



DYNAMICS OF SOME BASIC DEMOGRAPHIC INDICATORS IN BULGARIA FOR THE LAST CENTURY

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ABSTRACT

Purpose: to describe and analyze basic demographic indicators in the last century, to discuss the opportunities for overcoming the present demographic crisis. Methods: Information from the national health statistics and the regional office of WHO in Copenhagen for the past 100 years. A descriptive analysis of the status and dynamics of basic demographic indicators in Bulgaria has been done. Results: The demographic development in the beginning of the 20-th century reflects the general tendencies resulting from the socio-economic development of the country, defining the demographic transition and change in the pattern of the reproductive behaviour. Since the beginning of the transition to market economy the long lasting tendency of decreasing child mortality rate has been stopped. The indicator's critical level is reached in 1997. A trend of decreasing child mortality rate has been marked recently but it remains significantly higher in comparison with the average for the EU countries. The dynamics of the indicators: birth rate, marriage rate, fertility, natural growth is unfavourable in the recent decades. Towards the end of the period a slight improvement occurs in the context of the severe aging of the population. The necessity of a clear concept of demographic policy of the country focusing main directions is underlined.

Key words: demographic indicators, demographic crisis, birth rate, concept, growth, demographic policy.

Current changes in the demographic status in Bulgaria are raising certain concerns that attract the attention of medical professionals of different fields. Various indicators are used to describe the demographic status. Among them of great importance are the demographic ones. They are topic of interest for us, due to their influence over children's health and role and participation of pediatricians for its improvement.

The purpose of our study is to track and analyze some basic demographic indicators, depicting the demographic status in Bulgaria for the last century, and to discuss the changes that overcome current demographic crisis (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11).

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MATERIALS AND METHODS

An official data supplied by National Health Statistics:

- Annual indicators "Healthcare" – 1959-2008 (12);
- Health indicators of National Centre for Health Informatics; basic demographic indicators; National Statistical Institute (13, 14);
- Health indicators data base HFA of Regional Bureau of WHO (15).

Using these sources an SPSS database is built (16). It lacks some data for the first 4 decades of XX-th century to be complete.

RESULTS AND DISCUSSION

Child mortality rate: Child mortality rate (infant deaths per 1000 live births) is extremely sensitive indicator for assessing population's standard of living, effectiveness and quality of undertaken measures – social and political to ensure child's well-being.

At the beginning of the XX-th century the level of child mortality rate is extremely high and reaches 131.5‰ for 1900. It stays elevated for the first 4 decades of last century: 1910 – 158.7‰; 1920 – 146.0‰; 1929 – 155.6‰; 1939 – 138.9‰.

Extremely high are the values of pointed above indicator in the postwar period in 1921 - 182.9‰ (**Figure 1**). The fifth decade (1940-1950) continues tendency of 3 digits values of child mortality rate, but they have slightly decreased from 1947 and 1950 is the year

when child mortality rate for the first time is lower than 100 - 94.5‰. The 1950-60 period is marked with stable decrease and by 1960 it reaches 45.1‰ - a value lower than 50‰. In time period of a single decade child mortality diminishes dramatically – almost twice. For the next period 1960-70 child mortality keeps its steady course of going down and ends up at 30.5‰ in 1969. Following decade (1970-1980) further lowers these values as it starts from 27.3‰ in 1970 to reach 19.59‰ in 1979.

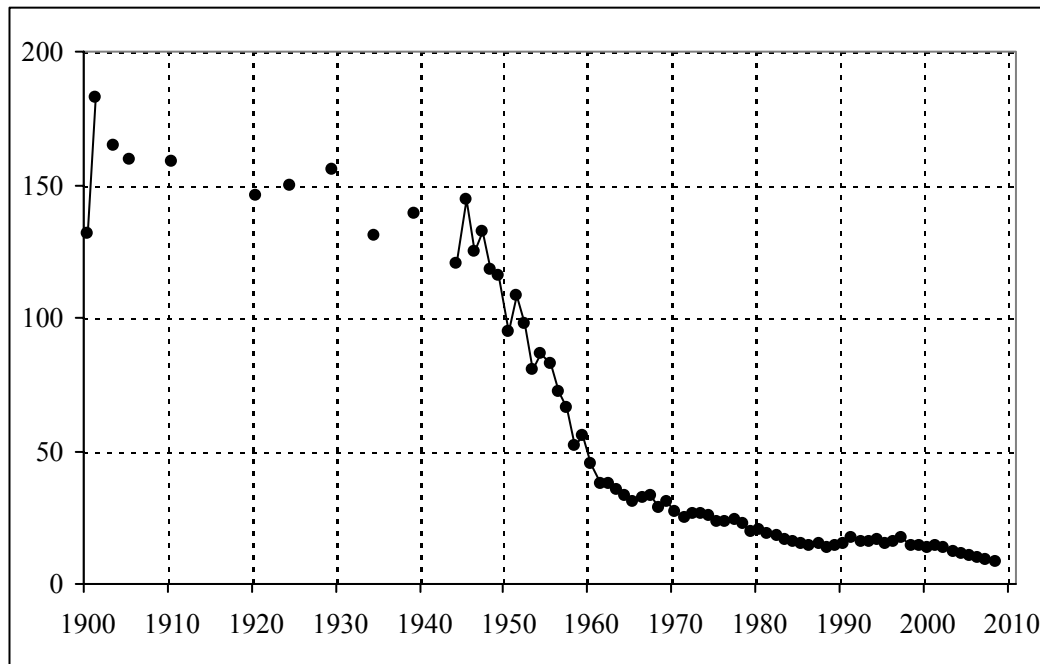


Figure 1. Child death rate in Bulgaria, 1900-2008 year (per 1000).

Child mortality in Bulgaria continues to decrease and during the next decade - from 20.24‰ in 1980 to 13.58‰ in 1988. Following 1989 the above described long term trend is disrupted. Last decade of the century is characterized with variability – 16.93‰ in 1991, and highest values: 17.51‰ - 1997. At the beginning of third millennium the observed indicator decreased (in 2000 is 13.31‰). In 2006 it goes below 10‰ - 9.7‰ and reaches 8.6‰ in 2008, which is the lowest level ever reached in Bulgaria. Using data from NSI in 2004 year 814 children up to 1 year died (child mortality indicator CMI is 11.6‰.), which is almost twice the average child mortality in EU countries (4.69‰ in 2006) and 2 points higher than average European level - 7.84‰ in 2003 (**Figure 2**).

