unbalanced in terms of territorial distribution. The highly populated urban settlements are usually equipped with one or more hospital unit(s) being located along the national road E85 and the adjacent national roads, fulfilling in most cases municipal roles or holding vital social and economic importance for the region. The longer distances the patients are forced to travel for medical assistance the higher health costs due to the additional travel costs the person has to undertake. One direct result of this travelling is overcrowded hospitals in the targeted areas which in its turn may have negative impacts on the quality of services provided and on the amount of time the people need to spend in that facility.

Key words: Health, Health Care, Hospital, Average Distance, Accessibility Degree, North-East Region

Introduction

The North-East region has an area of 36 850 km² meaning 15.46% of the total area of the country and the largest number of inhabitants out of the either regions of the country (with a total number of 3.836.835 inhabitants). Geographical and historical factors contributed to this region having a lower development rate compared to the rest of the country.

The health care status of each person depends mainly of the possibility of receiving immediate medical care whenever necessary. This translates into the direct access of that person to sanitary infrastructure and services. During the communist era the Romanian health care policy was centred more on curing the patients rather than preventing the disease which translated into larger investments being transferred towards the hospital type units. The health care network was made up of hospital units (that can either be rural, city, municipal,

county, specialized or University hospitals), public policlinics that were transformed into Treatment and Diagnosis Centres and general health centres. The Treatment and Diagnosis Centres became home to individual medical centres and only provide fee based medical assistance, the general population having to pay for each visit or medical investigation he/she has undertaken. Thus the possibilities of receiving free medical care remain hospitals and general health centres. The nowadays reality concerning the general health centre is very grim: they don't dispose of the basic facilities or medication necessary for providing medical assistance, the buildings are often old ones that don't even have running water or electricity and most often the physician responsible for that unit will only come on certain days of the week without having a fix schedule. This continuous degradation of the general health centres resulted in more and more people having to travel towards the nearest

hospital in order to obtain even the most basic medical care (a broken leg, an eye exam or treatment for the commune flue). Thus the most important indicator of health care infrastructure became hospital type facilities, which provide immediate, surgical or psychiatric care and professional services to the general population. The institution we nowadays call hospital began as a charitable institution for the needy, aged and infirm or the young. The “Hospitals Law” approved by the Romanian Government in May 2003 defines this institution as being “a sanitary unit with beds, of public utility that has judiciary identity of public or private property, that provides medical services”. The institutions analyzed in this present study are municipal or general hospitals that have minimum 3 or 4 basic specialized units: internal medicine, pediatrics, gynaecology and surgery.

An important indicator for the population accessibility degree to the health care units (in this case hospital(s)) and with a direct influence on the quality of the services received is the coverage area of each hospital units basically the number of inhabitants that relate to a single town for receiving medical care. The degree of accessibility of the population of the north-east region to health care units was also analyzed in regard with the number of kilometres needed to travel in order to reach the nearest hospital and total population covered by the hospital unit(s) from one town. Due to the territorial inequalities of the distribution of the hospital units some villages are as far as 62km or 65km in the cases of Fărcașa and Borca in Neamț County and in the latter case Andrieșeni in Iași County. The transport costs increase according to the distance between the villages and the hospitals which in some cases makes the general population to resort

to home medical care instead of visiting a doctor and only reach a hospital in critical situations or in advanced stages of the illnesses. The last issue analyzed was the sanitary influence area of each hospital.

Regional analysis of the hospital network and the degree of population coverage with specific services (hospitals)

There are 32 towns in the north-east region of Romania where the general population can receive medical care in hospital units (Tutova and Bârlad being neighbouring towns were analyzed together as locations holding hospital types units). Based on the average distance between each village and the closest town with a hospital unit there was established the total number of inhabitants that depend on the specific services provided in that town. The number of inhabitants that travel towards each town can thus vary depending on the territorial distribution of the hospital type units and on the transport infrastructure of the region from 43 713 inhabitants in the case of Comănești in Bacău County, 65 311 for Hărlău in Iași County or 212 304 for the town of Suceava (*Figure 1*).

Considering the total number of inhabitants depending on the services from each town there can be:

a. *Towns with a low population coverage* namely with less than 50 000 dependant inhabitants. A total number of 9 towns make up this category (in a decreasing order of the number of dependent inhabitants they are Câmpulung Moldovenesc, Darabani, Săveni, Comăbești, Vatra Dornei, Murgeni, Trușești Siret, and Solca). The small number of dependant inhabitants is explain by their geographical location:

- In mountainous (Carpathian) regions towns like Câmpulung Moldovenesc, Vatra Dornei and Comănești. This type of relief makes for scattered villages with large areas but small number of inhabitants as the economic and thus demographical development is limited due to the physical-geographical characteristics of the area.

