

## **SYNTHESIS REPORT**

# **ON THE SOCIO-ECONOMIC CHARACTERISTICS OF THE POPULATION, MORBIDITY, AND SCOPE OF HEALTH SERVICES IN THE REGION OF MOMCHILGRAD MUNICIPALITY AND KRUMOVGRAD MUNICIPALITY, KARDZHALI REGION, REPUBLIC OF BULGARIA**

**2020 - Haskovo**

Regional Health Inspectorate (RHI) - Haskovo is a beneficiary of project B2.9a.09 "Policies for Enhancing Access to Health Services in Deprived Areas (HEALTHY MUNICIPALITY)", financed under the Cross-Border Cooperation Programme INTERREG V-A Greece - Bulgaria 2014-2020.

The project is approved for funding under Priority Axis 4 of the Programme with Investment Priority "Investing in Health and Social Infrastructure", which contributes to national, regional and local development, the reduction of inequality in health status and the promotion of social inclusion.

Partners of RHI - Haskovo on the side of the Hellenic Republic are: Regional Development Agency of Rhodope S.A., Aristotle University of Thessaloniki - Department of Economics, Municipality of Ariana, Municipality of Iasmos and the Agency for Transnational Training and Development. On the Bulgarian side, partners of the Inspection are: the Association of Rhodope Municipalities (ARM), the Municipality of Krumovgrad and the Municipality of Momchilgrad.

The Project "Policies for Enhancing Access to Health Services in Deprived Areas /HEALTHY MUNICIPALITY/" aims at developing and implementing municipal-level policies for health prevention in remote areas of the cross-border area. The task of the project is to investigate the causes of morbidity, to develop maps of population morbidity, to study the access to healthcare services and the level meeting healthcare needs in the cross-border region, to identify vulnerable groups and to take various health prevention measures and policies.

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*The contents of the publication are sole responsibility of Regional Health Inspectorate-Haskovo and can in no way be taken to reflect the views of the European Union, the participating countries the Managing Authority and the Joint Secretariat.*

## **ABBREVIATIONS**

CEMC - Center for Emergency Medical Care  
CFTA - Center for Family-type Accommodation  
CPS - Center for Public Support  
CSPD - Center for the Support of Personal Development  
CMSCC - Center for Medical and Social Care for Children  
DCC - Diagnostic and Consultation Center  
DRES - Directorate "Regional Employment Service"  
DWTP - Drinking Water Treatment Plant  
EEA - Executive Environment Agency  
GHAC - General Hospital for Acute Care  
IPPHC - Individual Practice for Primary Health Care  
MDL - Medical Diagnostic Laboratory  
ME - Medical Establishment  
NHIF - National Health Insurance Fund  
NSI - National Statistical Institute  
OCIPPDC - Outpatient Clinics for Individual Practice of Primary Dental Care  
OCIPPMC - Outpatient Clinic for Individual Practice of Primary Medical Care  
OCIPSMC - Outpatient Clinic for Individual Practice of Special Medical Care  
RDE - Regional Department of Education  
RHI - Regional Health Inspectorate  
RIEW - Regional Inspectorate of Environment and Water  
WSS - Water Supply and Sewerage  
UDK - United Children Complex

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## **PART 1. MUNICIPALITY OF MOMCHILGRAD**

### **1. Synthesis of the identified socio-economical characteristics of the population, morbidity, scope of health services in the region of the municipality**

#### **1.1. General characteristics of the region**

The municipality of Momchilgrad is situated in South Bulgaria and occupies the southeastern parts of the Eastern Rhodopes. The municipality lies between 41° 53' N and 25° 42' E. To the east it borders with the municipality of Krumovgrad, to the south - with the municipality of Kirkovo, to the west - with the municipality of Dzhebel and to the north with the Municipality of Kardzhali.

The terrain is predominantly mountainous, with the municipality falling within the highly segmented part of the East Rhodope Stramni Rid Ridge, which is about 40 km long and 15-22 km wide. In terms of morphological structure, the municipality falls within the Eastern Rhodope structural depression, which in turn is occupied by marine Paleogene sediments and eruptive masses. The intensive development of modern erosion is immensely facilitated by not only mass deforestation and but also prolonged summer droughts and heavy autumn rains.

The municipality consists of 49 settlements, most of them with a population of less than 200, with one of the settlements - Yunatsi Village - being depopulated. The population of the entire municipality is 16,263 (as of 01.02.2011), with the central town of the municipality - Momchilgrad, having a population of 7,831. The second largest settlement is Gruevo Village with a population of merely 715, followed by Zvezdel (491) and Nanovitsa (478).

The climate in the municipality of Momchilgrad falls within the moderately Mediterranean climate and is described as temperate continental to Mediterranean. The province is under a predominantly Mediterranean climatic influence - especially in relation to Mediterranean cyclones. Due to its greater openness to the north during the winter year-half, the impact of cold continental air masses invading from the north is felt noticeably.

Through the territory of the municipality of Momchilgrad passes Pan-European transport corridor 9. The distance from the municipality to Border Control Point Makaza is 42 km, which gives an opportunity for its socio-economic and cultural development. The national road network on the territory of the municipality is 81.5 km long. The road network is well developed. There are no settlements without access to the municipal center. Most of the roads are in poor condition. The asphalt pavement is worn out and roads are in need of rehabilitation.

The Kardzhali - Momchilgrad - Podkova Village railway line with a length of 22 km passes through the territory of the municipality.

Water is supplied to the population from the Borovitsa Dam and is distributed by "Water Supply and Sewerage" OOD - Kardzhali. 33 of the 49 settlements in the municipality are supplied with water. In some of the settlements water is rationed permanently and/or on seasonal basis.

A sewerage network is only constructed in the municipal center - the town of Momchilgrad and in Sokolino Village. The only water treatment plant on the territory of the municipality is in Sokolino Village and serves the population of the village.

Both maintenance of the power transmission and distribution network and its facilities on the territory of the Municipality of Momchilgrad and power supply are carried out by ENV Bulgaria. All settlements on the territory of the municipality are electrified and none of them is subject to power rationing.

There is no gas transmission network or central heat supply on the territory of the municipality. Public buildings and schools are heated by locally constructed heating systems running on liquid fuel. The installations are obsolete, with high operational costs and low efficiency.

On the territory of the Municipality of Momchilgrad has been established a Telecommunications Technical Unit, which also serves the municipalities of Dzhebel and Kirkovo. Through the territory of the municipality passes an optic-cable route, enabling high-speed data transfer. The three national mobile operators MTel (A1), Globul and Vivatel provide 100% signal coverage on the territory of the municipality.

The most widespread natural hazards in the region of the municipality of Momchilgrad are landslides which have been a major problem for many years for both the municipality and the local population directly affected by these hazardous natural phenomena. According to data by the Ministry of Regional Development at present there are two active landslides in the region.

### **1.2. Socio-economic characteristics of the region**

The demographic development of the municipality of Momchilgrad is influenced by factors and conditions of different nature. Data from the latest censuses indicates a lasting tendency for decrease of the population. During the period between the 1985 and 2011 censuses, the decrease in the population of the municipality is widespread and affects, to one degree or another, all 49 settlements, incl. the municipal center - the town of Momchilgrad. Only for the period 2005-2012 the residents of the municipality have decreased by 612 as a result of both the negative natural and the negative mechanical growth. The rate of decline during the period was 3.67% with the average annual rate of decline being 0.46%. The population density in the municipality is significantly lower than the average for the country (67 people per km<sup>2</sup>). About half of the municipal population lives in the villages. Negative changes in population size are one of the main disadvantages for the future demographic and socio-economic development of the municipality.

Age synthesis of the population (2011) shows that 13.09% of the population is aged 0-14; 49.65% aged 15-49 and 37.25% - 65+. Compared to 2015, in 2016 the number of young people in the municipality of Momchilgrad was increased by 581.

The age-sex pyramid of the population shows a trend of population aging for both sexes. The sex ratio is 100.0:100.7 at the beginning of the period and 100.0:97.5 in 2012. As a result, in 2012 there is a certain prevalence of the male population. A major factor in this is the increased migration of working-age women.

According to data of the General Directorate of Civil Registration and Administrative Service as of 06 January 2017 the population with registered permanent address in the town of Momchilgrad is 18,925. The share of youth aged between 15 and 29 is 3,212, which is 16.97% of the total population.

In the first half of the 2007-2012 period the birth rate of the population in the municipality of Momchilgrad was higher than the average for the country, the Southern Central Statistical Region and the province of Kardzhali. This is definitely influenced by the preserved traditions in the reproductive behavior of the population, especially in the villages. The increased migration of the population of reproductive age in recent years reflects unfavorably on the age structure of the population. As a result, since 2009 the birth rate has been decreasing and in 2012 it was already lower than the average for the country, the region and the province.

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The municipality of Momchilgrad has a sufficiently developed network of educational institutions with an optimal structure for meeting the current needs for general education and

vocational training. The secondary schools are concentrated in the municipal center and have a good material and technical base. In primary schools remote from the municipal center reduction of class caps and combining of grades is allowed. The tendency is for reduction in the number of students and respectively classes. During academic year 2017/2018 on the territory of the municipality of Momchilgrad operated eight educational establishments from the 1st to the 12th grade; six kindergartens; one nursery working and one service unit - Center for the Support of Personal Development - Municipal Children Complex (CSPD - MCC).

Compared to the country average, the data shows a lower level of education among the population.

According to data from the census in 2011 the total population in the municipality of Momchilgrad aged 15 and above is 14 139, or 10.7 % of the total size of this population in the province of Kardzhali. The number of economically active persons in the municipality is 6,561, which represents 46.4 % of the population aged 15 and above. This indicator of the municipality of Momchilgrad is equal to the average for the province of Kardzhali - 4.5 per cent.

In recent years the number of unemployed persons in the municipality of Momchilgrad has remained relatively high. The unemployment rate in the municipality of Momchilgrad in 2012 was 14.2%. This value is above the average for the country (11.1%), but lower than the that for the province of Kardzhali (15.1%).

With the available housing stock and the available living area, relative to the existing population in the municipality, a relatively good standard of living has been achieved in all settlements. The majority of the 7,759 housings available as of 2011 are privately owned. There is a significant number of uninhabited housings, whose total number for the municipality amounts to 2723, which is 35.1 % of all available housings. The quality characteristics of a part of the housings show reduced values in terms of level of development. This refers to the existence of housings without bathroom and such with external bathroom.

The Gross domestic product (GDP) per capita in the municipality of Momchilgrad is at relatively low levels compared to the average for the country. However the municipality shows improvement - in recent years there has been an increase in the expenses on fixed tangible assets in the main sectors of the economy.

The unemployment rate (11%) is above the national average, but the low value of net sales revenue per employee is an indirect indicator of lower productivity and competitiveness of the local economy and the production of the municipality.