This unpleasant evolution positioned Bulgaria in rather unfavorable situation with Poland and Hungary, which in the past had always higher rate than Bulgaria (**Figure 3**). Commenting the child mortality rate it is worth mentioning, that it's value is much higher in two of the biggest national minority groups – Turkish (17.8‰) and Gipsy (25‰) in 2002.

Child mortality rate by residence: Child mortality rate among children living in the rural area is higher than in children living in urban area for the whole period (**Figure 4**). For 2008 child mortality rate in urban areas is 7.6‰ and rural - 11.6‰. According to data from National Strategy for Demographic Development of Bulgaria (2006-2020): „...for the last couple of years the indicator in town's decreased, while in the rural areas it stays stable”(5).

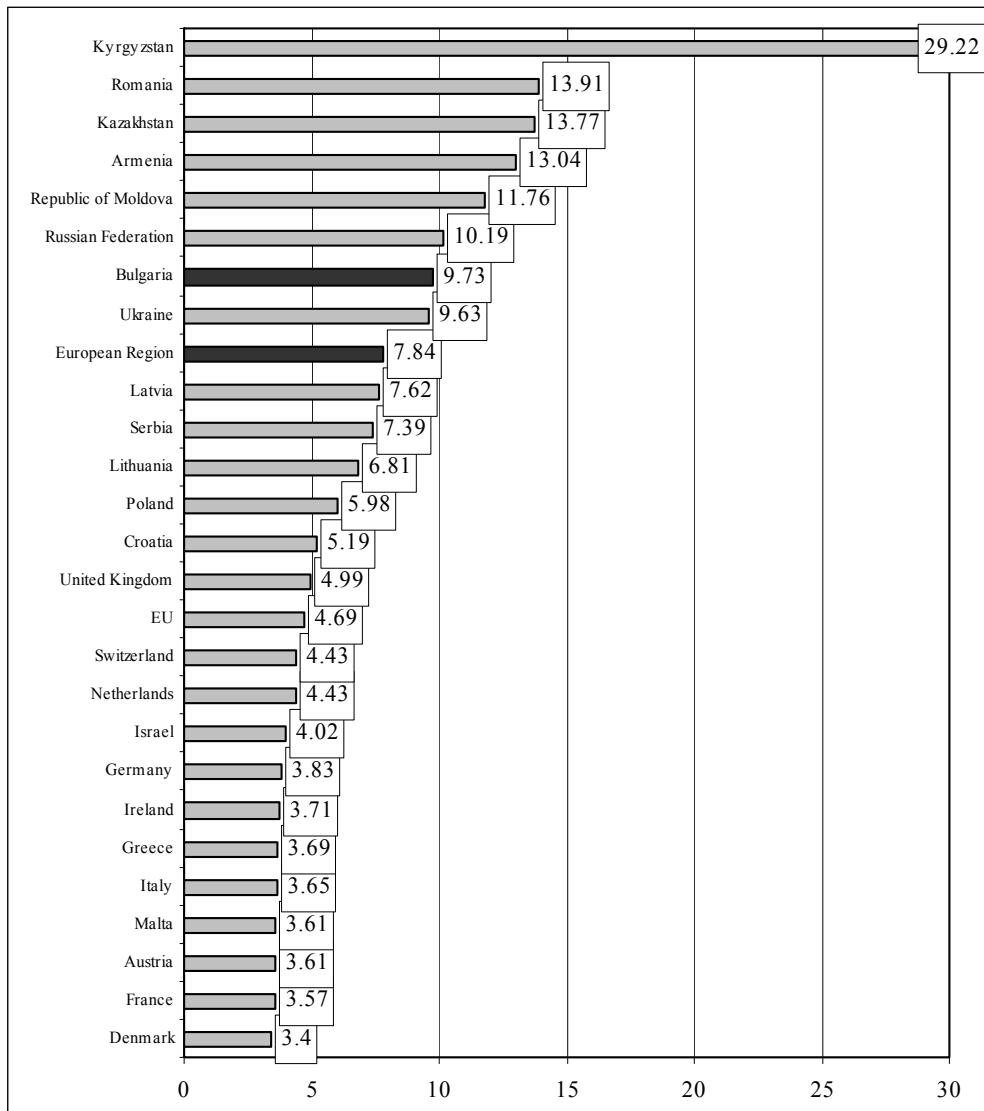


Figure 2. Bulgaria position among the other European countries according to the child death rate index, 2006 year.

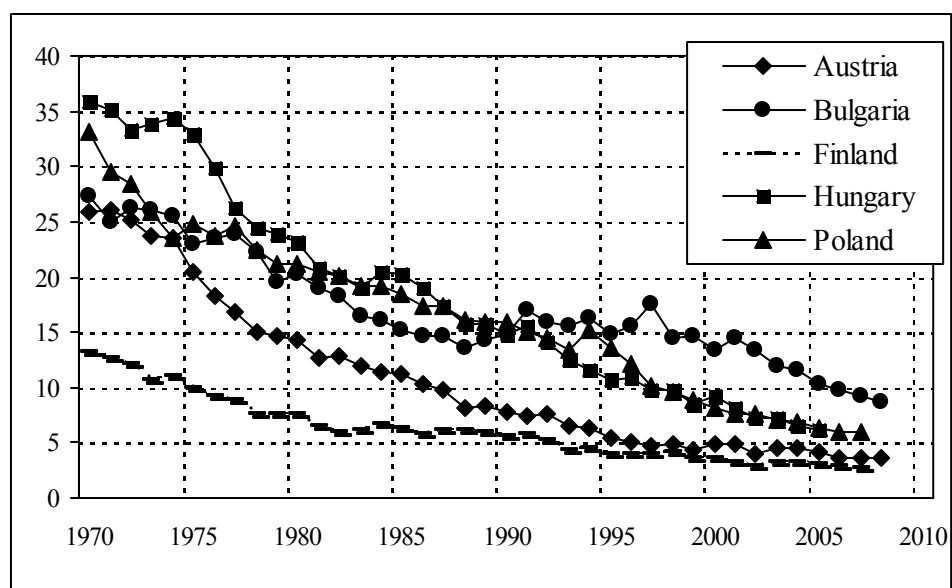


Figure 3. Child mortality rate in Austria, Bulgaria, Finland, Hungary and Poland, 1970-2008 year.

