



## **SOME ASPECTS REGARDING INFANT MORTALITY IN DOLJ COUNTY BETWEEN 1966 AND 2006**

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### **SYNOPSIS**

**Key words:**  
infant mortality,  
demographic index,  
Dolj county.

The infant mortality is one of the most important factors that characterize the health state of the population. The present study aims at rendering the evolution of the infant mortality rate within Dolj county for a period of four decades at the level of the administrative-territorial units and according to the environment where the deaths of under 1 year of age were registered. The second objective is to emphasize the structure of the infant mortality rate according to the death age. Other important objectives of the present study are to identify and make a hierarchy of the causes triggering the death of under one year of age and to analyze the main risk factors that may induce infant mortality.

### **INTRODUCTION**

According to the Explanatory Dictionary of Romanian Language (DEX, 1998) the infant mortality represents the frequency of deaths in the first year of life to one thousands alive born babies (Latin mortalitas, -atis). Erdeli G. et al (1999) defines it as being the specific mortality upon the age, expressing the intensity or the frequency of infant deaths (under the age of one year) within a population.

The infant mortality is defined as a demographic phenomenon of deaths intensity of the new born babies (up to one year) from the underpopulation of alive new born babies and can be seen and treated as a particular aspect of the specific mortality according to the age category.

This demographic indicator has a particular importance within the population of a state, because, on one hand, it reflects the perspective of the respective population, and on the other hand, indicates welfare under a synthetic shape, the educational

level, and the civilization of the respective collectivity.

The level of this demographic phenomenon depends on numerous factors related to the general education level of masses, the sanitary education, the feeding patterns, on one hand, and on the other hand, to the network and the efficiency of pediatrics medical system. In other words, in comparison with other demographical indicators the dimension of which is greatly influenced by the economic factors, the infant mortality is more under the impact of educational, psychological, cultural variables (Trebici & Hristache, 1986; Babeanu & Moldoveanu, 2004).

**Study area.** Dolj County is located in the south-west of Romania, the mathematical coordinates that define its position being the parallels of 43°43' and 44°42' northern latitude and the meridians of 22° 50' and 24° 16' eastern longitudes.

The geographical space of Dolj County is characterized by a large surface (7,414 sq km representing 3.1% of the country surface, which makes it hold the fifth place among the Romanian counties), by the predominance of low landforms (floodplain, plain and small hills that do not exceed 350 meters altitude), by specific climatic features (on the background of a temperate continental climate with sub-Mediterranean influences, there develops a topoclimate characterized by a long drought period and high temperatures in the South of the country), by a rich hydrographic system (the Danube represents the southern limit on a distance of 150 kilometers, the Jiu River crosses the county on a North-South direction, the secondary river system, lakes, basins, pools).

The features of the landscape and of the human settlements, at which there can be added the demographic potential (715,989 inhabitants representing 3.3% of the country population) define a geographical space marked by economic and social mutations.

## MATERIAL AND METHOD

In order to elaborate this study, the statistical data provided by Dolj Statistics Bureau and by the Sanitary Direction of Dolj County for infant mortality rate have been used as basic materials. The data processing and organization took into account the period 1966-2006, as there has been calculated the infant mortality rate. For the territorial analysis, we have used the following reference years – 1966, 1977, 1989, 1992, 2002 and 2006. According to the values of the studied indicator, we have drawn diagrams and maps which aim at rendering the situation both at the county level and on the two main social environments (urban and rural). The research methodology was based on the use of statistical-mathematical methods, statistical correlations, analysis and synthesis.

## RESULTS AND DISCUSSIONS

The dynamics of infant mortality is directly linked to the social-economic development and to the life standard of the population. Also, the evolution of this indicator has to be reported to the situation registered at the national level (Fig. 1.).