In terms of sectors the tobacco and processing industry, in particular the food and beverage industry and the textile and clothing industry, are of major importance for the economy of the municipality. Livestock breeding is one of the main activities. Plant breeding is represented mainly by tobacco growing, while wheat and barley growing in recent years are negligible.

The municipality of Momchilgrad has a high natural potential and a rich cultural history, which is a prerequisite for the development of tourism as well as related economic activities. The service sector is represented by trade.

More than 50% of the agricultural land of the municipality is represented by pastures and meadows, while the arable land in the municipality of Momchilgrad makes up about 40% of it. Forest area exceeds agricultural area, with only 1.2% of it being privately owned.

There is a total of abandoned land in the municipality amounting to 35,401 decares (24% of the agricultural land).

Measures are needed to consolidate farmland and build up an adjoining infrastructure (irrigation, processing, and transport) to justify and allow investment in technology and human resources for the development of plant breeding.

In the municipality of Momchilgrad the relative share of the Turkish ethnicity is 84.8%, and in the province of Kardzhali - 66.2% of the number of the respondents who have volunteered information on the ethnicity poll.

Cultural sites of national and local importance are an asset that should be used to attract socio-economic activity in the municipality. It is necessary to prepare projects for the conservation, restoration and adaptation of the sites and their integration into a common network, bound to the settlement structure of the municipality.

### **1.3. Characteristics of public health**

The total mortality rate for the province of Kardzhali in 2011 is 12.7 ‰. It is highest in the municipality of Ardino - 15.6 ‰, followed by the municipalities of: Kirkovo - 14.7 ‰; Krumovgrad - 13.9 ‰, Chernoochene - 13.6 ‰; Dzhebel 12.2 ‰, Momchilgrad - 11.6 ‰ and Kardzhali - 11.4 ‰.

The difference in the values between urban and rural populations is notable.

Among the reasons for the increase in mortality in the province are: increasing aging of the population; increase of the mortality in active age from socially significant diseases; risk factors related to the lifestyle of the population: irrational nutrition, smoking, hypodynamia and stress; socio-economic and environmental factors.

There has been a steady trend for decline in child mortality.

The average life expectancy for the population of the country for the period 2015-2017 is 74.8 years.

In the structure of the hospitalized patients in the province of Kardzhali during the last 3 years the leading diseases are: Diseases of the circulatory system followed by Diseases of the respiratory system and in third place Pregnancy, childbirth and postpartum period. The situation in the municipality Momchilgrad is similar.

### **1.4. Health and welfare services in the region**

There are still unoccupied medical practices in the province of Kardzhali, while practices in most of the settlements in the municipality of Momchilgrad are mostly occupied by retirees or persons in pre-retirement age.

Emergency medical care as a whole is insufficiently effective due to difficult access. Medical staff is more abundant in towns than in the countryside. This is mainly due to the specific infrastructure - fragmentation and remoteness of small settlements. For this reason, emphasis should be placed on preventive medicine.

In the province of Kardzhali there are 136 OCIPPD, followed by 68 OCIPSMC, and 63 OCIPPMC. Smallest is the number of Diagnostic Consultation Centers (DCC) and hospices.

The system of medical establishments in the Municipality of Kardzhali is capable of meeting the public healthcare needs of both the municipality and the province.

On the territory of the province of Kardzhali operate the following GHAC:

- GHAC "Dr. Atanas Dafovski" OOD
- GHAC "Ardino" EOOD - Ardino
- GHAC "Dr. Sergei Rostovtsev" - Momchilgrad
- GHAC "Life+" - Krumovgrad

In the territory of province of Kardzhali, there is also a CEMC in the town of Kardzhali, which has 8 branches in the rest of the province.

The equipment in ME is at a good level and physicians exchange experience with specialists from the entire country.

Due to shortage of pre-hospital care, the number of hospitalizations has been increasing.



In the municipality of Momchilgrad there is a single general hospital - GHAC "Dr. Sergei Rostovtsev". Its Diagnostic Consultation Block has:

1. Consultative Rooms for: Internal Diseases, Child Diseases, Nervous Diseases, Obstetrics and Gynecology.
2. Diagnostic Imaging Department - no beds - The unit has the following equipment: X-ray, scanner, Doppler, echocardiograph, abdominal echograph.
3. Clinical laboratory, which has advanced high-capacity automatic analyzers - haematological, biochemical, ion-selective, blood-gas analyzer, coagulometer and glucagon analyzer, hormone-immunological analyzer, glycosylated hemoglobin and microalbuminuria device.
4. Manipulation room
5. Duty Room

The Inpatient Block has 69 beds and the following compartments: Internal Ward; Children's Ward; Neurology Ward; Obstetrics and Gynecology Ward; Anesthesiology department without beds; Department for Continuous Treatment of Internal Diseases and Diagnostic Imaging Department.

The Duty Room is provides medical assistance to health-insured and uninsured persons.

The distance of all settlement in the municipality of Momchilgrad (in km) to the municipal center ranges from 28 to 4 km.

The analysis of newly registered diseases and morbidity shows that chronic noninfectious diseases of the circulation and respiratory system are determinants in the pathology of the population. In recent years there has been a tendency for the increase of patients hospitalized due to myocardial infarction and stroke in the municipality of Momchilgrad. GHAC "Dr. Sergey Rostovtsev" - Momchilgrad cannot offer these patients convalescence care through the application of rehabilitation and physiotherapy.

On the territory of municipality of Momchilgrad are provided only communal social services: Day Care Center for children with disabilities (the number of users of this service is greater than its capacity); Center for Public Support (CPS) - a set of social services related to the prevention of abandonment, violence and dropping out of school; Center for Public Support - Momchilgrad with the capacity to support 40 children at risk and their families; Social Service "Foster Care" provides: Individual work with children, preparation for accommodation and follow-up on a case-by-case basis; Training and support for families of relatives who have accommodated children; Home Social Patronage at Home; Social Services in a Family Environment: Personal Assistant, Social Assistant and Home Assistant;

In order to improve the welfare of the municipality, the following programs are being implemented: Program "Provision of social assistance through applying a differentiated approach"; Program "Target Social Aid for Heating"; Child Protection Program; Municipal Social Protection Measure to assist persons in severe social and/or health conditions.

Sports traditions are well developed in the municipality. In the town of Momchilgrad operate year-round the Rhodope Stadium, a swimming pool and a sports hall, two sports clubs - the Rhodope-1935 Football Club and the Rhodope Table Tennis Club.

In the municipality of Momchilgrad are identified 40 archaeological and historical sites, declared as immovable cultural assets. 9 of them are of national importance.

### **1.5. Public healthcare in the region**

The water supply and sewerage services in the territory of the province of Kardzhali are provided by "Water Supply and Sewerage" OOD - Kardzhali. 238 settlements out of 471 i.e. 50.53% are supplied with water. 16,876 people live in the 233 villages not supplied with water.

There are no particular problems with the quality of raw water. It is safe and clean and there are no indicators which warrant purification except for microbiological indicators, which is why disinfection is carried out regularly.

The quality of drinking water in province of Kardzhali, respectively the municipality of Momchilgrad is good.

The air quality in the municipality of Momchilgrad is good and there is no need for further development of an air quality improvement program.

The ecological status of surface water in the municipality can be described as "good" and "moderate". Overall, data analysis shows a sustained trend for good water quality. Occasional deviations are detected. Main receiver of industry and drinking/domestic waste water of the town of Momchilgrad is the Varbitsa River. Domestic wastewater is discharged directly in the river without purification. Concentrations of lead, zinc, cadmium, pH and insoluble substances exceeding the specified individual emission limits have been recorded.

On the territory of the municipality Momchilgrad there are predominantly cinnamon forest soils with a humus content of 2-4% with alluvial meadow and deluvial meadow soils along the rivers. Soils in the region of the municipality are clean, with a tendency for decrease in pollution in recent years. All measured contents of heavy metals and metalloids are below the maximum permissible concentrations, which are limit values for the assessment of contamination. A serious problem related to soils is that of erosion.

The area of the municipality of Momchilgrad is characterized by a rich biodiversity - the presence of many birds and especially the birds of prey, such as the Griffon, Black and Egyptian vultures, the Rock Eagle, the Black Stork, the Lanner falcon etc. Of interest are two species of terrestrial tortoises, rare species of reptiles and amphibians and the plants from "Borovets" Reserve, established to preserve a natural black pine forest.

The municipality of Momchilgrad has not developed a program for insecticide control, but prescriptions by Regional Health Inspection (RHI) - Kardzhali of measures for control of tick populations on green spaces and disinsection for control of mosquito populations are observed.

Agriculture in the municipality is based on subsistence farming, with a single industry structure and low efficiency. Family farms are of confined type, the land is cultivated almost without the use of machinery, no agro-technical activities are conducted, which leads to low yields.

On the territory of the municipality there is a system of 23 micro-dams and ponds with a total area of 3 628 decares. The irrigation facilities (the irrigation area is 18 879 decares) are largely unused and not maintained.

Livestock farming in the municipality has the character of natural farming. Cows are mainly grown for milk and meat, sheep are also well developed. Birds, goats, and bee families are also grown on private farms.

A strategic geographic location providing cross-border development prospects for the municipality of Momchilgrad is the proximity of Transport Corridor 9 and BCP Makaza. Living conditions are characterized by good climate and natural resources, good environmental status, access to rail transport, good transportation and communication infrastructure, a rich cultural calendar.

On the territory of the municipality there are significant deposits of mineral resources, which enable the development of the mining industry.

The necessary structure to prevent the formation and the establishment of unregulated landfills has been organized, covering all 41 settlements in the system for organized waste collection and disposal. Hospital waste is collected in a specialized repository for the temporary storage, a system for separate collection has been introduced. No standardized street cleaning system has been formulated. On the territory of the municipality there is no well-functioning system for the separate collection of packaging waste.

Important religious sites and complexes in the municipality are: the Elmali Baba Religious Complex in the village of Bivoljane; The church "Sv. Tsar Boris I" in the town of Momchilgrad; The Old Town Mosque in Momchilgrad.

## **2. Survey (fieldwork - quick statistics) on the accessibility and level of coverage of health services - synthesis**

Survey 559684 "Policies for providing access to health services in remote places" (fieldwork - quick statistics) was conducted in the municipality of Momchilgrad. The number of entries is 1000, the total number of entries in the questionnaire is 2000. The standard deviation from the quick statistics is 318.37%.

The survey included the questioning of 1,000 people, of whom 420 (42%) were males and 580 (58%) were females over the age of 18.

Of the respondents with primary **education** were 283 (28.30%), with secondary education - 406 (40.60%), with semi-higher education 89 (8.90%) and with higher education - 222 (22.20%).

By **occupation** the respondents were distributed as follows:

- farmer - 15 or 1.50%;
- livestock farmer - 62 or 6.20%;
- self-employed - 43 or 4.30%;
- civil servant - 238 or 23.80%;
- employed in the private sector - 225 or 22.50%;
- housewife - 21 or 2.10%;
- student - 105 or 10.50%;
- pensioner - 266 or 26.60%;
- unemployed - 25 or 2.50%.