- Along the County/Romanian border with the Ukraine in the case of Darabani and Siret which limits the population with access to the specific units to a smaller number of inhabitants.

- In the vicinity of other urban centres (larger or similar in dimensions) with whom they share the population coverage e.g.: Săveni in Botoșani County (between centres like Trușești, Botoșani and Darabani), Trușești in Botoșani County (between centres like Săveni and Botoșani) or Solca in Suceava County (between centres like Rădăuți, Suceava and Gura Humorului) and Murgeni in Vaslui County close to Bârlad but also situated near the County's limits.

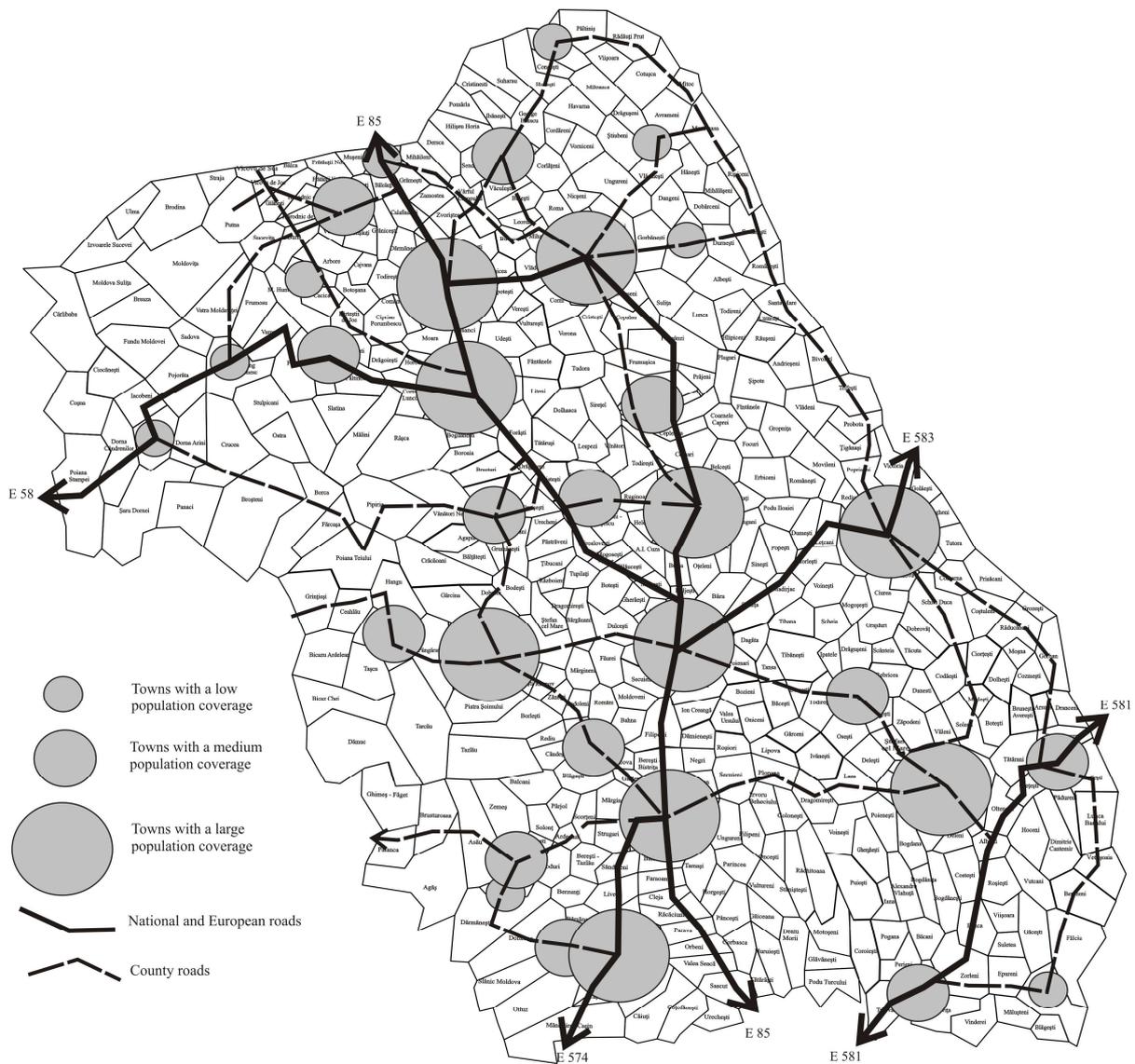


Figure 1. Regional analysis of the hospital network and the degree of population coverage with specific services (hospitals)

