SOME OBSERVATIONS ON THE OPTIMIZATION
OF PRE-HOSPITAL EMERGENCY MEDICAL SERVICES
FROM THE CITY OF IASI, ROMANIA

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SOME OBSERVATIONS ON OPTIMIZATION OF PRE-HOSPITAL EMERGENCY MEDICAL SERVICES FROM THE CITY OF IASI, ROMANIA (Abstract): In the Iasi City, with a population of 825,100 inhabitants, the number of requests for ambulance service has increased steadily for the past 17 years. One of the determining factors could be the development of the primary health care prevention. 

Material and methods: We take into study some factors which consider influencing the reorganization of emergency medical systems in the Iasi City territory. 

Results: According to the spatial analyzes, distribution of health units in Iasi City is concentrated type, developing in the downtown area, where there is also a high accessibility to health care services. There are some areas with a high population density, have low accessibility to hospital units, due to the presence of spatial network railroad as a spatial barrier, limiting interaction with other areas of the city. 

Conclusions: The analysis of optimization concept of Medical Services in a city like Iasi is about the challenge to understand the impact of the population health towards the development and organizing the territory, and, interrelated, how we can improve the population health by the best possible organization. 

Keywords: AMBULANCE SERVICE, HEALTHCARE, EMERGENCY CARE UNIT, CENTRAL PLACES THEORY

The evolution of the health status of the population is a phenomenon that could not be anticipated, but factors that influence it positively or negatively could be identified. Thus, situation is contradictory: although we live in a time when innovations in healthcare are increasingly diverse, living standards higher than that of previous periods, we are witnessing a growing demand for emergency medical services.

The Ambulance Service of Iaşi (A.S.I.) is a strategic medical unit, with legal personality and its specific work on standby 24 hours from 24, 365 days per year. A.S.I. is subordinated to the Department of Public Health Iasi. A.S.I. provides pre-hospital emergency care, both at application and during transport of patients (sick, injured, pregnant women) to the hospital. In addition, A.S.I. provides ambulatory care at the request, but also non-medical transportation. A.S.I. answers telephone calls coming from people and various medical units, with an average of 150 requests in 24 hours to about 4,500 requests a month, with a distribution of structurally relatively equal.
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There is a higher share of major emergencies (disaster emergencies, collective and individual emergencies), followed by those of second degree and medical transport.

MATERIAL AND METHODS
Pre-hospital emergency medical services and medical transportation are provided of County Ambulance Service of Iasi (C.A.S.I.), for a population of 825,100 inhabitants (in 2008), of which 393,389 urban and 431,711 rural population. To better resolve requests, C.A.S.I. has organized ambulance substations in 9 towns in the county (Pașcani, Hîrlău, Tg. Frumos, Bivolari, Răducăneni, Podu Iloaie, Mircești, Vlădeni, Țibănași).

We take into study some factors which consider influencing the reorganization of emergency medical systems in the Iasi City territory.

RESULTS AND DISCUSSION
The number of requests for ambulance service has increased steadily for the past 17 years. One of the determining factors could be the development of the primary health care prevention.

![Graph showing the number of requests from 1995 to 2011]

\[ y = 2110.7x + 81498 \]
\[ R^2 = 0.7483 \]

**Fig. 1.** Evolution of the number of requests in Iași (1995-2011) (source: C.A.S.I.)

<table>
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**TABLE I**
The evolution of the ambulances number during the period 2006-2012 (source: C.A.S.I.)
The situation of fleet of ambulances is not good, according to European standards, if we consider the optimal number of ambulances reported to the population served (an ambulance with stretcher to 5000 inhabitants). Thus, at the end of May 2012, the situation was as follows: 38 ambulances, of which 4 are Resuscitation and Intensive Care Ambulances (C1/C2) and 18 are Emergency Ambulances and Resuscitation (B1/B2), 8 unassisted ambulance transport (A1/A2) and 8 unclassified (T1/T2) with crew formed by healthcare specific activity of 1, 2 or 3 people, including: physicians, nurses and ambulance drivers. These ambulances are sent to the area to resolve the 150 requests on average in 24 hours, a number that increases by 30-40% in case of outbreak (tab. I).