By indicator "Monthly Family Income" the results are as follows::

- no income - 124 or 12.40%;
- up to 500 BGN - 366 or 36.60%;
- from 500 to 1000 BGN - 388 or 38.80%;
- from 1000 to 1500 - 87 or 7.80%;
- from 1500 - 2000 - 31 or 3.10%;
- from 2000 to 3000 BGN - 2 or 0.20 %;
- above 3000 - 2 or 0.20%.

To the question „**Do you have health insurance?**” with „Yes” responded 960 or 96.00% , and with „No” 40 or 4.00% of the respondents.

The survey on **family status** indicates, that the majority of respondents are married - 639 or 63.90%, followed by single - 179 or 17.90%, widow/widower - 100 or 10.00%. Of the total number married without children are 61 or 6.10%, divorced - 21 or 2.10%, and a greater part of 603 (60.30%) of the respondents fall in the comment category of the survey by this indicator.

To the question „**How many persons does your household consist of?**” predominant is the estimate „average” - 3.03 and „minimum” - 1.

To the question „**You live in a...**”, the answers are as follows:

- house - 653 or 65.30%;
- apartment - 345 or 34.50%;
- other - 2 or 0.20%;

836 (88.30%) of the respondents have a **toilet and a shower** inside their home, 155 (15.50%) - outside of their home, 9 (0.90%) only have an outside toilet.

**Household heating** is of different types, with the highest percentage of the respondents using wood - 749 (74.90%), in second place are respondents who use electricity for heating - 426

(42.60%), in third place - coal - 97 (9.70%); other - 15 (1.50%) of the respondents, gas - 5 (0.50%) and oil - 1 (0.10%).

Most respondents give more than one answer to the question if **they cook with:**

- electricity - 652 or 65.20%;
- gas - 550 or 55.00%;
- wood - 311 or 31.10%;
- other - 1 or 0.10%.

The self-assessment of **health status** among respondents („Overall your health is...”) is as follows:

- excellent answered 68 or 6.80%;
- very good - 236 or 23.60%;
- good - 502 or 50.20%;
- satisfying - 183 or 18.30%;
- bad - 11 or 1.10%.

In the last year 541 or 54.10% of the respondents had **concerns about their health**, while 459 or 45.90% did not.

606 of the total number or 60.60% felt had **discomfort**, while 394 or 39.40% - had had no complaints.

**Physical or psychic discomfort or a social problem** in the last year experienced 505 respondents or 50.50%, while 495 didn't, which is 49.50%.

In the last year 382 respondents or 38.20% **were diagnosed with an acute or chronic illness**, while 618 were not - 61.80%.

From those with **manifested first symptom/problem** most - 55 (8.68%) of all respondents, have increased blood pressure, while 30 (4.73%) have osteoporosis, followed by knee symptom - 20 (3.15%).

Heart arrhythmia had 16 or 2.52%; cataract - 17 or 2.68%; other visual disturbances - 16 (2.52%); prostate symptom - 16 (2.52%); influenza, chronic bronchitis and goiter had 14 (2.21%); disorders of the digestive system - 13 or 2.05%; diabetes, gout, urine symptom, leg symptom and abdominal pain reported 13 respondents (2.05%). Neurological symptoms had 10 (1.58%). The rest of the listed symptoms were indicated by only one person or not indicated at all, with the percentage being below one or 0.63%.

To the question „**Have you sought medical help for the indicated symptom/problem in the last year?**” with „Yes” respond 533 or 84.07%; while with „No” - 94 or 14.83%; 7 of the respondents did not answer the questions, which constitutes 1.10% of the total.

Those who answered „Yes” (to all questions asked - 9 in total) **sought help** from their GP at the expenses of the NHIF - 441 (689.06%); those who attended a specialist at the expenses of the NHIF are 289 (451.56%); 140 (218.75%) had a diagnostic examination in a laboratory with expenses recognized by the NHIF. 102 (159.38%) were hospitalized at the expense of the NHIF.

41 or 64.06% had emergency visits to a medical center or a hospital.

72 visited a doctor, had laboratory examinations or were hospitalized in a private hospital at their own expenses. One does not remember, while two answered „Other”.

Of those **who did not seek medical help for the symptom/problem** (those who answered "No"), 60 were treated with medication without a doctor's prescription; 21 felt that the symptom was not something serious; 14 did not know what the right health service was for them; 9 did not find free time to seek health care, and 8 did not remember or did not want to respond.

To the question „**How well of badly did the symptom develop on the scale from 0 to 10?**”, most respondents - 122 (19.24%) gave an estimate of 4; 104 (16.40%) - of 5; 93 (14.67%) indicated 3; 77 (12.15%) - 6; out of the respondents 66 (10.41%) indicated an estimate of 2, and as much

have also indicated 7. 0 was not selected by anyone, while 10 was only indicated in the questionnaire by 19 persons (3.00%).

10 (1.58%) of the respondents indicate increased blood pressure as a **second symptom**; a social problem indicate 588 (92.74%). Only 42 (72.41%) have sought medical help, 4 (6.90%) - have not sought health services, while 12 (20.69%) did not respond.

Of the ones who responded with „Yes” for manifested second symptom/problem 35 appointed a meeting with a physician, 18 - with a specialist, 5 were hospitalized at NHIF expenses, three had diagnostic laboratory examinations, two appointed a meeting with their GP and 1 visited a medical center by urgency.

In the case of those who answered "No" - one person was treated with medication without a doctor's prescription, one did not know what kind of health service they needed, one answered that one should avoid visits to doctors. "Other" was also indicated by only one respondent.

To the question „**How well or badly did the symptom develop on the scale from 0 to 10?**”, 14 (24.14%) indicate 3; 12 (20.69%) do not respond; 4 and 5 were indicated by 10 persons (17.24%) each; four (6.90%) indicated 2; three (5.17%) 6; 7 and 8 were indicated by two persons (3.45%) each.

As a **third symptom/problem** 631 (99.53%) indicated the option „Social problem”. Two (11.76%) sought help; one (5.88%) didn't, and 14 (82.35%) did not respond. Of those who sought help, one went to a GP, one went to a specialist and was diagnosed in a laboratory. The one who didn't seek health services treated themselves with medication from the pharmacy without prescription.

To the question “On the scale of 0 to 10 how well or badly did the third symptom develop?”, 14 (82.35%) do not respond; 2 (11.76%) give an estimate of 4, and one (5.88%) - of 3.

No **fourth symptom** was indicated, with 634 (100.00%) not answering the question at all. No medical help was sought, 14 (100.00%) did not answer. No assessment on the 0 to 10 scale for development of the problem was given either.

The answers regarding a **fifth, sixth, or seventh symptom/problem** with the personal health of the respondent are similar.

**To the question „Are you healthy?”** 373 (37.30%) of the respondents answered „Yes”, while „No” was indicated by 627 (62.70%).

In the last year 616 (61.60%) have had **prophylactic examinations or vaccines**, while 384 (38.40%) did not. From those that responded with „Yes” 519 (280.54%) had prophylactic blood tests; 226 (122.16%) - PAP smear/mammography/prostate gland examination; 142 (76.76%) had a flu vaccine or another vaccine, while 11 (5.95%) indicate „Other”.

To the question „**In the last year did you meet any encountered any obstacles, problems or obstacles in accessing health services?**”, 189 (18.90%) of the respondents answer “Yes”, while 820 (81.10%) answer „No”. Those who answered with „Yes” have encountered the following problems: 80 indicate, that the distance between their home and the nearest health service is long; 61 indicate as an obstacle the long waiting time for an available reception slot for the respective health service; 59 - financial difficulties in covering the transport expenses for reaching health services or lack of means of transportation; 23 have no health insurance; 22 find it difficult to pay for health services available at private expenses; 15 - distrust available health services; 10 - do not remember or do not want to respond and one answered „other”.

### **3. Conducted studies (fieldwork) on morbidity in the region - synthesis**

In the period 26 August - 10 September 2019 a study was carried out by a team of Medikus-2001 EOOD (Occupational Health Service - Plovdiv).

Subject for study and analysis of the morbidity of the population inhabiting the remote areas of the municipality of Momchilgrad is the totality of identified cases of morbidity in 500

persons, subjected to prophylactic clinical laboratory medical tests and examinations under the project „Preventive health measures for the population of the municipality of Momchilgrad” under the project: „Policies for Enhancing Access to Health Services in Deprived Areas”, acronym „The Healthy Municipality”, which was implemented with the financial support of the cooperation programme INTERREG V-A Greece-Bulgaria 2014-2020” under Lot 1: „Identification and analysis of local morbidity of population living in deprived areas of the municipality of Momchilgrad through the collection of blood samples, targeted to 500 persons, separated in two packages for men and for women”.

The data from the conducted prophylactic laboratory tests and examinations were reflected in a record for each examined patient, which contains a questionnaire for risk factors for socially significant diseases, family history, results of the conducted tests, conclusions and recommendations to the GP for treatment.

The study included 368 women (73.6%) and 132 men (26.4%) in 5 age groups.

Blood sample tests were separated in two packages:

• **Test package for women:**

- 1) Full blood count with 22 components:
  - white blood cells (leukocytes) WBC, Neu (Neutrophils), Neu %, Ba (Basophils), Ba%, Eo (Eosinophils), Eo%, Mo (Monocytes), Mo %, Ly (Lymphocytes), Hemoglobin, Erythrocytes Er (Erythrocytes), Hematocrit HCT, MCV, MCH, MCHC, RDW, Platelets PLT, MPV, PDW, PCT;
- 2) Cholesterol
- 3) HDL- cholesterol (HDL-C)
- 4) LDL- cholesterol (LDL-C)
- 5) Glucose (blood sugar)
- 6) Triglycerides (TG)
- 7) MAT (Anti-microsomal antibodies)
- 8) TSH (TSH- receptor antibodies)
- 9) fT4 (Free thyroxine (fT4)
- 10) ASAT (Aspartate aminotransferase/Glutamate oxalate transaminase)
- 11) ALAT(Alanine aminotransferase)

• **Test package for men:**

- 1) Full blood count with 22 components:
  - white blood cells (leukocytes) WBC, Neu (Neutrophils), Neu %, Ba (Basophils), Ba%, Eo (Eosinophils), Eo%, Mo (Monocytes), Mo %, Ly (Lymphocytes), Hemoglobin, Erythrocytes Er (Erythrocytes), Hematocrit HCT, MCV, MCH, MCHC, RDW, Platelets PLT, MPV, PDW, PCT;
- 2) Cholesterol
- 3) HDL- cholesterol (HDL-C)
- 4) LDL- cholesterol (LDL-C)
- 5) Glucose (blood sugar)
- 6) Triglycerides (TG)
- 7) MAT (Anti-microsomal antibodies)
- 8) TSH (TSH-receptor antibodies)
- 9) ASAT (Aspartate aminotransferase/Glutamate oxalate transaminase)
- 10) ALAT(Alanine aminotransferase)
- 11) PSA (Total prostate specific antigen)

Of those surveyed, the majority were over 55 years of age. Those were 340 in total, which is 68.0% of all respondents. In second place are persons falling in the 45-55 age group - 75 in total, or 15 percent. In the third place are persons falling in the 35-45 age group - 46 in total, which is 9.2%

of all respondents. Next is the 25-35 age group - 24 persons, which constitutes 4.8%. The persons in the group of up to 25 years of age were 15 or 3.0%.