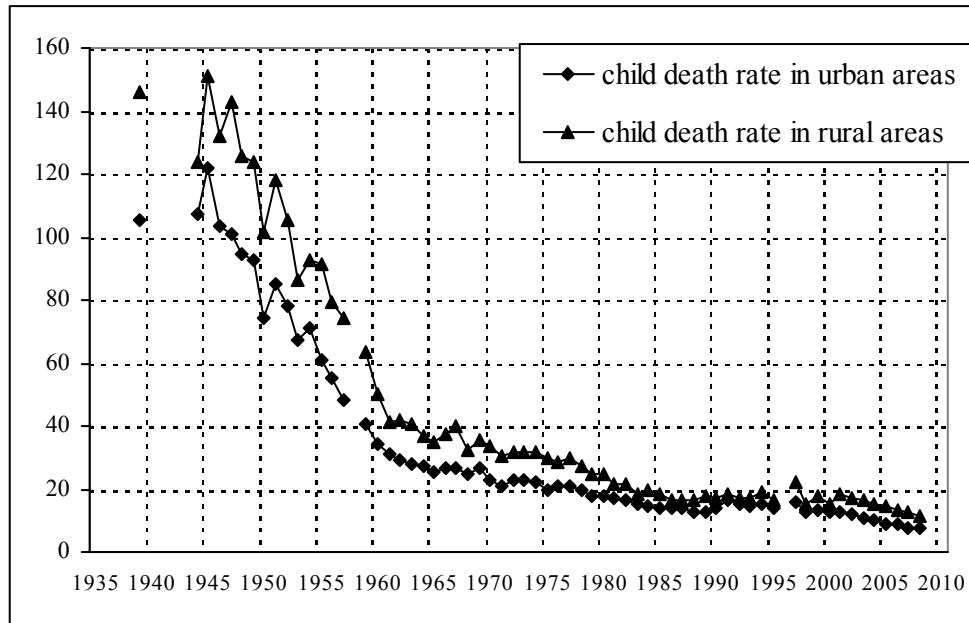


Figure 4. Child death rate in urban and rural areas, 1939-2008 year.

Child mortality dynamics by periods

The Figure 5 presents Child mortality by periods in Bulgaria (for 1960-2008 time interval) - perinatal, neonatal and postneonatal, while at the next figure (Figure 5A) is represented as early neonatal, late neonatal and

postneonatal mortality rate. Child mortality is highest during perinatal period. In the beginning of the studied period the rate of the indicator is over twice higher compared to the end of it (23.3% in 1960, respectively 11.0% in 2007).

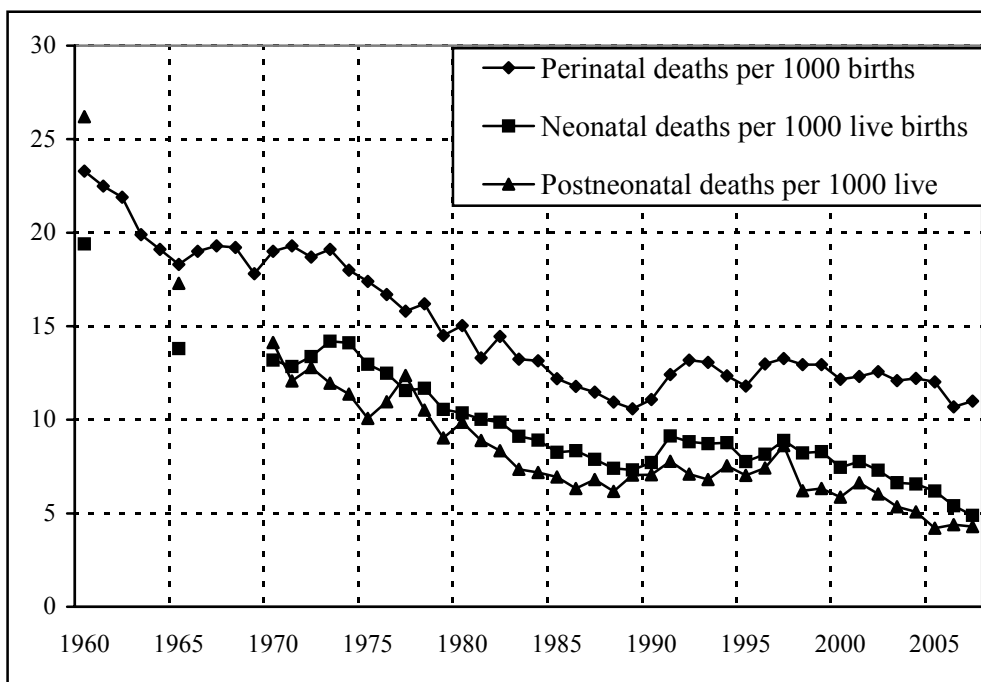


Figure 5. Child mortality rate by periods, Bulgaria 1960-2008 year.

In 60-80 period neonatal and postneonatal child mortality rate vary and they both often exchange positions. After 1980 neonatal child mortality rate permanently remains higher than postneonatal. We should point that postneonatal child mortality rate in EU for 2005 is 1.72%,

while in Bulgaria it counts for 4.20%, i.e. the difference is almost 2.5 times. In '80 neonatal child mortality rate is 10.37% and postneonatal - 9.87%. Early neonatal child mortality rate is higher than late neonatal for the whole 1970-2003 period, which is represented in Figure 5A.

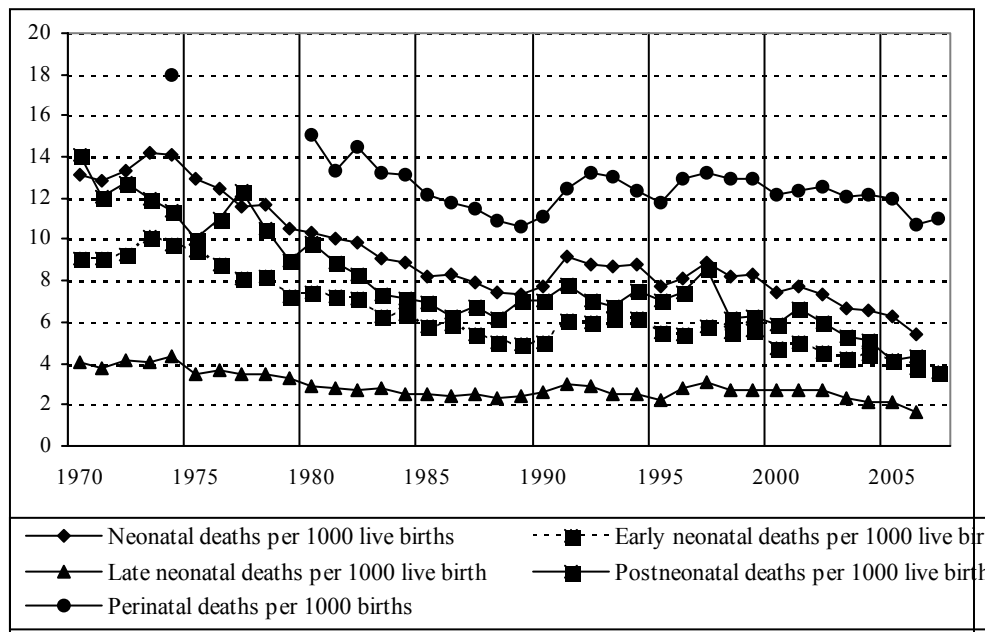


Figure 5A. Child death rate by periods, Bulgaria 1970-2008 year.