The general population is less likely to resort to centres from the last two categories for anything else than basic medical needs on the contrary they prefer to travel longer distances towards centres that are viewed as being more modernized and are likely to offer better and more specialized assistance.

b. *Towns with a medium population coverage* namely with a number of dependant inhabitants between 50 000 and 100 000. These ten urban centres are in general larger than the ones from the previous category with more important economic and territorial administrative importance. Similar to the first group of towns there are physical-geographical differences that separate the towns from this category:

- *In mountainous regions (Bicaz) or in areas of contact between mountainous (Carpathian) regions and Subcarpathians* for example Moinești (72 861 inhabitants), Gura Humorului (69 327 inhabitants) and Târgu Ocna (59 431 inhabitants).

- *Along each County border:* Negrești and Huși in Vaslui, Buhuși in Bacău County, Hârlău in Iași County, Dorohoi in Botoșani County and Târgu Neamț in Neamț County.

c. *Towns with a large population coverage* namely with more than 100 000 inhabitants migrating towards them. This category includes the largest cities in the North-East region and can be subdivided as well into two smaller groups namely the towns that gather between 100 000 inhabitants and 150 000 and the last group of towns gather more than 150 000 inhabitants. The first subgroup made out of six towns (Fălticeni with 129 323 inhabitants, Bârlad with 129 003 inhabitants, Rădăuți with 126 931 inhabitants, Onești, Târgu Frumos, Pașcani). These towns are important urban centres that most often take over the excess social

and economic flows from the municipal towns in each county. What ties all these urban centres together is that all of them are situated on or close to important European roads crossing the country. All of them are situated on the European road E85 or roads adjacent to it. For example Fălticeni is one of the towns situated on this European road and Rădăuți and Pașcani are very close to it. The other three towns are located in road branches of this important communication artery: Târgu Frumos is situated on the E583 national road Bârlad on E581 and Onești on E574.

The remaining towns have the greatest regional influence with the most important administrative-territorial and socio-economic importance and have the largest population coverage varying from 169 196 inhabitants for Vaslui to 514 936 in the case of Iași. Six out of the seven urban centres are municipal towns in their specific County and three of them are located on the E85 national road (Suceava, Roman and Bacău). Their increased population coverage is explained by a series of factors: their regional economical development, their location of important transport routes that make them more accessible to the population, the unequal territorial distribution of hospital units. The unequal territorial distribution is one important factor in cases like Roman and Bacău. Thus, although Roman is only the second largest town of Neamț County it has an important population coverage of 187 886 inhabitant due to its isolate position in the south-east corner and the lack of any other centres that would take over some of the population. The geographical position is also a vital factor for Bacău's and Iași's large population coverage, of course in the case of Iași we have to take into consideration the fact that this town is the

most important urban centre in the region both from a socio-economical and cultural point of view. It is the largest university town in the north-east part of the country and disposes of vast research facilities and the latest, most modern health care infrastructure in the area. All these factors combined with the inadequate placement of the other hospitals in Iași County result in a total population of 514 936 inhabitants of the region depending on the 15 hospital units from Iași.

Analyzing the territorial distribution of all the towns in which one or more hospital units(s) can be found based on the population coverage of all of them we can draw up a series of characteristics:

- The population coverage increases exponentially as the towns locations shifts from the Carpathian region to the Subcarpathians to the hills and depressions regions and finally three of the towns with the largest population coverage are located in plains areas (Vaslui, Botoșani and Iași);
- All the towns with large population coverage are located along important transport axes;
- All the towns with large population coverage have important administrative roles within their designated counties;
- The population coverage is influenced by the inadequate, uneven distribution of the hospitals within the region.