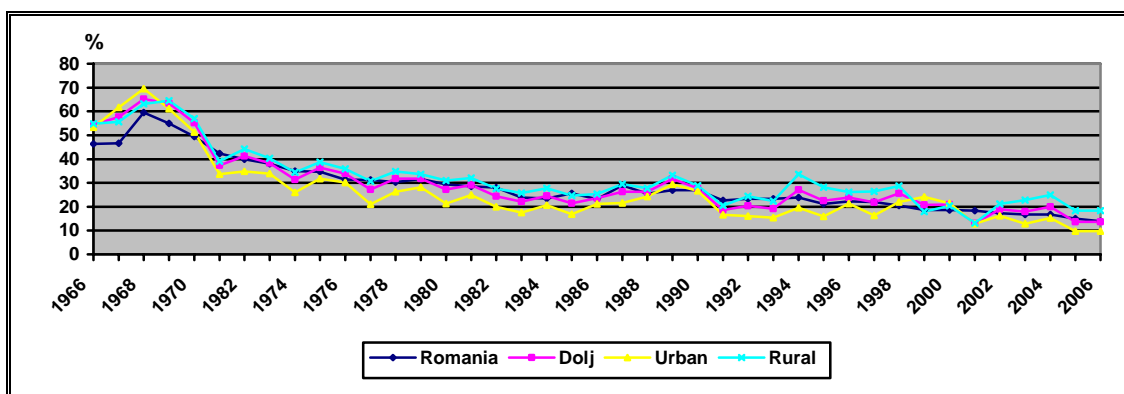


Fig. 1. The dynamics of the mortality rate in Romania and in Dolj county (urban and rural areas)

During the period 1966-2006, the rate of infant mortality in Romania and in Dolj county registered decreasing rates, which had been accentuated during the last few years. (Anuarul Statistic al Romaniei, 2007; Anuarul Demografic al judetului Dolj, 2007). From the point of view of the evolution four periods can be identified:

- the 1966 – 1969 period is marked by a positive evolution, reaching a maximum rate (in the year 1968) of 59.5‰ at the national level and 65.1‰ within the county of Dolj. This positive trend is the result of the restrictive legislation regarding abortion. Consequently, the birth rate had a sudden increase, from 14.3 live births per 1,000 people in 1966 to 27.4 live births per 1,000 people in 1967 in Romania, and from 13.2 live births per 1,000 people in 1966 to 27.1 in Dolj. Dumitrache (2004) states that the laws imposed for sustaining the birth rate did not mirror the relatively few possibilities of the majority of the population to raise and care for a great number of children, the society being forced to use various non-medical methods for regulating these situations.
- the period 1969 – 1978, is characterized by a constantly decreasing tendency; it registered a decrease from 54.9‰ to 30.3‰, respectively from 63.4‰ to 31.7‰ in Dolj county;
- the period 1978-1996 is strongly oscillatory, with annual variations which go from 31.6‰ in 1979 to 21.2‰ in 1995 for Romania and 31.7‰ in 1978 and 1979 respectively 18.6‰ in 1991 in Dolj;
- the period 1996 – 2006, where the evolution curve has a decreasing tendency, the

infant mortality reaching the maximum level of 13.9‰ in 2006 for Romania and 13.0‰ in 2001 in Dolj.

In 1966, on the background of an average of 54.4‰ the greatest part of the administrative units of Dolj county were placed over the national average, registering a maximum of 200‰ in Ordel commune. At the opposite side, there were placed the communes of Bistreț, Gogașu, Măceșu de Jos, and Urzicuța, where it had not been registered any infant death. Figure 2 indicates that the north half of the county registers higher values of the infant mortality rate, while the south-east and south extremity outlines compacted areas with few deaths of babies under the age of one year.

In 1989, the value differences of the analyzed indicator at a local level diminish, the extreme limits being 103.4‰ at Radovan and 0 in 11 other communes (Afumați, Botoșești-Paia, Ciupercenii Noi, Melinești, Perișor, Secu etc.), which are compactly located in the West and North of the county, or punctually, in the South. There is a high extension of the areas with infant mortality that varies from 20 to 50‰. In the north-western half, having a north-east – south-western orientation, there develops a compact area that displays high rates of infant mortality, with values that exceed 50‰ (Brabova, Orodol, Predești – 72.3‰). In the southern extremity, isolated, a 100‰ value is registered in Măceșu de Jos (Fig.3).