A trend toward raise of neonatal child mortality rate starts from the beginning of '90 - 1997 (7.71‰ for 1990 to 8.99‰ in 1997), to decrease to 7.45‰ in 2000 (in 2005 is 6.20‰ and 4.9‰ in 2007).

Concerning the dynamics indicators discussed above a legitimate comparison with those from the beginning of the XX-th century couldn't be made because of lack of sufficient primary data.

Analysis of the causes for death until the age of one

Analysis of the causes for death until the age of one for the beginning of the studied period shows a high mortality due to transmitted infectious diseases. Some of these are: abdominal typhus, measles, pertussis, diphtheria and dysenteric. The mortality caused by respiratory and digestive system diseases is high.

Later, after 1950 considerable changes in etiological structure of child mortality is observed as a result of purposeful and active measures taken, mainly from pediatricians, shown in Table 1 and Figure 6.

Table 1. Child death rate in Bulgaria by leading causes of death (per 100000).

Causes of death	1980	1990	2000	2007*	2008*
XV Some conditions appearing during perinatal period	665.4	393.6	438.4	388.9	360.3
VIII Respiratory system diseases	660.7	382.2	244.3	132.7	132.5
XIV Congenital anomalies	310.5	401.2	320.3	159.3	199.5
IX Digestive system diseases	99.9	24.7	24.4	-	9.0
XVII Traumas and poisoning	79.6	66.6	40.7	38.5	28.3
I Infectious diseases and parasitoses	75.7	72.3	100.4	37.2	30.9

* - by ICD, revision X

For 1980-90 period highest is the mortality caused by some diseases, developing during the perinatal period. The second cause for death in nursing age in 1980 is respiratory tract diseases. Tracked down the rate of death caused by that group diseases decreases in the

following years. This is possible because of decreased mortality caused by pneumonia and influenza. Congenital anomaly as a cause of death is growing up and from 3rd place in 1980 reaches 2nd in 1991. Despite the decreased level of the indicator in the following years, it keeps its importance as a cause of death in nursing age.

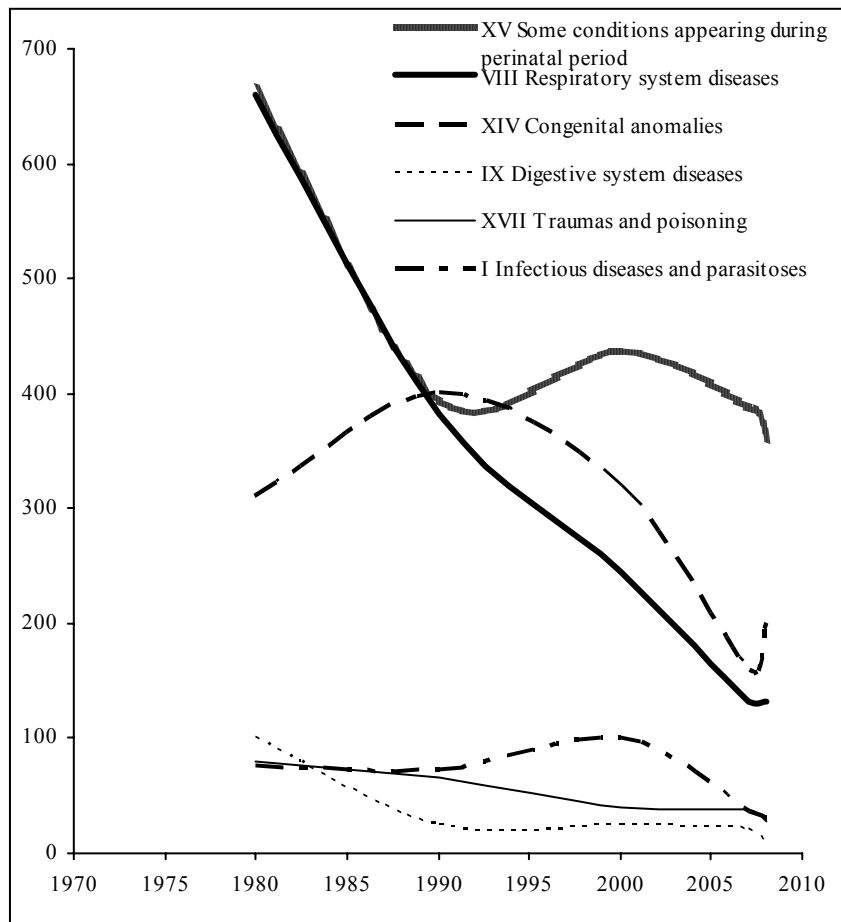


Figure 6. Child death rates by causes of death in Bulgaria, 1980-2008 year.

Mortality from digestive system diseases shows tendency toward decrease until '90 and steady level for 1990 and 2000 while trauma mortality varies in the last 2 decades of the century. The unfavorable trend toward rise of mortality caused by infectious diseases and

parazitosis for the 90's reaches up to 100.4 per 100000 people in 2005, and is no longer observed - decrease is reported for 2008 - 30.9 per 100000 people. Mortality structure and main causes of death in nursing age in Bulgaria for 2008 are represented in Figure 7.