- **Results by disease groups**

In the conducted clinical laboratory tests and examinations were identified **306 newly detected cases of diseases or deviations in blood tests.**

The greatest number of registered diseases are from the group of **Diseases of the circulatory system – 497 cases in total**, out of which **166 were newly detected**. The leading disease in this group is Essential hypertension (high values of the arterial tension) – 166 female cases and 54 male cases, followed by Chronic Ischemic Heart Disease – 33 female cases and 16 male cases. 16 cases of sequelae of cerebrovascular disease are registered - 13 female cases and 3 male cases.

In the second place are diseases from the group of **Diseases of the endocrine system, eating and metabolism disorders – 182 cases in total, out of which 85 were newly detected**, identified for the first time changes in health status. In the conducted clinical laboratory tests were identified 51 cases of pure hypercholesterolemia (40 female cases and 11 male cases), 47 cases of pure hypertriglyceridemia (33 female cases and 15 male cases), 34 cases of mixed hypercholesterolemia (30 female cases and 4 male cases).

In the separate male and female laboratory blood tests were included hormonal studies for screening of **Thyroid Diseases - MAT** (Anti-microsomal antibodies), TSH (TSH-receptor antibodies), FT4 (Free thyroxine (FT4)). The analysis draws attention to the great number of thyroid diseases –107 cases in total, of which 81 newly detected. 71 cases were identified (9 male cases and 62 female cases), out of which 55 newly detected cases of high MAT (Anti-microsomal antibodies) levels. The persons with registered high MAT levels were referred to their GP for further diagnostics in relation with an observed Autoimmune thyroiditis diagnosis.

From the group **Diseases of the thyroid gland**, in the second place are the cases of Hypothyroidism – 16 cases, out of which 14 newly found, followed by other thyroid diseases, unspecified - 10, of which 8 were newly detected.

All persons with identified changes in the clinical laboratory tests, incl. changes in hormonal activity, were referred with letters to their GP for further diagnostics and dynamic follow-up.

From the group **Diseases of the endocrine system, eating and metabolism disorders** were registered 53 cases of non-insulin dependent diabetes mellitus (14 male cases and 39 female cases), out of which 3 newly identified, and 14 cases (2 male cases and 12 female cases) of insulin dependent diabetes mellitus.

In the conducted laboratory blood tests were identified 34 cases (8 male and 26 female), of **Anemic Syndrome**, of which 33 newly detected, and the persons with identified changes in blood tests were referred to their GP for further diagnostics and follow-up.

Analysis of the blood tests establishes 21 **newly detected cases of elevated levels of liver enzymes** - ASAT, ALAT, of which 11 female cases and 10 male cases, which were referred to their GP for further diagnostics,

There were 10 registered cases in total from the group of **Malignant diseases**:

- 4 cases of malignant neoplasm of the mammary gland - underwent surgery, under surveillance, with ongoing therapeutic treatment and monitoring by specialist;
- 1 case of malignant neoplasm the rectum;
- 1 case of malignant neoplasm of the larynx;
- 2 cases of malignant neoplasm of lower lobe, bronchus or lung;
- 1 case of secondary malignant neoplasm of colon and rectum;
- 1 case of multiple myeloma.

The registered cases are diagnostically determined, and the persons are placed under surveillance and monitored by the respective specialists.

In the conducted **prostate cancer** screening with a PSA (prostate specific antigen) test, of the 132 men who were subjected to screening in 5 were detected elevated levels of PSA. Given the differential diagnosis of elevated prostate-specific antigen levels in inflammatory diseases and/or prostatic hypertrophy, administration of prostate medications, etc., persons with identified high levels of prostate-specific antigen were referred to a physician for further diagnostics, follow-up and consultation with a specialist in urology.

In the prophylactic medical tests and examinations were registered 26 persons with a diagnosis of **Obesity** (2 male cases and 24 female cases).

During the examination the patients were consulted on about healthy eating habits and were provided with a hygienic-dietetic regimen in order to prevent the risk of cardiovascular diseases and metabolism disorders.

All persons with newly detected cases of morbidity and abnormalities in blood tests were referred with letters to their GP for further diagnostics, dynamic follow-up and, if necessary, consultation with a specialist.

### **CONCLUSION**

In the performed clinical laboratory studies and examinations of groups of the population in remote areas of the municipality of Momchilgrad and the analysis of local morbidity the following was established:

➤ Most cases of morbidity were detected in the 55+ age group. In the second place were people of age 45-55 with identified changes in health status.

➤ In the first place with 497 cases is the group of Circulatory diseases – Diseases of the cardiovascular system, of which 221 cases of arterial hypertension /high blood pressure levels/, as with age the incidence of hypertension in both sexes /men and women/ increases.

➤ In second place is the group of Endocrine diseases, eating and metabolism disorders, of which 107 cases of Thyroid disease, 53 cases of non-insulin dependent diabetes mellitus, 14 cases of insulin dependent diabetes mellitus etc.

In the conducted clinic laboratory tests of 500 persons, in 135 persons were identified changes in the lipid profile - 51 case of pure hypercholesterolemia, 49 cases of pure triglyceridemia, 34 cases of mixed hyperlipidemia, 1 case of lipoprotein metabolism disorder, etc.

These changes are a risk factor for the occurrence of chronic non-infectious diseases - cardiovascular diseases and diseases of the endocrine system, etc.

During the prophylactic medical examinations and the laboratory tests among the population were conducted surveys on risk factors for the occurrence of socially significant diseases (chronic non-infectious diseases). As risk factors were cited - smoking, irrational eating habits, alcohol use, motor activity, obesity, stress factors at home and at work, family history, etc.

Analysis of the questionnaires establishes that:

➤ 43.67% of the examined persons declare they experience stress factors at home and at work;

➤ 34.4% use too much salt in their food;

➤ 17.0% of the examined persons are overweight;

➤ 10.0 % are smokers – smoke more than 10 cigarettes per day.

With regards to family history as a factor for the development of diseases, out of the 500 person subject to prophylactic laboratory tests and examinations:

➤ 38.0 % have a family history of hypertension (high levels of blood pressure and risk of cardiovascular disease);

➤ 13.60 % have a family history of diabetes mellitus (Disease of the Endocrine System);

➤ 10.40 % have a family history of cardiovascular disease;

➤ 7.20 % have a family history of malignancies.



118 persons were identified as clinically “healthy”, which is 23.6% of the number of examined persons or a total of 500.

The cited data from the study in the municipality of Momchilgrad confirm the necessity and purposefulness of conducting prophylactic screening medical examinations and tests with the aim of early identification of socially significant diseases and risk factors for public health. They should serve for the development of Programmes for integrated prophylactics of chronic non-infectious diseases (Cardiovascular diseases, Endocrine diseases, Malignant diseases, etc.), the identification of vulnerable groups and the implementation of specific measures for the reduction of morbidity and the development local health policy plans, incl. preventive healthcare.

## **PART 2. MUNICIPALITY OF KRUMOVGRAD**

### **1. Synthesis of the identified socio-economical characteristics of the population, morbidity, scope of health services in the region of the municipality**

#### **1.1. General characteristics of the region**

The Municipality of Krumovgrad is an administrative unit of province of Kardzhali, its territory falls entirely in the Eastern Rhodopes. It occupies 26% of the territory of province and 0.75% of the territory of the country.

To the east it borders with the municipalities of Ivaylovgrad and Madzharovo, to the west - with Kirkovo and Momchilgrad, to the north with Kardzhali and Stambolovo and to the south with the Hellenic Republic.

Its total territory is 843,320 m<sup>2</sup>, of which 48,79% are forests, 47,83% - agricultural lands, 2,18% are settlements and other urbanized territories, 1,2% is water area, transport infrastructure etc.

The municipality consists of 80 settlements in 403 neighborhoods. The administrative center is the town of Krumovgrad, which 310 km away of the capital and 48 km of the provincial center Kardzhali. The nearest land border checkpoint 130 km away is Kapitan Andreevo. The closest water border checkpoint is Burgas, 310 km away from Krumovgrad. The closest railway junction is 32 km away in Momchilgrad. The Makaza Border Checkpoint is 40 km away from the town of Krumovgrad and 18 km away from the western border of the municipality.

The territory of the municipality of Krumovgrad falls into the northern periphery of the Mediterranean climatic influence and is characterized by a transitional Mediterranean climate. The winters are relatively mild. The average annual precipitation is 52.1 l/m<sup>2</sup>, which is close to the average values measured in meteorological stations in 2001. The low-mountain landscape, the openness to the north through the Krumovitsa River valley, allows the unobstructed invasion of both Mediterranean and cold continental air masses, resulting in a great a variety of the climate.

The constructed road network in the municipality is with a total length of 360.6 km, of which 264.6 km are asphalted. Second-class roads are 27 km, third-class roads - 75 km and municipal roads - 261 km. The density of the road network is 43 km/100 m<sup>2</sup>, which is higher than the average for the country (33 km/100 m<sup>2</sup>). The major arterial roads are road III-509 Harmanli - Dolno Cherkovishte - Dolna Kula - Krumovgrad - Tokachka - Makaza and road II-59 Momchilgrad - Krumovgrad - Ivaylovgrad, both passing through the municipal center, Krumovgrad and connecting the municipality with neighboring municipalities, the provincial center and the national road network. The major arterial roads are road III-509 Harmanli - Dolno Cherkovishte - Dolna Kula - Krumovgrad - Tokachka - Makaza and road II-59 Momchilgrad - Krumovgrad - Ivaylovgrad, both passing through the municipal center, Krumovgrad and connecting the municipality with neighboring municipalities, the provincial center and the national road network. They are important for the socio-economic development of the municipality as a connection to Transport Corridor 9 Kardzhali - Makaza - Alexandroupolis and create prerequisites for active economic development and increase in the attractiveness of the municipality in the eyes of external investors.

The main problems for the maintenance and development of the municipal road network are related to the lack of funds for repair and investments in road infrastructure and a tendency for continuing deterioration in the quality of the infrastructure caused by the intensity of water erosion, especially on roads with crushed stone pavement and unpaved roads. The budget resources of the municipality of Krumovgrad, like those of most other small municipalities in Bulgaria, are highly dependent on subsidies from the republican budget. The potential for realizing own revenues for financing of significant infrastructure projects is limited.