One of the downsides of the increased population coverage of certain urban centres is possibly a decrease of the quality of the medical care provided. Thus an ever larger number of persons concentrating on the limited infrastructure of one town can influence the way a patient receives medical assistance but also on the amount of time he/she spends on the hallways of a hospital waiting

for a consult. On the other side the poor quality of the facilities and lack of basic infrastructure from the communal hospitals or the hospitals from smaller towns forces the population to travel further in order to ensure their personal well being, most often having to spend large sums of money on transport.

Regional analysis of the average distance travelled by the general population in order to reach the nearest hospital

As the local general medical centres are inadequately equip for ensuring the basic medical assistance the general population travel by a variety of transport vehicles (going from personal car to the ever rustic wagon) towards the nearest hospital can be as far as 60km away (in the case of Borca in Neamț county or Andrieșeni in Iași County). The large distances are caused by a series of factors from the type of relief in which the patient lives in (mountainous Carpathian relief results in longer more winding roads that are not asphalted whereas hills and plains relief represent environments for more direct transport routes) to the territorial distribution of the towns the hospital(s) is/are located. The average distance between each village and the closest hospital thus becomes one of the most important indicators of the accessibility degree of the general population to health care units and ultimately of their health care state. Shorter routes reflect in faster and cheaper access to medical care. Depending on these distances and the fact that sometimes they surpass the financial possibilities of the common rural population home remedies are preferred to specialized consults sometimes with unwanted or even tragic results.

Depending on the average distances to the nearest hospital units the localities from the north-east region were divided into four categories (Figure 2):

- Localities situated at less than 5km away from the nearest hospital unit;
- Localities situated at distances between 5.1km and 10km;
- Localities situated at distances between 10.1km and 20km;
- Localities situated at more than 20km from the nearest hospital unit;