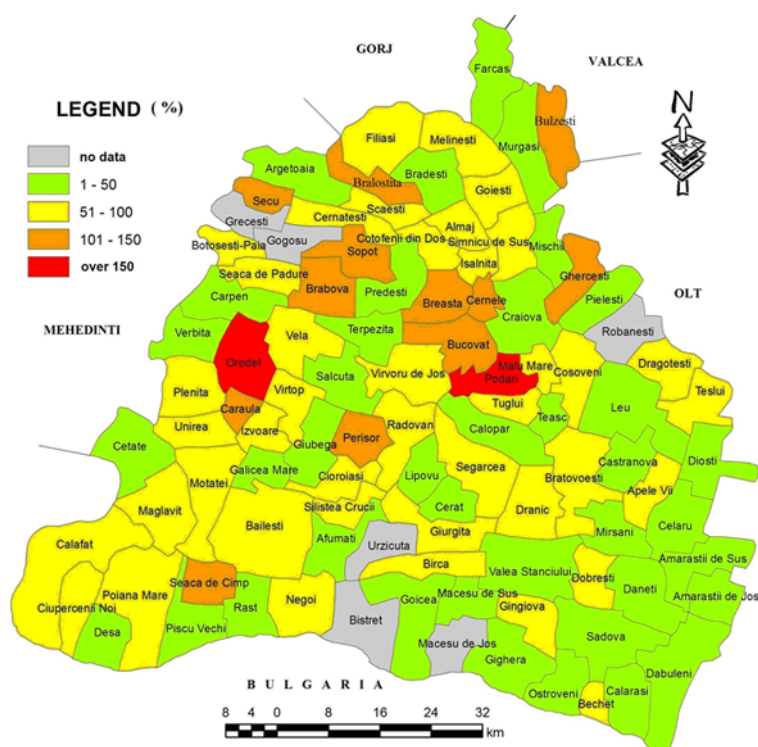


Fig. 2. Infant mortality rate repartition in Dolj county in 1966

The map rendering the territorial distribution of the infant mortality rate in 2006 (Fig.4) reflects the significant decrease of the analyzed indicator. As compared to the average of the county of 18.9‰, major part of the administrative units have lower values (in 46.8% of the total rural and urban settlements, the rate being null) and the upper ones are scarcely represented. Taking into consideration the spatial extension, there are mentioned the communes in the south-east (Ostroveni, Călărași, Sadova și Daneți) and in the central-eastern part (Podari, Malu Mare, Coșoveni, Robănești, Drăgotești), with rates from 30.1 to 60‰.

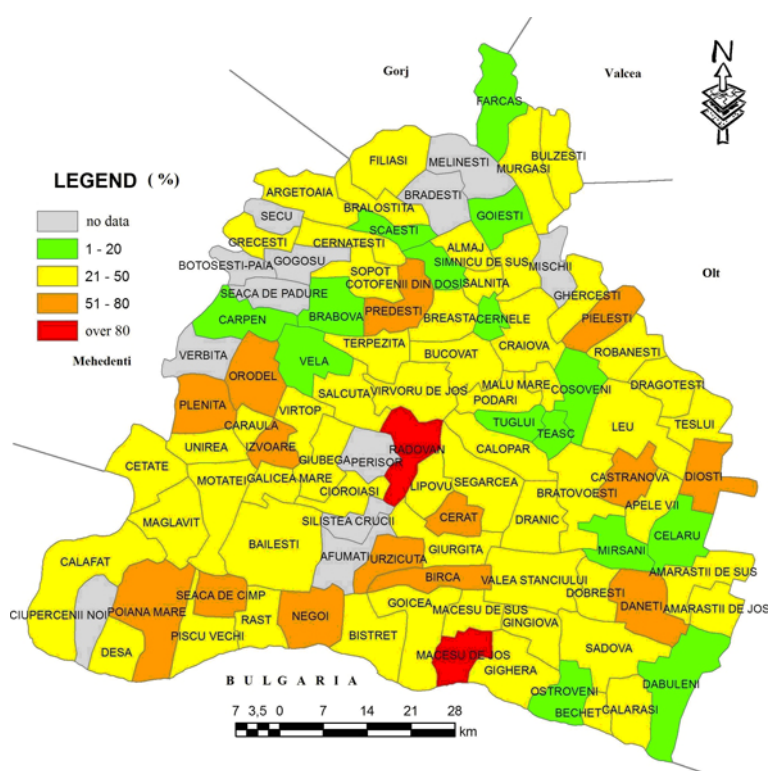


Fig. 3. Infant mortality rate repartition in Dolj county in 1989

If we compare the situation of 2006 with the one of 1966 (Fig.5), we conclude that in most administrative units, the infant mortality rate displays decreases oscillating between a minimum of 20‰ (Seaca de Câmp) and a maximum of 111.5‰ (Afumați). In 13 administrative units, the infant mortality rate increased by a minimum of 17.4‰ (Giubega) to a maximum of 131.5‰ (Murgăși), the only commune with a constant evolution being Măceșu de Jos.