Water sources in the municipality of Krumovgrad are insufficient in quantitative and qualitative terms. 38 settlements are supplied with water and one is partially supplied. The rest are supplied with water from local water sources and during the summer months water needs to be delivered with tank trucks. The water supply network is managed by WSS OOD - Krumovgrad, which has state and municipal participation. The amount of water supplied to households in the municipality of Krumovgrad (85 l/h/day) is higher than these values for the province and lower than the values for the country (71 and 90 l/h/ day respectively), the main problem being the lack of sufficient water sources with quality drinking water. A sewerage network is only constructed in the municipal center - the town of Krumovgrad, while in the rest of the settlements septic tanks and absorbing wells are used.

All settlements in the municipality of Krumovgrad are electrified, which is implemented by "EVN Electrodistribution" EAD - Plovdiv, Kardzhali branch, Krumovgrad region. On the territory of the municipality operates Hydroelectric Power Station "Studen Kladenets", constructed on a dam of the same name, which is used for energy production. The plant has an installed capacity of 60 megawatts and annually produces 153.1 million kilowatts of electricity. The transformation of high voltage to medium voltage is carried out by Substation Krumovgrad, which is connected with Power Station Studen Kladenets and Substation Momchilgrad. The Krumovgrad substation has a total transformer capacity of 40 megawatts.

The establishment and improvement of the irrigation zone would lead to an increase in the income of the population from production. Irrigation at this stage is carried out mainly in the lands near the valleys of the rivers Krumovitsa and Arda by method of extending irrigation lines. Dam waters are not sufficiently utilized. At this point there are no irrigation companies whose members would manage and exploit dams at a lower price.

The Krumovgrad Municipality is served by the regional telephone network with a main Automatic Telephone Exchange in Kardzhali; a transit node operates in the municipal center of Krumovgrad, and the local nodes are 13. Nearly all settlements are included in the automatic telephone dialing system. Internet access is provided through leased lines of BTC AD and a network of cable operators. The opportunities for development of the communications network are related to the proximity to the optic cable network Haskovo - Komotini.

## **1.2. Socio-economic characteristics of the region**

Because of the peculiarities of the terrain, the settlements in the municipality are fragmented and remote. The most distant village from the municipal center at 55 km is the village of Bryagovets. A bus trips to there once daily. The individual neighborhoods are remote from one another and are connected by a road network of poor quality.

The population of the municipality of Krumovgrad in 2011 was 17,662 people. Of these 5,019 live in the town of Krumovgrad and 12 643 in the rural settlements of the municipality.

Population aged 15 and above and economic activity as of 01.02.2011, according to NSI data of 2011:

- Total – 15 085;
- Total economically active population – 7 283;
- Of them employed – 5 921;
- Unemployed – 1 332;
- Economically inactive population – 7 802.

There is a tendency for the increase of the share of persons above working age, especially in the villages. Their population consists mostly of elderly people who live alone and have difficulty in organizing their daily lives.

The population decline in the municipality of Krumovgrad, as well as in the whole province of Kardzhali, began after 1990 and is still continuing. This is primarily due to the negative natural growth and the increased migration to the interior of the country.

The population by sex is distributed as follows: out of a total of 17,662 inhabitants of the municipality, 8,903 are men and 8,759 are women.

The absolute value of births shows a tendency for decrease.

The educational level of the population is low and the share of specialists with higher and intermediate education is small - a total of 4.81% of the population of the municipality (due to continuing migration abroad and to the larger cities of the country). The population group with secondary education (19.43%) is sufficient to supply the municipal economy with working staff. The group of residents with primary (33.91%) and elementary education (28.12%) is predominant. The illiterate are 6.03% and children in pre-school age are 7.05%. The educational level of 0.63% of the population is not indicated.

The economically active population encompasses all persons aged 15 and above who both employed and unemployed. According to this indicator Krumovgrad municipality is above the average for province of Kardzhali - 46.5 %. In regard to economically inactive persons, the municipality of Krumovgrad ranks first for retirees (55.3%). Employment rate is the highest in the municipality of Kardzhali - 51.0%, or by 4.6 percentage points higher than that of the province. The municipality of Krumovgrad is ranked second with 49.5 %.

The unemployment rate in the municipality in 2012 is 18% .This value is above the national average (11.1%) and higher than the one for province of Kardzhali (15.1 %). In terms of age, the relative share of registered unemployed persons in the age groups of 55 years and above and 50-54 years is the largest. In this case municipality of Krumovgrad is not an exception to the general trends in the country and the province.

An additional disadvantage for the municipality and the province as a whole is the lower education and qualification of young people. The relative share of unemployed youth below 29 in the municipality is 19.21 %. By this indicator the municipality of Krumovgrad ranks first in this province.

The analysis of the data for the municipality of Krumovgrad shows that problems with unemployment are particularly difficult to solve in small municipalities and settlements.

According to NSI data for 2012 the number of residential buildings is 7,753, with statistics for previous year showing that 53% of the housing stock is inhabited. In 2011 only 805 buildings were counted in the city, with the majority of the housing stock being in the villages. The density of the population is 20.7 people/km<sup>2</sup>:

- Useful area - 809,064 m<sup>2</sup>.
- Living area - 637,923 m<sup>2</sup>.
- Ancillary area - 137,824 m<sup>2</sup>.
- Kitchen area - 33 017 m<sup>2</sup>.

The main problem in the municipality is the lack of sufficient water sources with quality drinking water. A sewerage network exists in the municipal center and 4 villages, and is partially constructed in 6 villages. In the remaining settlements, septic tanks are used.

The population primarily uses solid fuel - wood and coal, for heating.

The Krumovgrad Municipality is served by the regional telephone network with a main Automatic Telephone Exchange in Kardzhali, while the local nodes are 13. The three mobile network operators have nearly 100% coverage, they also offer wireless internet.

The opportunities for development of the communications network are related to the proximity to the optic cable network Haskovo - Kavala. As a factor reinforcing the business development by creating conditions for the introduction of modern information services and

technologies, the telecommunications network needs further development, innovation and modernization.

From the available data on the poverty line for the country as a whole and in the province of Kardzhali, it is clear that single persons as well as families with 2 children under the age of 14 live below the defined poverty line in the country.

According to data of the NSI and RDE - Kardzhali, the total number of dropouts in the municipality of Krumovgrad for the period 2012-2016 is 86.

The Gross domestic product per capita is at relatively low levels compared to the average for the country. However the municipality shows improvement - in recent years there has been an increase in the expenses on fixed tangible assets in all three sectors of the economy.

The number of businesses registered in the municipality of Krumovgrad is 929, of which 99.4% are private, incl. 10% foreign businesses. There are 263 operation companies, of which 95 are micro-companies (employing up to 10 people). 90% of the businesses are registered as a sole trader. The largest share of registered companies has trade (45%), transport (22%), catering and accommodation (15%) and agriculture (5%).

The Krumovgrad municipality has a functioning light industry, which specializes in the production of footwear and sewn products. The enterprises are medium-sized and are concentrated in the town of Krumovgrad. The material and technical base is good and meets the technological requirements. The activity of the companies is mainly focused on export on the basis of toll processing and their output is below their productive capacity.

A small number of micro-enterprises are established in the municipality to produce bread, bakery products and soft drinks.

Part of the construction activities on the territory of the municipality are carried out by the company "BKS" EOOD. The company owns equipment, transport, warehouses. Several private companies are also engaged in construction activities.

In conducted geological studies of the region in the municipality were discovered gold deposits. The total amount of the deposits is 28 tonnes with high percentage of gold content. After concession the industrial gold mining began at the deposit site by an open-pit method. Mineral resources such as asbestos, trass and perlite have been identified but not developed in the areas of the villages of Avren and Golyamo Kamenyane.

The most powerful business factor in the municipality of Krumovgrad is "Dundee Precious Metals" EAD, exploiting the gold mining area in the Ada Tepe locality. The service contracts signed by the company with local businesses are 46. Total cost of the services is 5,780 thousand BGN. The dwellings rented in the municipality of Krumovgrad by Dundee Precious Metals EAD, including apartments and individual floors of houses, amount to 66. Average rental price per month is 520 BGN.

On the basis of a memorandum, Dundee Precious Metals EAD has signed a framework contract with the municipality of Krumovgrad and annually provides 500,000 BGN for municipal projects related to infrastructure, education and healthcare. In addition, the company supports financially the Vocational High School for Transport in the town. 50% of the concession fee also returns to the border municipality.

The locals of the municipality of Krumovgrad hired by Dundee Precious Metals EAD are 155, of whom 15 are women. Since the beginning of 2018, 41 more employees have been recruited. The indirect employees working for subcontractors of Dundee Precious Metals are 232, 48 of whom are women. In 2017, in Dundee Precious Metals Krumovgrad EAD were invested 80 million dollars. Two water treatment plants will be built on Ada Tepe. The first one is for domestic wastewater and the second one will be used in need of discharge of wastewater into the bed of the Krumovitsa River, in which case the water coming from the river will be of drinking quality.

Approximately 210-220 people will progressively be engaged in the Ada Tepe mining area. There are enough qualified candidates from the municipality of Krumovgrad for all types of professions, except for electricians, for which positions staff is brought in from Kardzhali.

Tobacco production shapes the economic image and characteristics of the municipality. Tobacco is the main culture that provides livelihood to a large proportion of the population. High quality oriental tobacco of the type "Bashi-Bali", origin Krumovgrad, is produced.

The semi-mountainous relief of the municipality of Krumovgrad is suitable for the development of livestock breeding. Poor mechanization and automation, high costs of animal husbandry, and a poorly functioning market have a negative impact on the number of raised animals and the produced output. Cattle and sheep breeding are best developed.

In spite of the ecologically clean area, there are no livestock breeding farms in the municipality. Animals are scattered on private agricultural properties and are grown mainly for personal needs. The produced milk produced is not marketed, which deprives the producers from the opportunity of capitalizing the production and of receiving subsidies. On the territory of the municipality there are no enterprises for processing the agricultural production.

Farmers are increasingly interested in the development of alternative farming as an opportunity to provide higher incomes and employment. In recent years, plantings have been created and white oregano is effectively grown on an area of 500 decares, St. John's wort - on over 30 decares, lemon balm - on over 50 decares, rose hip - on 50 decares. Annually with pepper are recultivated areas of over 500 decares, with summer savory - of over 500 etc. These crops cannot be an alternative to tobacco, as in their production engages only a small workforce.

Krumovgrad Municipality is located in a semi-mountainous area, where the local economy is heavily dependent on agriculture as a source of income and employment. Farming accounts for 54.2% of employment. The agricultural land in the municipality is 382,228 decares, incl. arable land 1475.45 decares (38.6%), meadows and pastures 141,140 decares (36.9%), forests in agricultural properties 93,543 decares (24.5%).

The irrigable area is 3,000 decares, but the irrigation system is heavily depreciated. The most utilized irrigation method is the extension of watering lines. 60 micro-dams are built on the territory of the municipality and can be used for irrigation. The rebuilding of the irrigation network is related to attracting investment and should take into account the peculiarities of small farms.