Force medical personnel consisted of 12 physicians, 121 nurses and 91 ambulance drivers (drivers trained to be the third person who fills specialized emergency response crew of the ambulance), at the end of May 2012. Program staff is working four shifts (day and night, 12-24, 12-48). Of the 15 hospitals of Iasi County, nine of them take major and second degree emergencies of the entire county, such as: "St. Spiridon" University Emergency Hospital, "St. Mary" Emergency Hospital for Children, "Elena Doamna" and "Cuza Voda" Obstetrics and Gynecology Hospitals, Clinic Hospital of Neurosurgery, “C.I. Parhon” Hospitay, TB Hospital, “St. Paraskeva” Infectious Diseases Hospital, “Socola” Psychiatric Hospital”.

According to the spatial analyzes, distribution of health units in Iasi City is concentrated type, developing in the downtown area, where there is also a high accessibility to health care services (fig. 2, 3).

At first glance, the two maps do not differ too much. The focus of accessibility around of medical services is observed. This fact respects Central Places Theory conducted by Christaller and Lösch (central places are the result of conscious choices of places optimal location). Even if in these cases central places are not chosen by default, the hospitals focus only in a specific area of the city offers a high degree of vulnerability of most outlying addresses or buildings. Thus, in case of emergency, a large proportion of Iasi remains in areas which could consider not accessible or accessible to a longer time interval, comparatively with emergency medical facilities. In addition, the costs to serve that population are increased.

We measured ease of movement or reaching the place from the population addresses - barycenters buildings, respectively - to the nearest hospital. The situation would be different if we take into account that every hospital has one highly specialized profile. We have achieved this mapping by using the Network Analyst function. Neighborhoods in the northwest, west and southeast, such as Pucurari, Canta, Dacia, Nicolina, CUG, Bucium, with a high population density, have low accessibility to hospital units, due to the presence of spatial network railroad as a spatial barrier, limiting interaction with other areas of the city.

The problems of Pre-hospital Emergency Medical System (EMS). Despite the well-established structure of the Romanian health system (primary care, local clinics, hospitals, emergency care unit ECU, and pre-hospital medical units), in the emergency medical services gaps appear different from the education of the public, to the treatment and resolution of cases.
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Fig. 2. Accessibility of public addresses to the nearest hospital (Iasi, Romania)
Fig. 3. Accessibility of central points of buildings (barycenters) to the nearest hospital (Iasi, Romania)
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Education of the population is the way to prevent and treat some diseases, the attitude to the disease and how they require and expect to be given pre-hospital first aid. Western European countries have placed great emphasis on education of the population, leading to a better functioning of ECU and a growth of the population state of health (the prevention of major emergencies - secular people learning first aid medical).

In addition to public education, another problem is the lack of cases screening at the level of the primary health care, leading to overuse of pre-hospital emergency services for cases that can be resolved in family physician's office. The lack of a complex hospital unit where various cases could be admitted, fully equipped for diagnosis and treatment, leads to situations of patients’ transfer, that endanger the state of it, and their resource consumption and wastage, both of those material and human.

Infrastructure is an impediment to the proper conduct of business by covering large distances, congestion because the permanent works to rehabilitate it. In addition to road infrastructure, that informational is insufficiently used. Another weakness of the Romanian medical system is the ratio between healthcare personnel and the deserved population, including the situation of the ECU also.

CONCLUSIONS
The concept of optimization underlies real need of improve Medical Services and, thus, the population welfare. Therefore, the analysis of this issue is about the challenge to understand the impact of the population health towards the development and organizing the territory, and, interrelated, how we can improve the population health by the best possible organization. This understanding requires not only the knowledge of the medical system problems or territory, but also the interdependencies that occur between the two.

REFERENCES