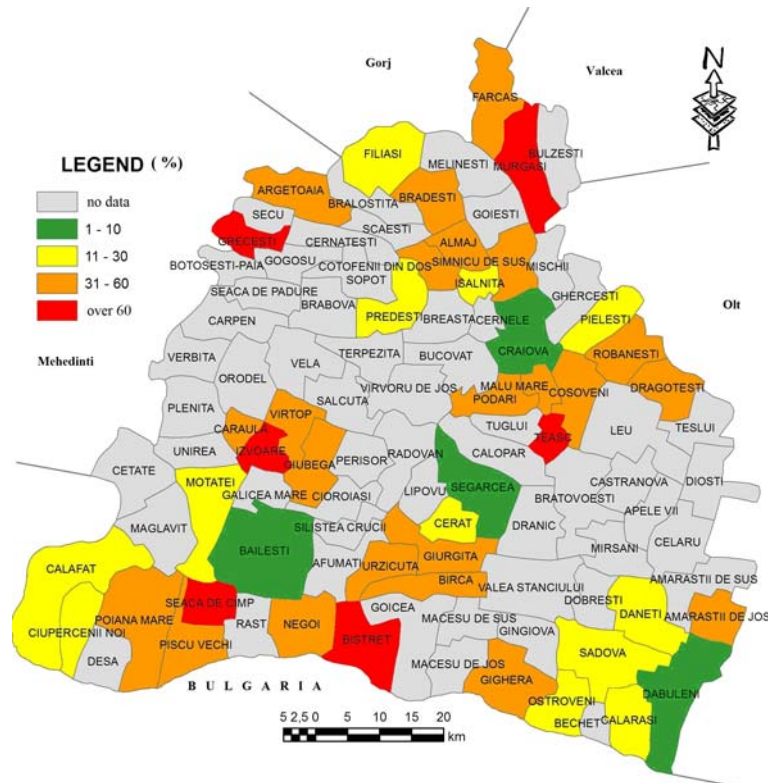


Fig. 4. Infant mortality rate repartition in Dolj county in 2006

The analysis of the statistical data in the period 1966-2006, regarding the deaths of under one year of age babies, depending on various provenience areas (Fig.6), demonstrate the predominance of the ones in the rural areas. Thus, from an overall of 13,514 deaths under one year of age, 9,018 (66.7%) came from rural settlements. In the analyzed period, the values of infant mortality rate in the rural areas varied from 54.8‰ in 1966 to 18.4‰ in 2006, reaching a maximum of 64.5‰ in 1969 and a minimum of 13.1‰ in 2001. In the urban areas, the values varied from 53.4‰ to 9.8‰, the extreme limits being 69.5‰ in 1968 and 9.8‰ in 2006. The evolution of this indicator is relevant to be pointed out at the level of each town (their number raised from 5 in 1966 to 7 in 2006). In the context of a general regression, the stressed diminutions are to point out in the cases of Băilești, from 90.9‰ in 1966 to 9.7‰ in 2006 and Calafat, from 88.1‰ in 1966 to 14.2‰ in 2006.

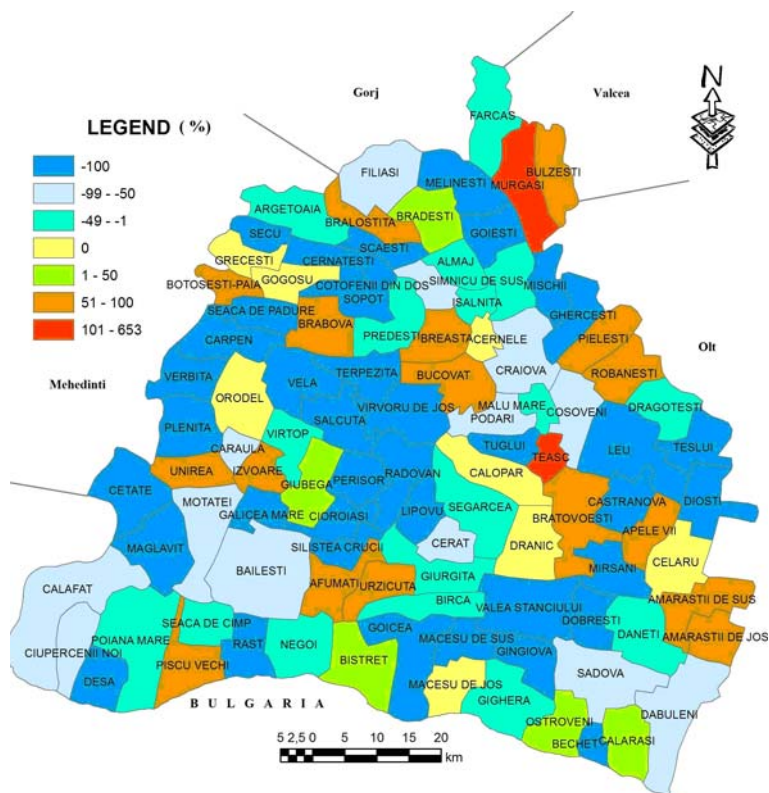


Fig. 5. Infant mortality rate evolution in Dolj county in 2006 as compared to 1966