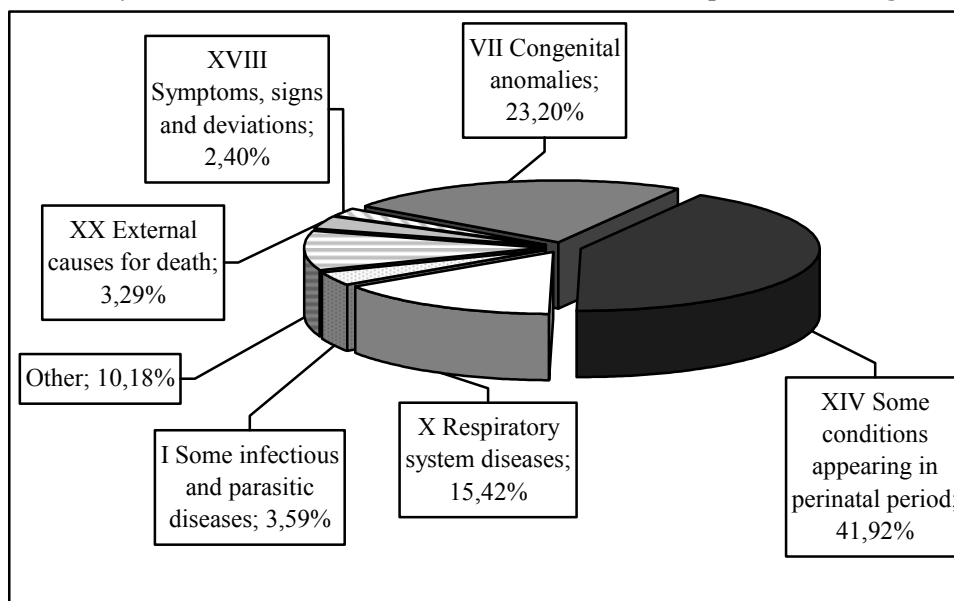


Figure 7. Mortality structure by main causes, at nursing age in Bulgaria, 2008 year.

Changes in child and crude mortality rates are pursued by **reduced birth rate (Figure 8)**. It is known that the birth rate is influenced by group of correlating and mutual acting factors – economical, psychological, demographic, medico-social etc.

Data, concerning the birth rate for the last century along with crude mortality and natural

growth rate are shown in Figure 8 and outline the trend toward significant decrease as a result of profound changes in social-economic development in the country. At the beginning of XX-th century birth rate is high and ranges from 40 to 45‰. In 1905 it is calculated to be 43.5‰. In the following 5 years shows a slight decrease and in 1910 accounts for 41.7‰.

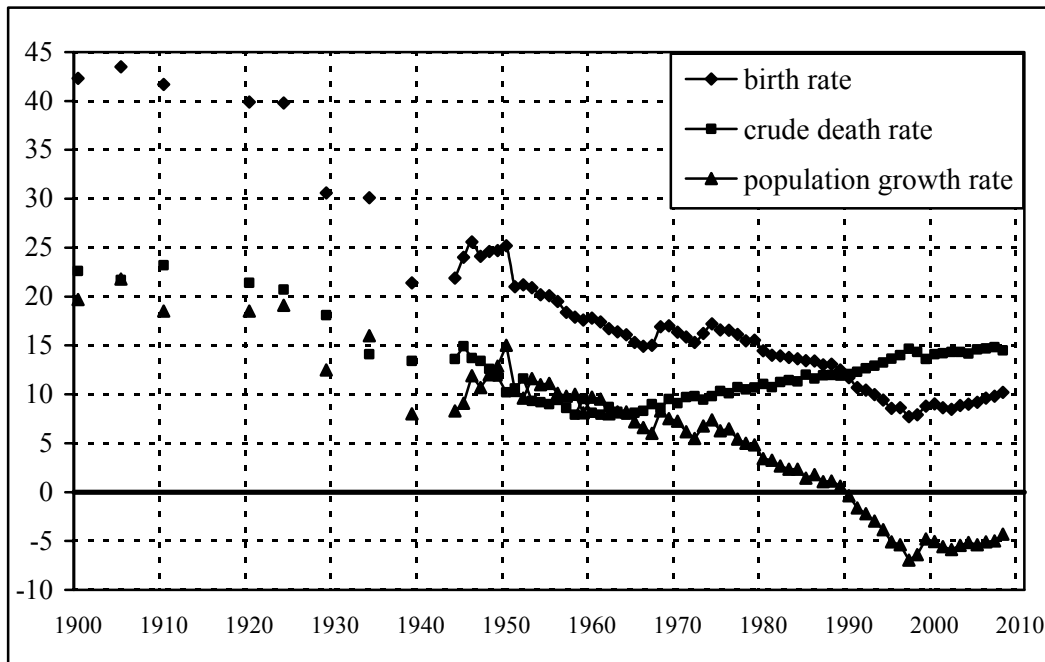


Figure 8. Birth rate, crude death rate and population growth rate in Bulgaria, 1900-2008 year (per 1000).

The second decade of XX-th century is marked with considerable fluctuations in birth rate values. During the Balkan War, Second Balkan War and World War First it has decreased and in 1917 reaches 17.2‰. In postwar years a compensatory catch up of birth rate is recorded and in 1914 it is 45.1‰. That is so far the highest value of the birth rate for the whole XX-th century in Bulgaria. After 1920 the birth rate goes down under 40‰ and never ever reaches higher levels (**Figure 8**). In World War II years the birth rate indicator is steady at 21-22‰. Some compensatory increase is observed following the postwar period and in 1950 birth rate reaches 25.2‰.

Right after 1950 the negative process of “systemic” birth rate reduction is initiated. So in 1951 it is 21‰, in 1961 - 17.4‰ and 1977 - 13‰. This negative trend is interrupted in 1968-1974, when a positive, unfortunately quite temporary increase is recorded due to carried out pronatalistic politics in the country. After 1988 the birth rate indicator reaches one

of the lowest levels in Europe and the world: 12.49‰ -1989; 10.44‰ - 1992 and 7.71‰ – 1997. In 1998-2003 period the birth rate is characterized with uncertain dynamics and values of the indicator of 10‰.

According to overall positive tendencies in the demographic development of the country starting from 2004 birth rate indicator is rising with 9.2‰ in 2005, 9.6‰ in 2006 and 9.8‰ in 2007. In 2008 for the first time in the last 15 years its value exceeds 10‰. With 10.2‰ birth rate indicator the demographic situation is now comparable with other European countries like Greece, Switzerland, and Poland, and is even higher than in Germany, Austria.

Along with birth rate changes a decrease in **marriages is observed (Figure 9)**. Because of that fact increases the number of **non-marital births**. That reaches up to 51.1% of all newborns in 2008. For comparison in 1989 this indicator is 12‰. It should be mentioned, of course, that part from these births are result from so called „**consent marriages**” (non-marital cohabitation).