By form of ownership, 19% of the agricultural land is private, 60% is municipal (and almost completely consists of so-called municipal residual land) and 21% is state-owned.

Land ownership is fragmented and the farms which cultivate less than 10 acres predominate. 2,009 decares are cultivated under lease. There is no modern equipment for carrying out agro-technical measures with a longer duration, which seriously reduces the efficiency of the economic activity.

The province of Kardzhali and the municipality of Krumovgrad have some specific features in their ethnic structure compared to the rest of Bulgaria. From the discovered data the higher relative share of the population of Turkish ethnicity in the municipality and the province compared to the average for the country is clearly visible. This peculiarity, characteristic of the municipalities of the Eastern Rhodopes, is important for the reproductive process of the population. Preserved traditions in the reproductive attitude and behavior of the local population are a major factor in maintaining a higher birth rate than the average for the country. Ethnicity also affects the external migration of the population in the municipality and the region, as well as its employment, education, etc. According to the census of 2011 in the municipality of Krumovgrad as Bulgarians self-identify 22.26% of the population, as Turkish - 57.01%, as Roma - 0.20%, 1.25% do not self-identify, and 18.73% have not provided answer.

For the cultural and historical heritage of the municipality of Krumovgrad testify over 2,000 exhibits, arranged in a museum collection with an exhibition area of 250 m<sup>2</sup> and separated in

archeology, new history and ethnography sections. The collection was opened in 1971 and is housed in a building built in 1901 and declared a cultural monument in 1982.

There are 31 archaeological sites and 12 architectural monuments in the territory of the municipality of Krumovgrad, which have the status of monuments of culture of local importance. In the central part of the town of Krumovgrad was uncovered a prehistoric settlement with materials from the Neolithic, Paleolithic and Bronze Age. Interesting Thracian cult monuments are the niches, cut in the vertical rocks along the valley of the Arda River. A cultural monument group of local importance are several old houses, tobacco warehouses, and a mosque, while architectural and artistic monuments are the churches in the villages of Avren, Chernichevo and Egrek.

The most significant cultural event in Krumovgrad, with twenty-five years of history, are the traditional cultural holidays "The lights of Krumovgrad" held annually on the eve of May 24th. The public event attracts cultural figures from different art fields.

Cultural activities on the territory of the municipality are organized in 12 cultural centers, each of which has a library with a collection of between 4 and 10 thousand volumes, with the cultural center of Krumovgrad having nearly 50,000 volumes. The cultural centers in Krumovgrad and the larger villages have cinemas.

Tourism is not very developed on the territory of the municipality and forms an insignificant part of the revenues. The potential for development of rural and ecological tourism has not been utilized due to the lack of funds for the establishment of accommodation facilities and the lack of investor interest in the tourism field, there is an acute shortage of qualified personnel.

The potential for development of tourism on the territory of the municipality is mainly related to the creation and promotion of ecotourism products and cultural routes.

### **1.3. Characteristics of public health**

The total mortality rate for province of Kardzhali for the period 2001-2010 is lower than in the country - from 10.8 in the beginning of the period to 11.1 in the end for the district and from 14.2 to 14.6 in the country.

The total mortality rate for the province of Kardzhali in 2011 is 12.7 ‰. It is highest in the municipality of Ardino - 15.6 ‰, followed by the municipalities of: Kirkovo - 14.7 ‰; Krumovgrad - 13.9 ‰, Chernoochene - 13.6 ‰; Dzhebel 12.2 ‰, Momchilgrad - 11.6 ‰ and Kardzhali - 11.4 ‰. The difference between the values of the indicator in towns and villages is significant.

Among the reasons for the increase in mortality in the province are:

- Increasing aging of the population;
- Increase of the mortality in active age from socially significant diseases;
- Risk factors related to the lifestyle of the population: irrational nutrition, smoking, hypodynamia and stress;
- Socio-economic and environmental factors.

In 2011 the highest child mortality rate is in the municipality of Krumovgrad - 8.9 ‰. The main cause of death of children under 1 year in 2011 are a number of conditions occurring in the perinatal period - 7.6. Relatively lower is the incidence of deaths among neonatal infants - 2.9.

In the structure of the hospitalized patients in the province of Kardzhali during the last 3 years the leading diseases are: Diseases of the circulatory system followed by Diseases of the respiratory system and in third place Pregnancy, childbirth and postpartum period. The situation in the municipality Krumovgrad is similar.

### **1.4. Health and welfare services in the region**

In 2011 in the province of Kardzhali there are 66 general practitioners registered. There are still unoccupied medical practices in all municipalities. A significant proportion of the physicians,

especially those in small settlements, are in retirement or pre-retirement age, and the number of young physicians is extremely low.

The large distances between small settlements and urban centers obstruct the access of inhabitants of remote and hard-to-reach settlements and neighborhoods to medical help. In most villages, people do not have direct access to primary care.

Emergency medical care as a whole is insufficiently effective due to difficult access. Evaluation of the demand for specialized medical staff in outpatient care detected the need to expand the package of services in each specialty and to relocate some diagnostic and treatment services from inpatient to outpatient care.

Providers of specialized outpatient medical care are also unevenly distributed, with their concentration being predominantly in the municipal centers. This obstructs public access to this type of service, increases the number of cases with late diagnosis and complications, and increases the number of hospitalizations.

The system of medical establishments (5) in the Municipality of Kardzhali is capable of meeting the public healthcare needs of both the municipality and the province. Because of the uneven distribution of pre-hospital care, the number of hospitalizations in many hospitals in the province has been increasing. Consultations with a specialist are impossible in remote places. Patients have no access to a laboratories, imaging diagnostic units, etc. and prefer to refer to directly a hospital as a single complex in which they can receive any needed medical care. . In primary outpatient care there is no established system for 24-hour admission. This increases the flow of patients to specialists and hospitals. This practice increases the number of secondary care visits and hospitalizations.

In the territory of the provincial center Kardzhali there is a Center for Emergency Medical Care (CEMC), which has 8 branches, which serve the 7 municipalities of the province.

In 2011 in the municipality were registered: 4 individual practices for primary outpatient medical care; 10 for dentistry 10; a single group practice for primary medical care and individual practices for specialized outpatient care.

There are unoccupied outpatient clinics in Krumovgrad and the villages: 4 in the town and 10 in the villages. On the territory of the municipality 15 specialists provide health services to children in 9 kindergartens and 12 schools.

There is a single general hospital - GHAC "Life +" EOOD in the municipality of Krumovgrad. It was established on 04.09.2000 with a capital amounting to 248,595 BGN.

The sole owner of the company is the Municipality of Krumovgrad, with the property rights being exercised by the Municipal Council of Krumovgrad. In the medical establishment Medical specialists, together with other staff, treat people with acute illnesses, acute chronic diseases and conditions requiring surgical treatment in hospital conditions in the following main medical specialties:

- Diagnosis and treatment of diseases in case successful treatment can't be achieved in outpatient care establishments;
- Natal care;
- Rehabilitation;
- Diagnosis and consultations requested by a physician or dentist from other medical establishments;
- Follow-up

Diagnostic Consultation Block - consists of reception rooms, clinical laboratory, diagnostic imaging department, microbiological laboratory, laboratory for general clinical pathology and departments without beds - anesthesiology department and physiotherapy department, which is not functioning at present.



Inpatient block with 54 active beds with Department of Internal Diseases, in which activities in the medical specialties Pneumology and cardiology are carried out; Department of Pediatrics (Children's ward); Department of Obstetrics and Gynecology; Department for Continuous Treatment of Internal Diseases.

Administrative - business block with Sterilization Room; Automobile transport; Administration. The Duty Room has been providing medical assistance to health-insured and uninsured persons between 8.00 pm and 8.00 am on working days and 24 hours a day during weekends and holidays. The hospital structure includes a hospital pharmacy.

The hospital is well equipped with medical equipment, with respect to the diagnostic-consultation care, outpatient treatment and urgent emergency medical care carried out in it.

In the municipality is under construction the Medical Center No.1 EOOD for outpatient specialized care with internal medicine room, surgery room, children's room, ENT room, Obstetrics and Gynecology room and Ophthalmology room.

The Regional Medical Centers in the province of Kardzhali are 5. There are no private clinics. There are also no private doctors.

Settlements in the region are characterized by a great distance from health services - up to 10 km - 21 villages; between 10.1 km and 20 km - 28 villages; between 20.1 km and 30 km - 15 villages; between 30.1 km and 40 km - 8 villages; between 40.1 km and 50 km - 4 villages. Most distant are 3 settlements, respectively one at 51 km, two at 53 km.

Doctors (539) per 1000 inhabitants in the province as of 31.12.2017 are 3.6 and in the municipality of Krumovgrad (19) - 0.9.

Healthcare specialists per 1000 inhabitants (in the province - 854, in the municipality - 29) as of 31.12.2017, respectively 5.7 and 0.6.

Hospital beds per 1000 inhabitants (in the province - 826, the municipality - 54) as of 31.12.2017 are respectively 5.5 and 3.2.

The number of people using health services per 1,000 inhabitants for the municipality in 2017 is 16,931, for the province 151,133.

The number of hospitalized persons per 1000 inhabitants for the municipality in 2017 is 86.47% and for the province 175.12%.

The following health programs are provided in the municipality (vaccinations, information events, programs for the elderly):

Project "Provision of Integrated Services for Early Child Development in Krumovgrad Municipality", Procedure "Early Child Development Services" under the Operational Program "Human Resources Development" 2014-2020, co-financed by the European Social Fund of the European Union. It complements and supports the work of the successfully created Center for Provision of Integrated Social Services in the Community under the Social Inclusion Project, financed by Loan 7612BG from the International Bank for Reconstruction and Development in the period 2012-2015. The project aims to support young children and their families in improving access to healthcare, building parenting skills, improving the family environment, increasing the child's preparedness for entering the education system, and preventing placement of children in specialized institutions.

Foundation "Do Good - Alexandrovska", Sofia, with the assistance of the Municipality of Krumovgrad, organizes free annual preventive examinations for residents of the municipality over 60 years of age.

The following social services are provided on the territory of the municipality of Krumovgrad:

Center for Family-type Accommodation for children and adolescents 1 and 2 (CFTACA) - a residential-type social service, adolescents that provides an environment for the full-fledged growth

and development of children and adolescents who cannot be reared at the time of their accommodation in their biological family, in the family of relatives, or a foster family.

Center for public support (CPS) - Krumovgrad provides a range of social services for children and families aiming to prevent child abandonment and their placement in specialized institutions, to prevent of violence and dropping out of school, to deinstitutionalize and reintegrate of children, to train in independent living skills and socially integrate children from institutions, to counsel and support families at risk, to assess, train and support foster parents and adopters, to counsel and support children with behavioral problems and transgressions. The center employs a social worker, pedagogue, psychologist, and speech therapist who perform individual work with children and families.