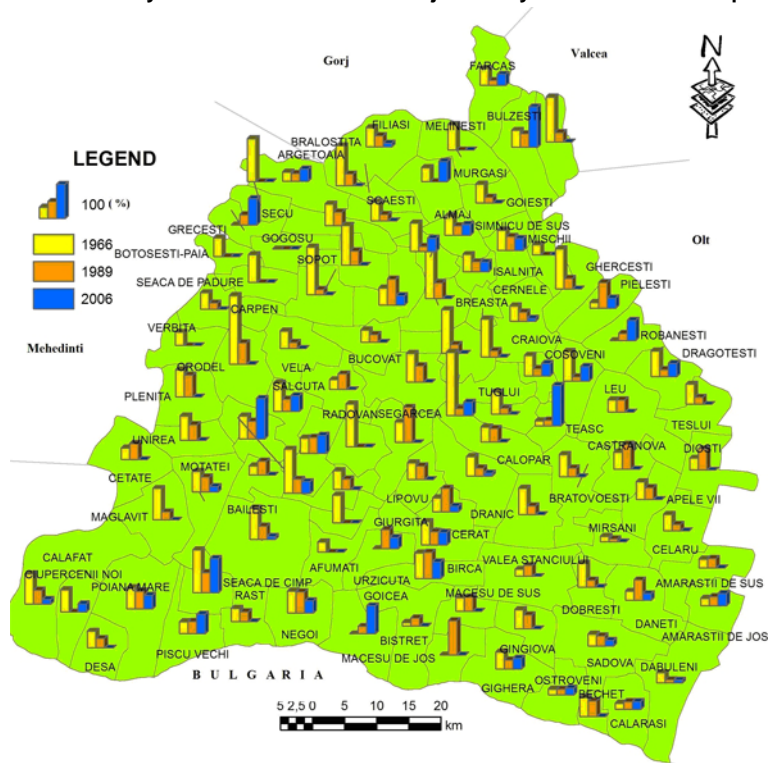


Fig. 6. Environment-related infant mortality dynamics (1966; 1989; 2006)

When dealing with the distribution of the deaths on age groups, we can observe an unequal infant mortality, the most exposed age being the first month, and, within it, the first week. Usually, infant mortality is analyzed taking into consideration the following age groups: the infant mortality within the first week (0-6 days), also known as precocious mortality, the infant mortality within the first month (0-27 days), also known as neonatal mortality and the latest months mortality (28 days –one year), also known as postneonatal mortality. (Belloiu, 2000)

From the point of view of infant mortality age structure, about 60-65% of under one year of age deaths are registered 27 days later, the best emphasized in this aspect being postneonatal mortality. The tendency of neonatal mortality to reach postneonatal mortality was registered in 1987 and 1996. In 1991, 1998 and 2002, neonatal deaths exceeded the postneonatal ones. The neonatal mortality's tendency to increase, in the context of a high postneonatal mortality is further on maintained (Fig.7). Regarding neonatal mortality, 62% of the cases occur during the first 6 days of life, from which 18% within the first 24 hours. Concerning postneonatal mortality, 58% of the cases take place up to 4 months of age. Therefore, we may conclude that the high intensity of under one year of age deaths are registered in the first week of life and decreases until reaching one month; afterwards it becomes intense again up to 4 months old, highlighting a progressive decrease until reaching one year of age.

All these considered, 78% of under one year of age deaths occur in up to 4 months old babies. The infant mortality within the first week of life, together with the rate of still-births (perinatal mortality) varies between 14.2 and 18.4%, higher value as compared to the national average (12.9%).

**Deaths under one year of age, by cause of death.** Among the causes which determine the deaths under the age of one year are: diseases of the respiratory system, congenital malformations, diseases of the digestive system, infections and parasitic diseases, injury, poisoning and other consequences of external causes etc. (Ritli, 1996) (Fig. 7.)