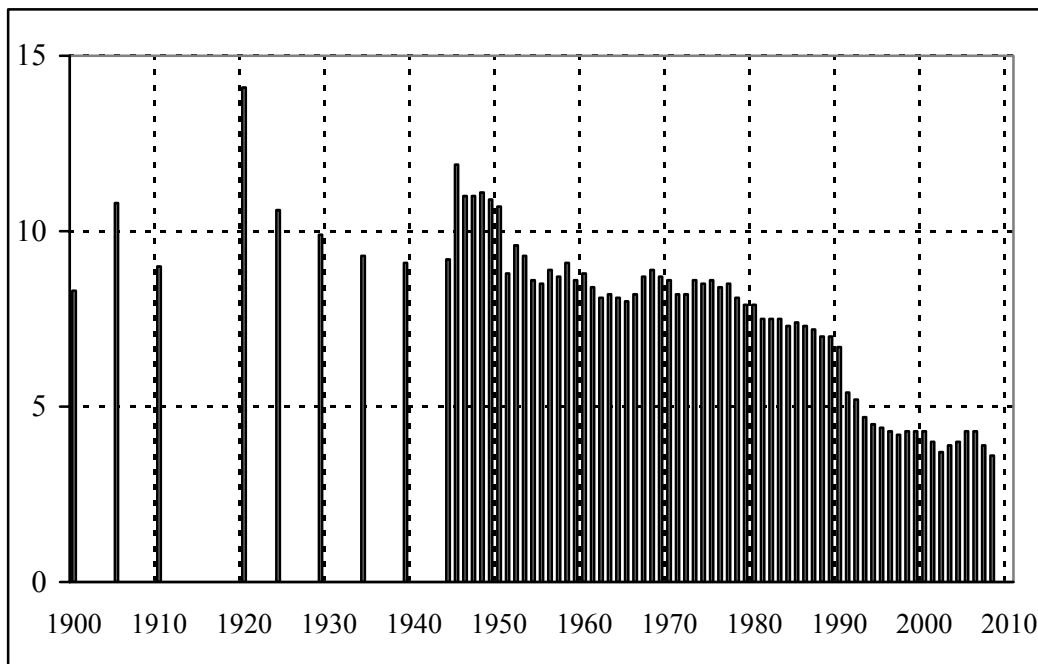


Figure 9. Marriage rate of the population in Bulgaria, 1900-2008 year (per 1000).

Decreased rate of birth giving in Bulgaria is intimately connected with changes in **total fertility rate** (it is defined as the average number of live births at 1000 women in birth

giving age). In the beginning of XX-th century the values of that indicator are close to 6.0, in 1980 - 2.0 and nowadays are 1.2 (2.65 average for the world) (**Figure 10**).

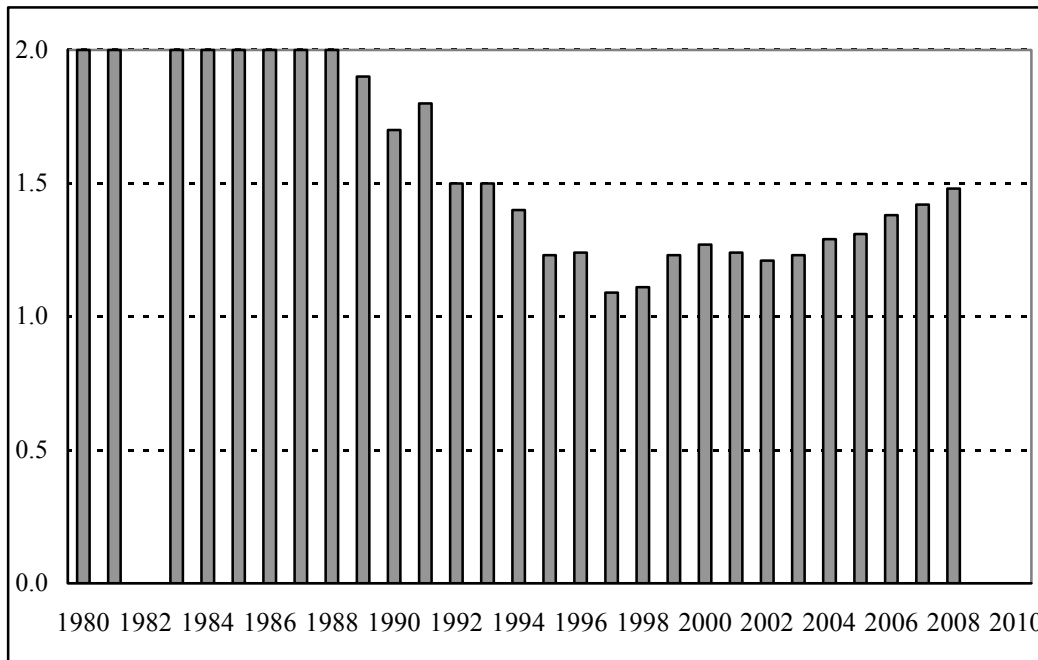


Figure 10. Total fertility rate in Bulgaria, 1980-2008 year (per 1000).

For decades long number of **abortions is high** as it surpasses deliveries until 1990. After 1999-2000 an inversion takes place. More than half of the abortions are performed in the most fertile female age (20-29). A trend toward

increase of abortions in the ages of 15-19 is noted. Dynamics and abortion indicator values represent the influence of complex group of factors dealing with the attitude toward abortion as an instrument for family planning.

This particular attitude has to do with various demographic, social, cultural and economical factors. Social-economy factors such as poverty and chronic unemployment also have their influence. Of significance is also insufficient information upon using reliable modern contraception. The birth rate is influenced by **unsuccessful pregnancy** which is defined as spontaneous miscarriage during 20-28-th gestation week (17). Major problem represents the recurrent miscarriage, which is due to acquired and genetic factors such as chromosome aberrations and thrombophilia. Most common congenital thrombophilia are

Factor V – Leiden mutation (G1691A), Factor II – prothrombin mutation (G20210A) and hyperhomocystaemia (MTHFRC677T).

Relatively rare are other thrombophilic factors as Factor XIII V34L, β -fibrinogen – 455G>A PAI-14G/5G. **Figure 11** shows electroforegrama of Genscan – analysis of 10 thrombophilic mutations (polymorphism in thrombophilic genes and folatemetabolism genes). Significant role plays **sterility in young families**. Irrespective of what has been achieved by now there is still no universal decision for solving sterility families' problem.