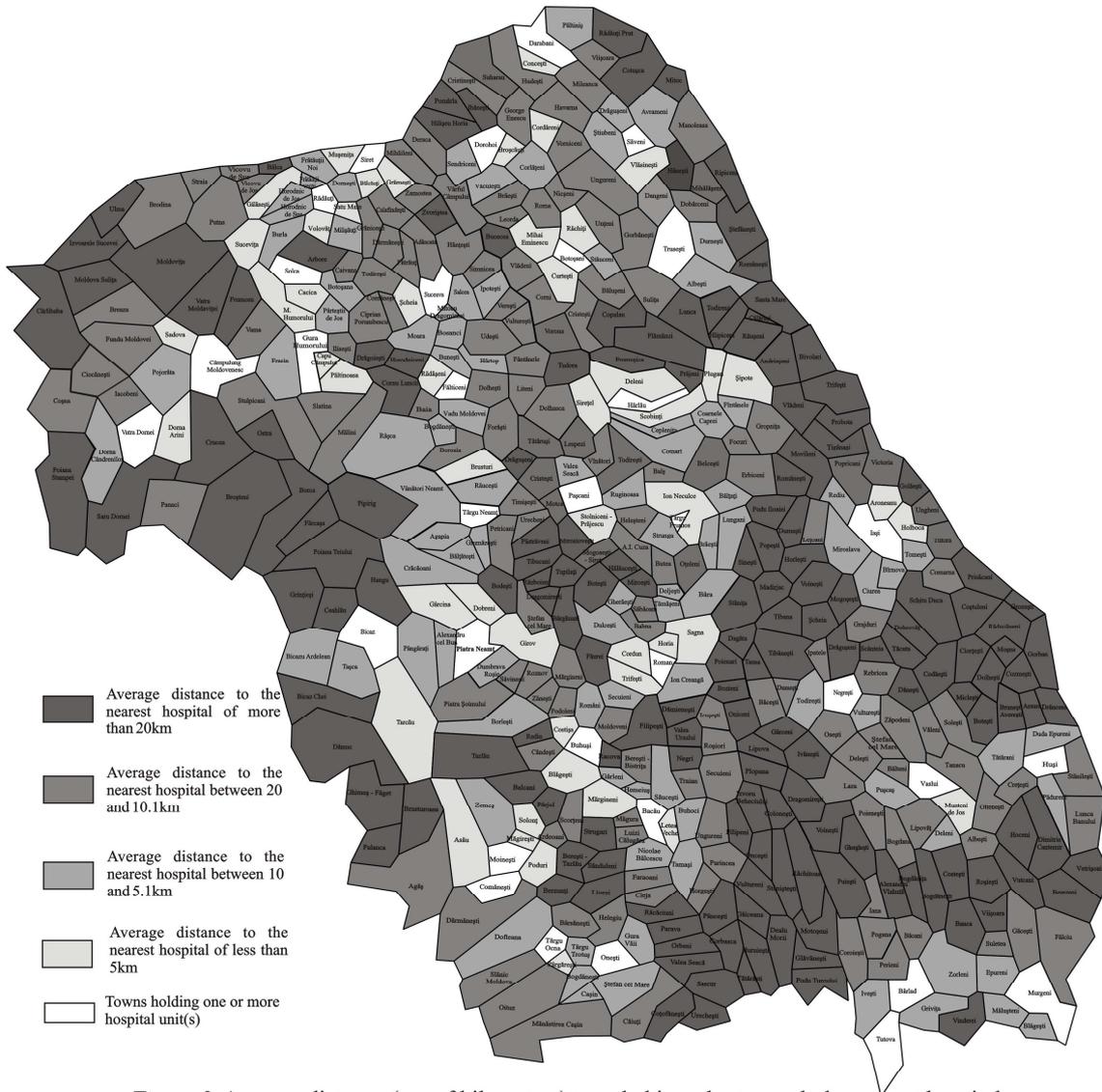


Figure 2. Average distance (no. of kilometers) traveled in order to reach the nearest hospital

Analyzing the percentage of localities closer than 5km from the nearest hospital for each county one can observe that the largest number (27% out of 49) are situated in Suceava followed by Iași, Neamț, Bacău, Botoșani and Vaslui (Figure 3). This fact is a result primarily to the fact that Suceava County

disposes of the highest number of cities with a hospital units from the entire region. In Iași County although there are only 4 cities with a hospital unit is only of four the area is well covered and 20% of the villages are within 5km away from these four cities.

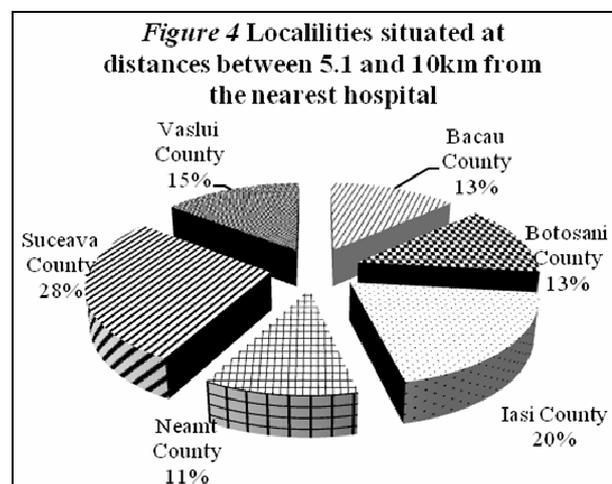
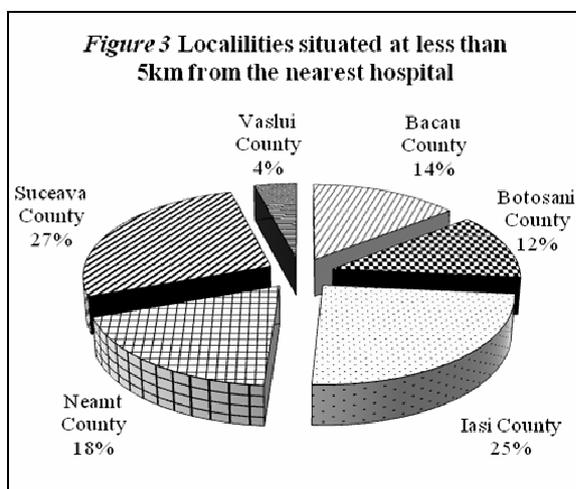
Another important factor for Iași is its geographical position which has a direct influence on the shape and size of the villages and also on the road network. The fact that Iași is situated on a plain area results in its villages being smaller and less fragmented than other areas and enables the national and European road network to have been developed without any hindrance from natural obstacles. Both in Bacău and in Vaslui there are 6 cities with hospitals but unlike in Vaslui where out of the six cities three are concentrated in the north and three in the south leaving the centre of the county without immediate access to a hospital unit, in Bacău the territorial distribution is slightly more balanced.