Elderly care facilities are:

Home for Elderly People with a capacity of 50.

Home social patronage - a set of social services provided at home. The capacity is 165 with two branches in the villages of Avren and Potochnitsa.

In the municipal center are established and function clubs for pensioners and people with disabilities.

Among the welfare programs of the municipality (economic, educational, health) is also the Municipal Youth Plan for planning and implementing the priorities of the municipal and national policy for young people.

The municipality has a stadium in the municipal center, a covered swimming pool in High School "Vasil Levski", Krumovgrad and sports playgrounds. The sports infrastructure in schools is in poor technical condition. In order to ensure the safety of the students and for renewal of the sports infrastructure and construction of additional facilities for sport and recreation invest the municipality and "Dundee Precious Metals" EAD - Krumovgrad.

The cultural sites of national and local importance are several: A late antiquity and medieval fortress wall, a Museum Collection, a Thracian Gold Mine, a Medieval fortress in the village Sarnak, Nature Reserve Center "Studen Kladenets", the Abrasive Wells and the Devil's Bridge (Sheytan), Reserve "Valchi Dol".

### **1.5. Public healthcare in the region**

The population benefiting from water services in the province of Kardzhali is 135,133 of the total number of its inhabitants. This means that 89% of the settlements are supplied with water.

The water supply and sewerage services are provided by "Water Supply and Sewerage" (WSS) OOD - Kardzhali, incl. to 41 settlements in the municipality of Krumovgrad with a total population of 15 203. In the summer some water supply units are incapable of meeting the increased water demand (mainly for agricultural purposes) and the introduction of a water regime is required. In case of water surge due to rains and snow melting runoff is impeded which is a cause for accidents and disruption of water supply.

The main pollutant in the municipality of Krumovgrad are automobile transport and domestic heating installations during the winter season. This pollution is episodic and can lead to abnormally high indication in specific weather conditions.

Irregular cleaning of the streets also affects the registered amount of dust. In the winter months there is a tendency for abnormally high levels of fine particulate matter up to 10 microns ( $\mu\text{g}$  - FPM 10), which is the result of the increased consumption of solid fuels in the domestic sector and the season-specific windlessness, mist and temperature inversions which create conditions for the retention and accumulation of atmospheric pollutants in the ground-level atmospheric layer.

The annual monitoring of the soils according to the monitoring network "Land and Soils" is carried out on the territory of province of Kardzhali. There are 14 points for soil sampling and

analysis for heavy-metal and metalloid contamination, incl. in the territory of the municipality of Krumovgrad.

The Krumovgrad Municipality organizes every year several sprayings of lands and areas in the town of Krumovgrad against mosquitoes and ticks.

The agricultural land in the municipality is 382,228 decares, incl. arable land 147,545 decares (38.6%), meadows and pastures 141,140 decares (36.9%), forests in agricultural properties 93,543 decares (24.5%). The most utilized irrigation method is the extension of watering lines. 60 micro-dams are built on the territory of the municipality and can be used for irrigation.

By form of ownership, 19% of the agricultural land is private, 60% is municipal (and almost completely consists of so-called municipal residual land) and 21% is state-owned.

A major part of the arable land is occupied with tobacco (26,583 decares). Medicinal plants (700 decares of white oregano, 70 decares of rose hips and 25 decares of lemon balm), fruit plantations (562 decares), vineyards (270 decares), other permanent crops (823 decares), pepper (270 decares) and savory (70 decares) are cultivated.

Land ownership is fragmented and the farms which cultivate less than 10 acres predominate. 2,009 decares are cultivated under lease. Although in recent years the number of small- and medium-sized equipment has increased, there is no modern equipment for carrying out agro-technical measures with a longer duration, which seriously reduces the efficiency of the economic activity.

Land ownership is fragmented and the farms which cultivate less than 10 acres predominate. 2,009 decares are cultivated under lease. The erosion processes induced by the sloping terrain reduce the area of arable land. The absence of large agricultural farms reduces labor productivity and opportunities for realizing lower production costs and market placement of the production.

Livestock breeding in the municipality has a smaller share of the agricultural output. Animals are raised on family properties, there are no large farms. In the majority of cases the animals are kept under primitive conditions.

For decades in the municipality of Krumovgrad there were concerns that the extraction activities of Dundee Precious Metals EAD will cause serious environmental problems. This has not been confirmed at this stage. At present all activities are environmentally sound and do not create environmental problems.

The municipal center - Krumovgrad, is covered by the system of organized waste collection and disposal. In the remaining settlements, municipal solid waste is disposed of in unregulated landfills, the removal of which is an important task for the municipal administration.

There are no significant pollutants on the territory of the municipality. The main pollutants of water are wastewater and sewerage water from the population and businesses, with no significant industrial pollution having been identified.

A specialized repository for the temporary storage of human medical waste has been established and a system for separate collection has been introduced. Cleaning of the streets is unorganized in nature which is directly related to ineffective spending of the already limited resources of the municipality.

Another major problem is that on the territory of the municipality there is no well-functioning system for the separate collection of packaging waste.

For the conservation of biodiversity the "Valchi Dol" reserve and seven protected areas have been declared. The reserve is with an area of 775 hectares, is situated in the land of the village of Studen Kladenets and has been declared as the only Bulgarian colony of Griffon Vultures. 23 species of birds of prey have been identified on the territory of the Reserve, 21 of which are listed in the Red Data Book of the Republic of Bulgaria.

On the territory of the municipality there are many caves, three of which are included in the list of the 250 most famous caves in Bulgaria.

## **2. Survey (fieldwork - quick statistics) on the accessibility and level of coverage of health services - synthesis**

Survey 559684 "Policies for providing access to health services in remote places" (fieldwork - quick statistics) was conducted in the municipality of Momchilgrad and remote places. The number of entries is 1000, the total number of entries in the questionnaire is 1933, with the percentage of all entries being 51.73%. The standard deviation from the quick statistics is 279.33.

The survey included the questioning of 1,000 people, of whom 495 (49.50%) **men** and 505 (50.50%) **women** over the **age** of 18.

Of the respondents with primary **education** were 416 (41.60%), with secondary - 449 (44.90%), with semi-higher education - 37 (3.70%) and with higher education - 98 (9.80%).

By **occupation** the respondents were distributed as follows:

- farmer - 55 or 5.50%;
- livestock farmer - 82 or 8.20%;
- self-employed - 31 or 3.10%;
- civil servant - 136 or 13.60%;
- employed in the private sector - 117 or 11.70%;
- housewife - 26 or 2.60%;
- student - 56 or 5.60%;
- pensioner - 461 or 46.10%;
- unemployed - 36 or 60%.

By indicator "**Monthly Family Income**" the results are as follows:

- no income - 87 or 8.70%;
- up to 500 BGN - 606 or 60.60%;
- from 500 to 1000 BGN - 239 or 23.90%;
- from 1000 to 1500 - 50 or 5.00%;
- from 1500 - 2000 - 10 or 1.00%;
- from 2000 to 3000 BGN - 6 or 0.60 %;
- above 3000 - 2 or 0.20%.

To the question „**Do you have health insurance?**” with „Yes” responded 922 or 92.20% , and with „No” 78 or 7.80% of the respondents.

The survey on **family status** indicates:

- married - 658 or 65.80%;
- married without children - 54 or 5.40%;
- single - 117 or 11.70%;
- widow/widower - 157 or 15.70%.
- divorced - 157 or 15.70%

A great part of 689 (68.90%) of the respondents fall in the comment category of the survey by this indicator.

To the question „**How many persons does your household consist of?**” predominant is the estimate „average” - 2.84 и „minimum” - 1.

To the question „**You live in a...**”, the answers are as follows:

- house - 879 or 87.30%;
- apartment - 114 or 11.40%;
- other - 7 or 0.70%;

707 (70.70%) of the respondents have a toilet and a shower **inside their home**, 240 (24.00%), - outside of their home, 53 (5.30%) only have an outside toilet.

**Household heating** is of different types, with the highest percentage of the respondents using wood - 906 (90.60%), in second place are respondents who use electricity for heating - 147 (14.70%), in third place - coal - 23 (2.30%); other (steam heating, pellets) - 10 (1.00%) of the respondents, no households use gas or oil.

Most respondents give more than one answer to the question if **they cook with:**

- wood - 662 or 66.20%;
- electricity - 538 or 53.80%;
- gas - 358 or 35.80%;
- other (ready meals, external service) - 4 or 0.40%.

The self-assessment of **health status** among respondents („Overall your health is...”) is as follows:

- excellent answered 74 or 7.40%;
- very good - 143 or 14.40%;
- good - 504 or 50.40%;
- satisfying - 250 or 25.00%;
- bad - 29 or 2.90%.

In the last year 560 persons or 56.00% of the respondents had **concerns about their health**, while 440 or 44.00% did not.

670 of the total number or 67.00% felt **discomfort in the last year**, while 330 or 33.00% - did not.

**Physical or psychic discomfort or a social problem** in the last year experienced 628 respondents or 62.80%, while 372 - didn't, which is 37.20%.

In the last year 357 respondents or 35.70% **were diagnosed with an acute or chronic illness**, while 643 were not - 64.30%.

From those with manifested first **symptom/problem** most - 83 (11.61%) of all respondents, have increased blood pressure, followed by osteoporosis - 59 (8.28%); cataract - 27 (3.71%); other visual disturbances - 26 (3.64%); headache - 21 (2.94%); migraine - 16 (2.24%); vertigo - 15 (2.10%); knee symptom - 31 (4.34%), and leg symptom - 23 (3.22%).

Heart arrhythmia had 26 or 3.64%; cardiac pain - 15 (2.10%); disorders of the digestive system - 11 or 1.54%; goiter - 13 (1.82%); gout - 15 (2.10%); menopausal syndrome - 12 (1.68%); insulin-dependent diabetes - 14 (1.96%); diabetes without insulin - 9 (1.26%). Of the respondents 6 (0.84%) did not answer the question. The percentage of respondents with other general symptoms is below one.

To the question „**Have you sought medical help for the indicated symptom/problem in the last year?**” with „Yes” responded - 514 or 71.89%; with „No” - 195 or 27.27%, 6 of the respondents did not answer the question, which constitutes 0.84% of the total.

Those who answered „Yes” (to all questions asked - 9 in total) **sought help** from their GP at the expenses of the NHIF - 410 (488.10%); those who attended a specialist are 239 (284.52%); 105 (125.00%) had a diagnostic test in a laboratory; 28 (33.33%) had emergency visits in a medical center or a hospital. 90 (107.14%) were hospitalized.

12 (14.29%) had a private appointment with a doctor, while 23 (27.38%) visited a specialist at private expenses. 6 (7.14%) of the respondents were examined in a private laboratory and also 6 (7.14%) were treated in a private hospital. 1 (1.19%) person does not remember or or does not want to answer the question 1 (1.19%).