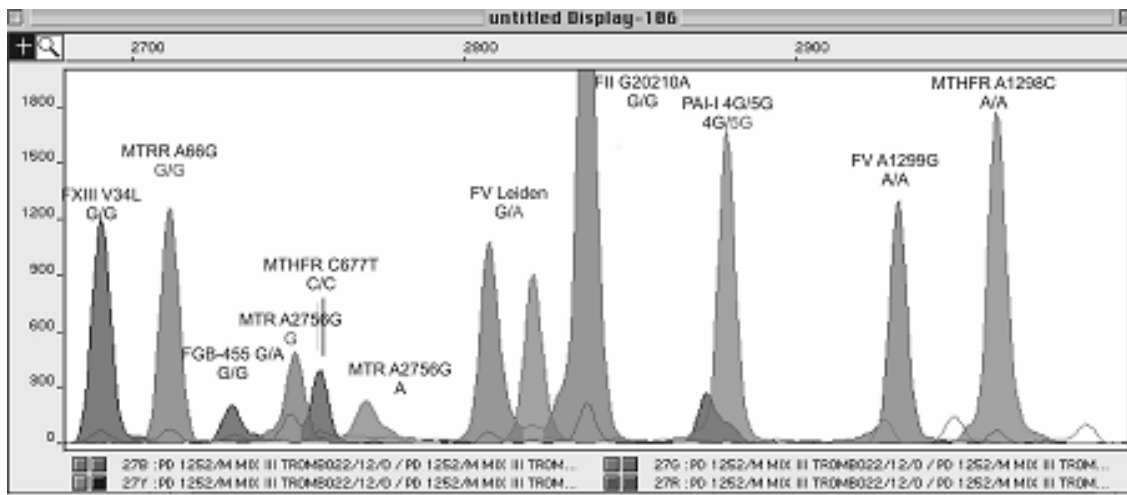


Figure 11. Electroforegramm of Genscan analysis of 10 thrombophilic mutations/polimorphisms in thrombofilic and folate metabolism genes.

In birth rate and total fertility rate there are ethno-cultural differences which are strengthening negative assessment of demographic situation. In Bulgaria highest is the total fertility rate of women from gipsy ethnic group and lowest in Bulgarian group (less than 1). In the last decades there is a tendency toward deferring pregnancy. It comes as a result of denial of having a second and third child in Bulgarian families. Wedlock decreases from 6.9% in 1990 to 4.3% in 2000. Wedlock level in Bulgaria is beneath the average for Europe and lowest at the Balkans.

Due to **ageing of the Bulgarian population the last decades an increased general mortality rate is observed**. In 60-89 period general mortality values grow up from 7.8% to 12%, to reach 14.3% in the last few years (11.7% in urban and 20.5% in rural areas). High incidence of child mortality rate, decreasing birth rate and growing crude mortality disrupt natural population growth (**Figure 12**).

The above scheme shows linear regression of natural population growth indicator with negative trend. This process started back in 60s of XX-th century along with the processes of high-speed industrialization, agriculture consolidation and urbanization. These processes caused massive migration towards the cities and led to a change in reproductive behavior of significant part of the population. That results in less children growing up in Bulgarian families. This is not only because of the demographic transition as a logical process in European countries but also because of social economy sudden changes as a result of transition towards market economy. Demographic transition in Bulgaria takes place faster and irregular pace compared with developed European country. It is not unitary in time for main ethnic groups which show different reproductive behaviour based upon changing reproductive consciousness.

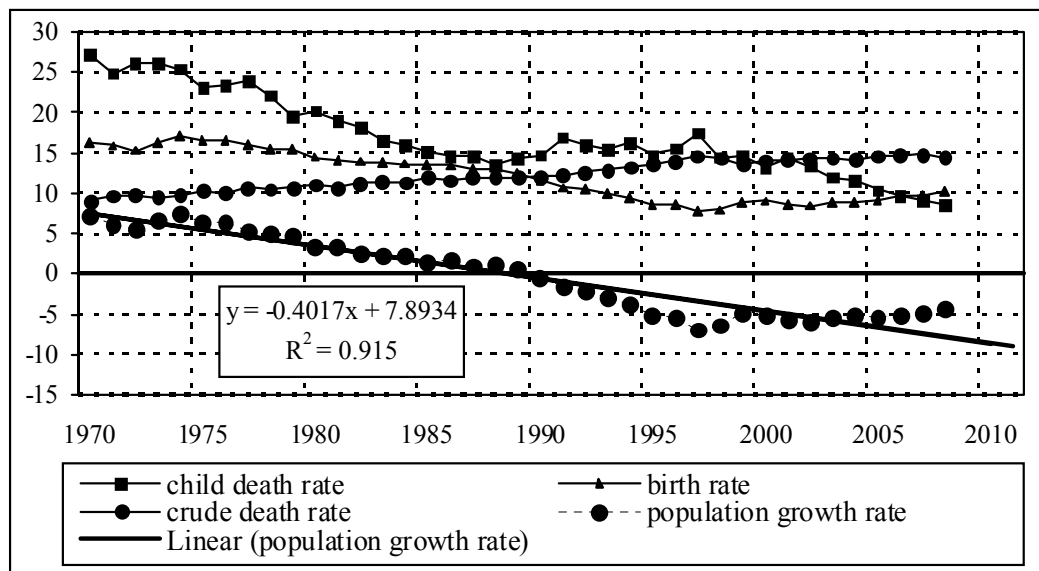


Figure 12. Birth rate, population growth rate, crude and child death rate in Bulgaria, 1970-2008 year (per 1000).

Until 1988 Bulgarian population grows up with decreasing trend which in 80s reaches approximately 0.2‰ per year. After 1989 it decreases with average 0.9‰ per annum. Though in the beginning of 90’s the reduction of the population is mainly due to migration, in the next 7-8 years it is because of negative natural growth rate resulting from increased death rate and low birth rate (Figure 12).

Nowadays in Bulgaria there are villages with 1-2 inhabitants. In last 15 years negative tendency in sex structure of Bulgarian population have intensified as that new equilibrium leads to restricted reproductive possibilities. The observed increase in birth rate in the last few years does not mean that there is a trend toward improvement of the demographic situation. The natural growth rate is negative (Table 2).

Depopulation is greatly pronounced in rural regions where the population is older.

Table 2. Birth rate, population growth rate and total fertility rate.

Year	Birth rate (per 1000)	Population growth rate (per 1000)	Total fertility rate
1990	12.1	- 0.40	1.81
1995	8.6	- 5.00	1.23
2000	9.0	- 5.10	1.27
2001	8.6	- 5.60	1.24
2002	8.5	- 5.80	1.21
2003	8.6	- 5.70	1.23
2004	9.0	- 5.20	1.29
2005	9.2	-5.40	1.31
2006	9.6	-5.10	1.38
2007	9.8	-5.00	1.42
2008	10.2	-4.30	1.48

A high migration mobility of the Bulgarian population is noted for the last 15 years. The Bulgarians that have emigrated are around 760000 (Figure 13). More that 1/3 of the emigrants are under the age of 30, which leads to decreased number of people in active

reproductive age and faster ageing of Bulgarian nation. In Figure 14 is shown the age pyramid in Bulgaria for 2005.