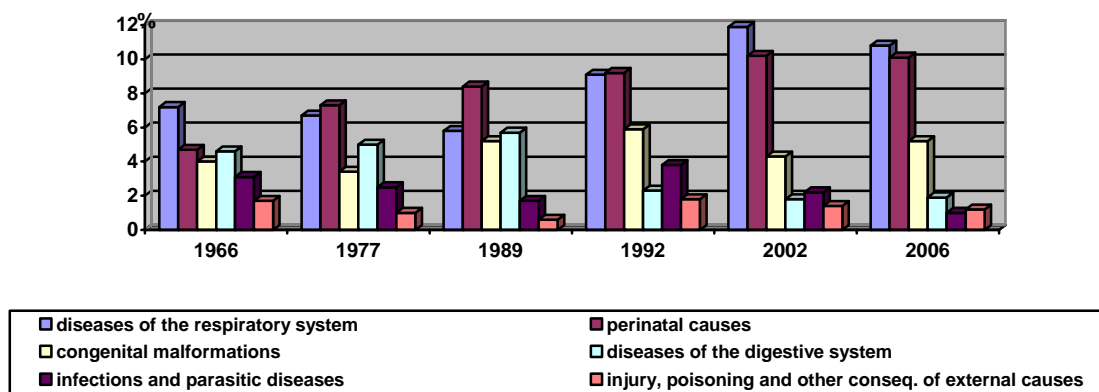


Fig. 7. Specific infant mortality (reporting to 1,000 born alive infants)

The analysis of the number of infant deaths depending on the main causes of death gives the general pattern for death rate for this age. During the analyzed period, the main causes of infant death rate were diseases of the respiratory system, diseases originating in the perinatal period and congenital malformations, representing 79.8% from the total number of deaths.

*The diseases of the respiratory system* represent the causes for most of the deaths (31.1%). Among these diseases, the acute pneumonia predominate, representing 30.9% of the deaths, with oscillations of 5.8 – 11.9 deaths to 1000 live born babies. Viral and bacterial etiologies are represented in almost equal percentages. The deaths caused by respiratory diseases occur especially during the post-neonatal period (92.4%). The percent of male deaths is higher than the one of female deaths, and in the rural areas the frequency of infant death rate due to respiratory diseases is higher than the one registered in the cities.

*Diseases originating in the perinatal period* are at the second place in the hierarchy of causes determined by the deaths of children under one year of age, representing 26.9% of causes. The annual variations are quite high, between 4.7 and 10.2 deaths to 1000 live born babies. It is remarkable that since 2002 this category of diseases represents the first cause of infant death rate, meaning that the Dolj county pattern is included within the general pattern of the country, where the first place is occupied by the perinatal diseases: obstetrics traumatism, fetal and neonatal hemorrhages.

*Congenital malformations, deformations and chromosomal abnormalities* represent 21.8% from the total number of deaths during the first year of life. In cases of congenital malformations, the highest percentage (47.7%) is held by the malformations of heart and respiratory system. Among the patients deceased because of congenital cardiopathies, an extremely small number of children under one year of age had been subject to surgery. This therapeutic procedure decisive for the patient life in certain situations is almost inaccessible in our country because of the precarious technical conditions and due to reduced capacity of the cardiac surgical centers to receive nurselings. In the same time we can notice the lack of addressability from parents and doctors, even in situations when a surgical intervention may be possible.

*The diseases of the digestive system* (5,0%) have annual oscillations between 1.8 and 5.7% of deaths percentages. Gastritis, non-infective gastroenteritis and colitis are the most frequent (approximate 72%). Most of the deaths occur during the post neonatal period for babies of 3 – 6 months. Until 1990, the infant death rate caused by digestive diseases had an increasing trend, subsequently the sense of evolution changed, and it stabilized during the last two years analyzed.

*Infectious and parasitic diseases* (13.2%) vary between 1.7 and 3.8 deaths to 1000 live born babies and are represented by diarrhea, gastroenteritis of infectious nature and meningococcus infections. The year of 1980 marks the disappearance of

deaths caused by scarlet rash until 1992, when this disease reappears as a cause of infant death rate.

Accidents, burns, intoxications represent 1.9% of the deaths, having a death rate of 0.6 – 1.8 of the cases for 1000 live born babies. Most of the cases have been represented by accidents caused by mechanical stifle, by aspiration of gastric content occurred during the night, usually at home, for nurslings between 3 – 9 months, exclusively in families with precarious conditions, having a poor education. Stifles by alien bodies are not rare (medicines, metallic objects). Every year there are registered 1 – 2 cases of infanticide by negligence, the circumstances being stereotypical: the nursling, while sleeping with his mother, suffers from a thoracic compression performed by the mother's body; the mother's screwy state is almost all the time obvious.

Rare are the cases of *traffic accidents, accidents by falls or intoxications with carbon monoxide or nitrates (0,1%)*. The later came especially from the localities situated in the south of the county, where the quality of water within the wells is affected by the chemical pollution.