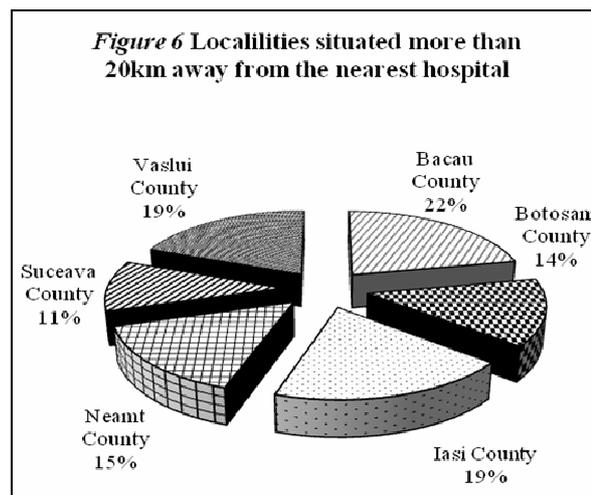
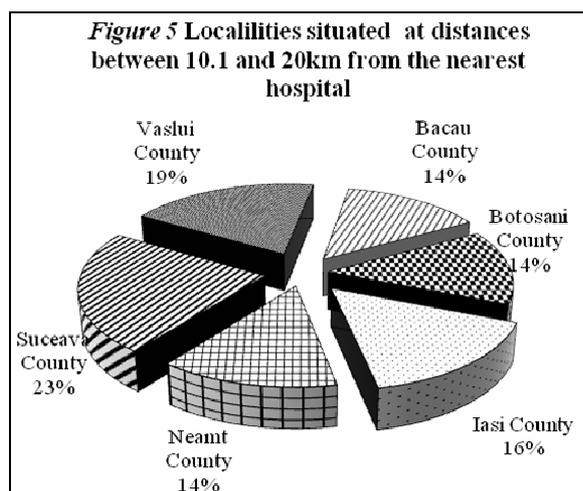
The average distance between 5.1 and 10km to the nearest hospital divides the six regions in two categories with four counties having around 15% of their villages at a maximum distance of 10km from the nearest hospital and two of them (Iași and Suceava) with 20% and more of the villages in this situation (*Figure 4*).

For each of the six counties the average distance a person has to travel to reach the nearest hospital varies between 21.68km in Bacău, 19.17 in

Vaslui, 19.13km in Iași and 18.97km in Botoșani, 18.16km in Neamț and 14.77km in Suceava. As illustrated in *Figure 5* the interval 10.1 – 20km divides the six counties into equal shares as this is the average distance characteristic for most of the villages in this region. There are specific factors for each particular county that produce disparities in the number of kilometres that a person needs to travel in order to reach the nearest hospital unit. For example the transportation network (including European, national and local roads as well as the railways) is better developed in the eastern part of the region and in counties like Iași and Bacău.

The town of Bacău is also a very important railway junction connection Neamț County with the rest of the region. The large distances registered in Suceava, Neamț and Bacău are due to the fact that the western parts of these counties are located on mountainous Carpathian relief. This type of geographical structures makes for villages having larger areas and being more scattered but also imposes limitations in the transportation network. In counties like Botoșani and Vaslui the large distances are explained by the uneven territorial distribution of the hospitals.





The highest percentage of localities situated at more than 20km away from a hospital unit is found in Bacău County where both the above mentioned factors (geographical location and uneven distribution of the health care units) converge. For example for the entire eastern part of the county the most accessible town is Bacău with its three hospitals (*Figure 6*).

The best accessibility degree registers in Suceava County in spite of the fact that this county is the largest one in the entire region and that most of its territory represents mountainous regions.

Regional analysis of the sanitary influence areas

Combining the results from the above mentioned factors and based on the number of localities (villages and newly appointed towns that don't have hospital units) sanitary influence map was realised for each of the 32 towns targeted by the general population for receiving specific services (*Figure 7*). Considering the total number of dependant surrounding localities the towns were divided as follows:

- *Towns with weak sanitary influence areas* in which the inhabitants of as much as 10 surrounding villages travel towards it., as in the case of Hârlău, Săveni, Vatra Dornei, Moinești, Darabani, Trușești, Câmpulung Moldovenesc, Murgeni, Buhuși, Siret, Târgu Ocna, Comănești and Solca.

Hârlău, a small town in the north-west of Iași County, gathers inhabitants situated at an average distance of 6.37km. In three cases: Tibana, Mironeasa and Gorban the population is travelling to different countries to get to the nearest hospital: Negrești in case of the first two and Huși for the latter. Vatra Dornei due to its position in mountainous areas has an even higher average travelling distance, 23.12km and six out of the ten localities from its influence area are at more than 20km away. The same characteristics are valid to a lesser extent for Câmpulung Moldovenesc, Târgu Ocna and Comănești. The economic importance of the town Siret is given mostly by its geographical position being situated at the border of the country. Only seven villages have immediate access to this town. All of them are relatively close as three are no further than 5km and 3 are at distances between 10 and 20, only Bîlca is at 24km.