Negative changes in main demographic indicators, highly pronounced at the end of

20th century are reason to define the situation as a **demographic crisis**. They reflect changes in social-economic development, environmental factors, volume and quality of applied medical health care, especially during the period when health care system reform is performed. For that period of “endless

reformation” a total decompensation of preventive branch of child health care is established. Missed chances for prevention of significant social diseases in young age are reasons for increased morbidity, severe invalidization and death in active age.

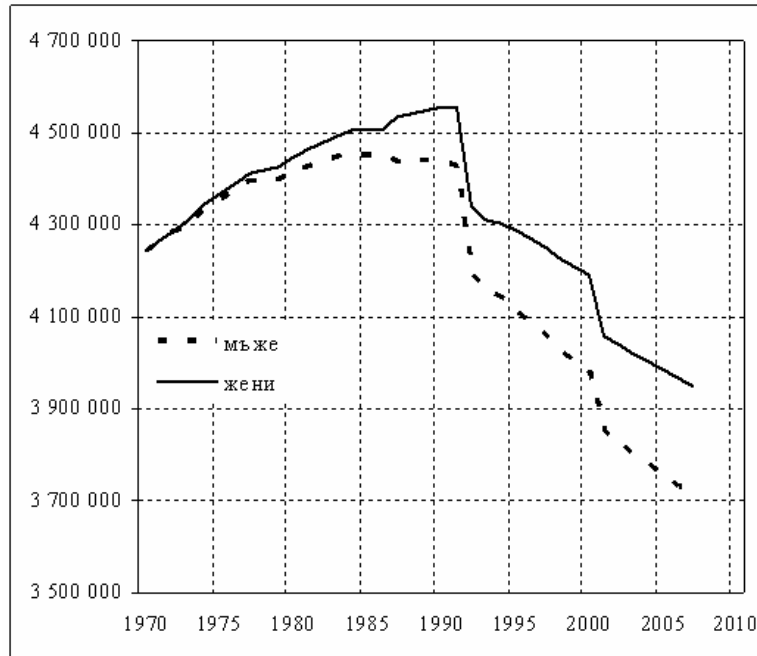


Figure 13. Average population in Bulgaria, 1970-2008 year.

Children and women consultation offices have “emptied” from their content. They couldn’t guarantee efficient primary medical care. Mother and child are deprived of optimal social and legal protection. That raised negative phenomena such as child crime, terrifying child prostitution and child drug addiction. Other terrifying

phenomenon and rude violation is observed – a newborn babies trade, the so called - organ transplantation business. The legislator should ban the so called “**child recognition**” by people that adopt and trade it afterwards. For that purpose there is an option – not single legal recognition, but DNA-analysis for paternity.

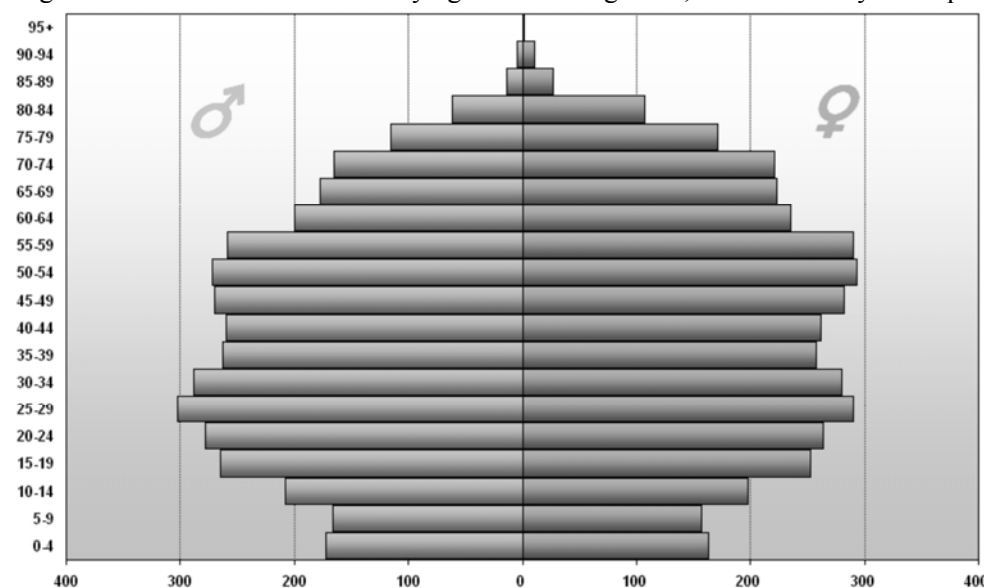


Figure 14. Age pyrimide of Bulgarian population for 2005 year (per 1000). Source: NSI, National strategy for demographic development in Bulgaria.

CONCLUSIONS

1. Child mortality rate in Bulgaria is extremely high in the first 4 decades of 20th century. In 1950-1988 period a significant reduction is reached, but during the social-political transition it does increase again. The prognosis looks optimistic, because it decreases in the last few years.
2. For the whole studied period child mortality rate is higher in rural than in urban areas.
3. Significant changes in child mortality structure are observed. In the beginning of the period it is high, because of transmitted infectious diseases; in second place comes congenital anomaly mortality. Respiratory diseases, though with decreasing intensity still have their role.
4. High birth rate at the beginning of the century after various changes in first few decades is followed by fast reduction.
5. Low birth rate and high general mortality determine negative natural growth rate.
6. Negative changes are observed in total fertility rate, number of marriages and non-married births.
7. High migration activity in the last 2 decades reduces the population to 7606551 in 2008.
8. Lack of adequate social-legal protection, gaps in education in children and youths and negative mass-media influence raise negative social phenomena in various directions.
9. Endless reorganization of the health care system and upsetting structures and strategies proven to be effective deprive the children of specialized pediatrician health care, both therapeutic and preventive.
10. Taking care for the child in health and child in illness couldn't be just a slogan. It should be primary concern of society and medical care. The children should be observed and treated by pediatricians, not by GPs. Incompatible seems the co-existing Hippocratic Oath and newly created medical doctors- mockingly called – “Pathway people” and “Doctors-LTD”. The famous French physician Paul Savi once wrote: “Taking out the pain is divine”. Pediatricians take out of the pain not only of the little patient, but of his parents, as well. Acting like that they perform a sacred act. It should be assessed both with moral acknowledgement and proper payment for the Bulgarian pediatricians.

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