The causality of deaths concerning the age, emphasizes the predominance of perinatal causes and malformations to new born babies, as well as the predominance of the diseases of the respiratory and digestive system at nurslings.

**Risk factors in infant death rate.** According to the Epidemiological International Association Dictionary, risk factors constitute attributes (age, gender, birth weight etc.) or exposals (characteristics of the physical environment, nourishment etc.), associated with the appearance of an unfavourable result with high probability (disease, decease, complications).

Risk factors represent circumstances of an extreme environment or biological particularities of a person which confers a high vulnerability percentage to the organism towards the aggressive agents. In specialized studies a series of factors are mentioned, which may generate infant death rate, such as: endogenous factors, mother-child system, environmental and social factors. (Popescu & Arion, 1982; Enachescu, 1987)

Among *child-related factors* we can mention: birth weight, newborn's gender, malformations, rachitis, nourishment, nutrition dysfunctions, anemia, acute being taken ill etc.

*Low birth weight* – equal or under 2500 g – respectively prematurity and dismaturity, constitute a health problem considering its frequency and important weight that contributes to the appearance of infant death rate. World Health Organization defines the premature as being the newborn with a pregnancy age below 37 weeks, weight under 2500 g and height below 47 cm; the dismature is defined as a newborn having weight below 2500 g and a pregnancy age over 37 weeks. The frequency of low birth weight varies from one area to another, between 4-15% of the

alive born babies and a third of them are dismature. Low birth weight has been emphasized at 878 children (37% of the deceases). The percentage of this category of premature and dismature nurselings has the tendency to grow lately among the deceased. The most recent studies made by The Medical Heading in Dolj county highlight an increasing percentage of the 1000 to 1999 g category among the low weight alive born babies. In 2002, increasing death rate at premature babies could be also explained by the higher percentage of low degree premature babies. Main factors that influence prematurity in Dolj county are socio-familial and nutritional ones, the consumption of tobacco before and during pregnancy, previous abortions.

Concerning *the gender of the baby*, it is well known the fact that there is a much higher male death rate at nurselings' age, but also at other ages, is probably determined by the particularities of genetic control regarding the development of the metabolic defense system. Nevertheless, the number of the male alive born babies is higher (51%) as compared to the female ones (49%). Recent studies highlight that at birth, masculinity index varies with the pregnancy age of the newborn; the highest index is registered between 28-35 weeks, decreases towards 41 weeks, although remaining overunitary. Instead, below 28 weeks girls are predominant or there is an equal to boys frequency. The rate of still-births is higher at younger pregnancy ages baby boys, but as approaching the term, the frequency of male dead born babies reaches the female one. Consequently, the male conception products outnumber the female ones. Given all the important losses caused by death or abortion, the number of male alive born babies remains higher. The intensity of male deaths in the intra-uterine period is not linear, being visibly high before 28 weeks, and then decreasing towards 48 weeks; boys are more vulnerable at birth, the precocious death rate being once again more intense at them. Also, we may conclude that male vulnerability towards the endogenous factors of death rate is more stressed than the exogenous ones. In the analyzed period, in Dolj County, male deaths consist of 7838 deaths in the infant death rate, meaning 58% of the total. The variation limits of male infant death rate vary from 25.3% to 36.7%, while the female one varies from 21.9% to 24.8%.

*Natural nourishment* of the newborn represents a protection factor for the young nursing. Through its qualities, the motherly milk prevents acute diarrhoea-related diseases, dystrophy and offers a good capacity of anti-infectious defence. Artificial nourishment and incorrect diversification constitute major risk factors for the health of the baby.

*Rachitis* occurs as a risk factor by lowering the anti-infectious defence capacity or, at a cell level, determining metabolic dysfunctions with multiple consequences: bone deformations, muscular hypotomy, tetany. In the analyzed period, rachitis was signaled at 230 nurselings (1.7%).

*The factors that regard the mother and the pregnancy* have a significant contribution in the incidence of infant death rate. Thus, from the point of view of

mother's age, over 35 year old mothers' babies have a higher decease risk in the first year of life than very young, below 18 years mothers' babies. During 1990-2006, in Dolj county, 18.3 % of the deceased babies had mothers below 20 years old and 0.9% over 40 years old.

*The mother's scarce education* influences her behaviour. The schooling of the deceased babies' mothers is emphasized by the fact that 56.8% have a low education level, meaning 5.1% without any kind of education and 51.7% had not finished primary school. The schooling factor, associated with the age and the mother's residence have a clear influence on babies' perception and assimilation of nourishment and hygiene rules, disease awareness, medical care addressing.