Figure 7. Regional analysis of the sanitary influence areas

• *Towns with average sanitary influence areas* in which the inhabitants of as much as 20 surrounding villages travel towards it, as in the case of other thirteen towns: Rădăuți, Suceava, Fălticeni, Piatra Neamț, Bârlad, Dorohoi, Târgu Neamț, Huși, Gura Humorului, Onești, Pașcani, Bicz, Negrești. The largest city in Suceava county and disposing of one Municipal Hospital the town bearing the same name is the target of inhabitants from nineteen surrounding villages. Unlike the other counties analyzed most of the villages (twelve to be more

exact) are in distances varying from 11 to 19km, six of them are at maximum 10km away and only one is further than 20km. A similar situation is representative for the localities for which Fălticeni is the most accessible centre in the sense that the proportion of each category of distances is more balanced than in the other counties. Out of nineteen surrounding localities two are in a 5km area, six are 5 to 10km away and six in 10 to 20km, the rest of five are more than 20km away.

From a geographical point of view the cities Târgu Neamţ and Piatra Neamţ represent a border line between the sub-Carpathian and the Carpathian regions of the county and between the two of them they share the dependency of over 170 000 inhabitants of the surrounding villages. Piatra Neamţ due to its central territorial position has within its influence area 18 villages. Out of those 18 villages three are less than 5km away, two are within 5km and 10km away and a majority of eight are situated up to 20km away. The rest of five villages are at distance between 25 and 38km. Out of the sixteen villages that depend on the town Târgu Neamţ one is less than 5km, three are within a 10km range and eight villages are as far as 17km. Only four of them are further than 20km away. Bicz is situated at the end of the railway that connects Bucharest and the rest of the North-East region of the country with Neamţ County. Twelve surrounding villages depend on the hospital unit in Bicz and eight of them are situated at distances bigger than 20km, even as far as 62km in case of villages like Fărcaşa and Borca. Only one village is situated at 16km and another three are closer than 10km.

- *Towns with strong sanitary influence areas* in which the inhabitants of more than 20 surrounding villages travel towards it. This category is made out of Iaşi, Bacău, Vaslui, Botoşani, Roman and Târgu Frumos.

In Iaşi County the territorial distribution of the hospitals is unbalanced and this causes 63.48% of the County's population to migrate towards the city of Iaşi. The average travelling distance is 24.8km and although twenty-four out of the forty-four villages are situated at more than 20km away, due to the fact that the County is situated in a plains area

the infrastructure has direct roads or railways which shortens the distance between the settlements. The second largest urban centre of the County is Târgu Frumos. There is only one locality less than 5 km away from Târgu Frumos, six at a distance between 5 and 10 km, ten localities at 10 to 20km away and eight further than 20km away. There are forty-six villages within range of Bacău and the average travelling distance is approximately 27 km. Out of the forty-six villages only two of them are at the less than 5 km away from Bacău, 6 are at a distance between 5 and 10 km, ten are at 10 to 20 km away and twenty-eight of them are further than 20 km away. The only town from Neamţ County that made it into this category is Roman and this fact is a result of the fact that it is the only urban centre disposing of a hospital unit in the south-western part of the county thus representing the target inhabitants from 25 villages. The maximum distance to travel is 33km and the inhabitants of more than half of the villages are within 19km distance of Roman.

Conclusions

The population accessibility to basic health care units (hospitals) is directly linked to the distances the population needs to travel in order to reach it. A second important factor is the population mental image and perspective over the respective hospital; in situations when a village is situated at similar distances from two hospitals the average person will tend to travel towards the bigger or most important one (in case like Buhuşi vs. Piatra Neamţ, Piatra Neamţ's hospital will surely be the most likely target even if the distance to it is slightly bigger than the one in Buhuşi).

The major factors influencing the number of kilometres needed to be travelled by the average person from this region are:

- The size and density of the villages within the County's territory;
- The existing transportation network (European, national and local roads and railways);
- The type of relief in which villages are located with a direct influence over the shape and size of the transport infrastructure.
- The territorial distribution of the hospitals.

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