*The mother's diseases*, especially the infectious ones or the ones prior to the pregnancy are frequently discovered in the anamnesis of the deceased nurselings. An important role is certified in cases of diabetic mothers or various types of anaemia. In the latter cases, mothers' death rate diminished, but aspects regarding the perinatal pathology haven't lost validity.

*The distance between deliveries* has been recently identified as a risk factor; in less than a year cases, the low weight degree at birth reaches 15.2% and death rate may generate the decrease of a low weight risk at birth and neonatal death by 7-11%.

An important risk factor for mothers is represented by the *chronic alcohol and tobacco poisonings*. Alcoholism may be responsible for a well individualized syndrome – fetal alcoholic syndrome – which affects the conception product, but the consumption of alcohol during pregnancy also affects the weight of the baby at birth and the appearance of minor abnormalities. Tabacosis is a cause for intrauterine hypotrophy, abortion and other complications. The death rate of smoking pregnant women's babies is higher between 28 days and 5 years. The professional toxins the pregnant women are exposed to may affect the fetus in various ways.

**The environment-related factors and socio-familial factors.** Among the environment-related factors (natural and social) and familial factors, concerning the increase of the probability of deaths under one year of age, we recall: the rural environment, favouring especially the post neonatal death rate, the matrimonial state, the poor quality of the dwelling, the hard physical work performed by the mother, geographical areas with reduced access, cold season. The demographical factors can also have an influence (the structure of the fertile female population, natural mobility of population), the periods of natural disasters, starvation, etc. It seems that the social factors have an unique effect over the neonatal death rate for babies with small weight, in the same time having a remarkable effect over the post neonatal death rate, no matter of the weight at birth. Other social-economic factors studied and considered as having a predictive value for the infant death rate are: the consume of animal products, the percentage of dwellings with no potable water, excessive percent of calories by fats. (Mihaila & Bejan, 1995; Vladescu, 2000)

Within the analyzed county, the social-familial factors having an influence over the infant death rate, have been estimated to 30.0% from the deceased nurselings.

The unfavorable conditions of life within the communities of Roma are well known, but the birth rate is not entirely known within this population in Dolj county. It is just an empirical estimation (which is not supported by official statistical data) according to which the birth rate would be higher than from the rest of the population. The number of Roma nurselings deceased during the studied period is about 2270 (16.8% from the deaths under one year of age), taking into consideration that at the census in 2002, the population of Roma represented 4.3% from the entire population of the county. A study performed in 1999 by Dolj Sanitary Department, emphasized the fact that from the deaths under the age of one year, 17.3% were Roma children, representing 41.8 deaths to 1000 Roma live born babies. (Directia Regionala de Statistica Dolj)

## CONCLUSIONS

Infant mortality rate is the main indicator that characterizes the children's health state. It is influenced by an assembly of economic, social, educational, and sanitary factors. During the analyzed period, the infant mortality rate within Dolj County displayed a constant decrease. The number of deaths under one year of age registered in the rural environment holds 66.7 percent of the total number of such deaths for the period 1966-2006 and the infant mortality rates are higher than the ones registered in the urban environment. This situation may be explained by a poorer accessibility of the health care system in the rural environment, by a lower preoccupation of the rural family with regard to the new born or even the ignoring of certain disease manifestations in case of very small children due to a poor educational level of the women living in rural areas.

The increased values of the infant mortality rate within Dolj County as well as the ones registered at the national level are induced by the high rate of deaths of under one year of age from the age group 1-11 months (postneonatal deaths), which are caused by factors related to the medical assistance for the children under one year of age and by environment factors.

The main cause of death in the case of children that die before the age of one year is represented by the diseases of the respiratory system, among which we mention pneumonia. The second cause of death are perinatal affections, the rate of which increased in the last period. The congenital anomalies of the heart and circulatory system represent the third cause; the deaths induced by this category of diseases display a higher frequency in the first month of life. The diseases of the digestive system, the infectious and accidental diseases, the intoxications etc. hold a smaller rate and an obvious decrease tendency. It is worth mentioning that in the rural

environment, the deaths provoked by external causes hold a higher rate, while in urban areas, the deaths caused by perinatal affections and congenital anomalies are more frequent.

The improvement of the population's financial situation, the efficientization of the sanitary services, mothers' alimentation, medical survey of the pregnancy, more active involvement of the National Authority for the Protection of Children's Rights and of the Institute for the Protection of Mother and Child etc., all these represent elements meant to fight against the risk factors in infant mortality.

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Received: 04. Aprile 2009.