Of those **who did not seek medical help for the symptom/problem** (those who answered "No"), 130 were treated with medication without a doctor's prescription; 48 21 felt that the

symptom was not something serious; 2 did not know what the right health service was for them; 6 did not find free time to seek health care, and 11 did not remember or did not want to respond.

To the question „**How well of badly did the symptom develop on the scale from 0 to 10?**”, most respondents - 202 (28.25% gave an estimate of 3 on the scale; 188 (26.29%) - of 4; 95 (13.29%) indicated 5; 74 (10.35%) - 2; out of the respondents 43 (6.01%) indicated an estimate of 6; 29 (4.06%) - indicated 7; 25 (3.50%) indicated 1; 8 and 9 are indicated by 18 (2.52%) respondents each; 15 (2.10%) - give an estimate of 10; 6 (0.84%) do not respond and 2 (0.28%) respond with 0.

**Second symptom** - no answer gave 590 (82.52%); elevated blood pressure indicate 25 (3.50%) respondents; 15 (2.10%) indicate knee symptom; osteoporosis 10 (1.40%); 8 (1.12%) - leg symptom; 8 (1.12%) - tension/headache. 100 (72.99%) have sought medical help; 25 (18.25%) not sought health services, while 12 (8.76%) did not respond.

Of the ones who **responded with „Yes”** for manifested second symptom/problem 76 appointed a meeting with a physician; 39 - with a specialist; 11 were hospitalized at NHIF expenses; 3 visited a medical center by urgency; 1 had an appointment with a private physician и 1 had diagnostics in a private clinic.

In the case of those who **answered "No"** - 18 of the respondents were treated with medication without a doctor's prescription; 4 found that the problem is not serious and did not require a health service; 1 didn't have the time; 1 did not know what kind of health service they needed; 1 could not find transport to the suitable health service and 1 indicates „Other” as a reason. 470 of the respondents chose not to respond.

To the question „**How well of badly did the symptom develop on the scale from 0 to 10?**”, 48 (35.04%) give an estimate of 3; 37 (27.01 %) of 4; 16 (11.68%) of 2; 11 (8.03%) - of 5; 5 (3.65%) of 6; 3 (2.19%) - of 1; 2 (1.46%) - of 7; and 2 (1.46%) - of 0; none of the respondents gave an estimate of 9 и 10. 12 (8.76%) did not respond.

For a **third symptom/problem** 691 (96.64%) did not answer the question. Osteoporosis indicate 5 (0.70%) of the respondents. Elevated blood pressure indicate 3 (0.42%); hand symptom/complaint - 2 (0.28%); the following were chosen by 1 (0.14%) respondent each - digestive symptom, cardiac arrhythmia, visual disturbances, insulin-dependent diabetes, goiter, asthma, pneumonia, neurological problem, leg and knee symptom.

20 (52.63%) **sought medical help**; 4 (10.53%) **did not**; 14 (36.84%) did not respond. Of those who sought help 18 went to a GP; 7 - to a specialist at NHIF expenses and 3 were hospitalized in a municipal/state hospital. Of those who did not seek medical help 3 treated themselves with medication without a doctor's prescription; 1 did not know what kind of health service they needed.

To the question “On the scale of 0 to 10 how well or badly did the third symptom develop?”, 14 (36.84%) give an estimate of 3; 7 (18.42%) give an estimate of 4, and one (2.63%) - of 1. 14 (36.84%) did not answer.

With regards to a **fourth symptom**, 706 (98.74%) did not respond; elevated blood pressure and varicose leg veins are indicated by two persons (0.28%) each; allergic reaction, digestive symptom, irregular heartbeat, neurological problem, influenza were indicated by 1 (0.14%) each. 8 (34.78%) sought medical help; 1 (4.35%) did not, and 14 (60.87%) did not respond.

Of the ones who responded with „Yes” 8 went to a GP; 3 visited a specialist at NHIF expenses and 1 was hospitalized in a municipal/state hospital. Of the ones who did not seek medical help one treated themselves with medication without a doctor's prescription.

To the question “On the scale of 0 to 10 how well or badly did the fourth symptom develop?” 14 (60.87%) do not answer; 5 (21.74%) give an estimate of 3; 2 (8.70%) - of 6; and 4 and 5 - one each (4.35%).

With regards to a **fifth symptom**, 713 (99.72%) did not answer; cardiac arrhythmia and abdominal pain/spasm were indicated by one person each (0.14%). Two sought help (12.50%), 14

(87.50%) did not answer. Of those who indicated a symptom one sought a GP and one sought medical help from a specialist at private expenses.

To the question “On the scale of 0 to 10 how well or badly did the third symptom develop?”, 14 (87.50%) do not respond, while 2 (12.50%) give an estimate of 4.

With regards to a **sixth symptom** 715 or 100.00% do not respond to the question at all. To the question “Have you sought medical help?” 14 (100.00%) did not respond. On estimate was also given on the 0 to 10 scale for development of the problem.

With regards to a **seventh symptom/problem** with the personal health of the respondents 715 (100.00%) did not respond.

**To the question „Are you healthy? ”** 291 (29.10%) of the respondents answer „Yes”, while „No” was indicated by 709 (70.90%).

In the last year 515 (55.50%) have had **prophylactic examinations or vaccines**, while 445 (44.50%) did not. From those that responded with „Yes” 451 (209.77%) had prophylactic blood tests; 171 (79.53%) - PAP smear/mammography/prostate gland examination; 97 (45.12%) had a flu vaccine or another vaccine, while 6 (2.79%) indicate „Other”.

To the question **„In the last year did you meet any encountered any obstacles, problems or obstacles in accessing health services?”**, 150 (15.00%) of the respondents answer “Yes”, while 850 (85.00%) answer “No”. Those who answered with „Yes” have encountered the following problems: 76 indicate, that the distance between their home and the nearest health service is long; 41 have no health insurance; 36 have financial difficulties in covering the transport expenses for reaching health services or lack of means of transportation; 28 indicate as an obstacle the long waiting time for an available reception slot for the respective health service; 13 distrust available health services; 4 find it difficult to pay for health services available at private expenses; 1- does not remember or does not want to respond and one answered and 2 answer „other” (poor treatment by doctor, poor treatment of patient).

### **3. Conducted studies (fieldwork) on morbidity**

In the period 12 - 19 December 2019 a study was carried out by a team of the Clinical Laboratory at GHAC “Dr. At. Dafovski” AD - Kardzhali.

Subject for study and analysis of the morbidity of the population in the municipality of Krumovgrad Momchilgrad is the totality of identified cases of morbidity in 501 persons, subjected to prophylactic clinical laboratory medical tests and examinations under the project „Preventive health measures for the population of the municipality of Krumovgrad” under the project: „Policies for Enhancing Access to Health Services in Deprived Areas”, acronym „The Healthy Municipality”, which was implemented with the financial support of the cooperation programme INTERREG V-A Greece-Bulgaria 2014-2020” under Lot 1: „Identification and analysis of local morbidity of population living in deprived areas of the municipality of Krumovgrad”.

The study included 501 residents of the municipality of Krumovgrad between ages 20 and 70. 357 of them are women (71.25%), and 144 are men (28.75%) .

Blood sample tests were separated in two packages:

- **Test package for women:**

1) Full blood count with 22 components:

- white blood cells (leukocytes) WBC, Neu (Neutrophils), Neu %, Ba (Basophils), Ba%, Eo (Eosinophils), Eo%, Mo (Monocytes), Mo %, Ly (Lymphocytes), Hemoglobin, Erythrocytes Er (Erythrocytes), Hematocrit HCT, MCV, MCH, MCHC, RDW, Platelets PLT, MPV, PDW, PCT;

Cholesterol

HDL- cholesterol (HDL-C)

LDL- cholesterol (LDL-C)

Glucose (blood sugar)

Triglycerides (TG)  
MAT (Anti-microsomal antibodies)  
TSH (TSH- receptor antibodies)  
ft4 (Free thyroxine (ft4))  
ASAT (Aspartate aminotransferase/Glutamate oxalate transaminase)  
ALAT(Alanine aminotransferase)

- **Test package for men:**

1) Full blood count with 22 components:

- white blood cells (leukocytes) WBC, Neu (Neutrophils), Neu %, Ba (Basophils), Ba%, Eo (Eosinophils), Eo%, Mo (Monocytes), Mo %, Ly (Lymphocytes), Hemoglobin, Erythrocytes Er (Erythrocytes), Hematocrit HCT, MCV, MCH, MCHC, RDW, Platelets PLT, MPV, PDW, PCT;

Cholesterol

HDL- cholesterol (HDL-C)

LDL- cholesterol (LDL-C)

Glucose (blood sugar)

Triglycerides (TG)

MAT (Anti-microsomal antibodies)

TSH (TSH-receptor antibodies)

ASAT (Aspartate aminotransferase/Glutamate oxalate transaminase)

ALAT(Alanine aminotransferase)

PSA (Total prostate specific antigen)

The data from the conducted prophylactic laboratory tests and examinations were reflected in a record for each examined patient, which contains the results of the examinations carried out.

Individual data with the results of the prophylactic laboratory tests for each examined patient are provided on paper as well as on an electronic medium.

The analysis of the local morbidity of the population, developed on the basis of the results of laboratory studies, contains statistical analysis, diagrams, graphs, conclusions and recommendations.

- **Results in females**

Of the examined 357 women: 137 women were found to be without deviations from the norm (38.47%) and 220 women (61.6%) were found to have deviations from the norm.

By indicators deviations from the norm have been found as follows:

- Lipid profile (cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides) - 134 women or 37.53% of the total number of subjects examined;
- Antithyroid microsomal antibodies (MAT) - 83 women or 23.24%;
- Thyroid stimulating hormone (TSH) - 45 women or 12.6%;
- Hemoglobin (Hb) - 44 women or 12.32%;
- Red blood cells (Eryt) - 44 women or 12.32%;
- Blood sugar - 29 women or 8.12% of the total number of subjects examined.

Most common abnormalities in women are: elevated lipid profile, elevated antithyroid microsomal antibodies (MAT), elevated (or reduced) thyroid stimulating hormone (TSH), low hemoglobin and erythrocytes.

- **Results in males**

Of the examined 144 men: 41 men were found to be without deviations from the norm (28.4%) and 103 men (71.6%) were found to have deviations from the norm.

The percentage rate in the examined indicators is as follows:

- Lipid profile (cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides) - 84 men or 58.33% of the total number of subjects examined;



- Liver enzymes (ASAT,ALAT) - 24 men or 16.6%;
- Blood sugar - 17 men or 11.8%;
- Antithyroid microsomal antibodies (MAT) - 6 or 4.16%.

In men predominated an increased percentage in the lipid profile (out of norm), which is mainly related to their diet. The increase in liver enzymes is a result of the frequent consumption of alcohol. Increased blood sugar is due to diet, age factor and immobilization.

Within the age range of 20-30 years pathological changes are rare. In women, it is mainly expressed in decreased hemoglobin (due to iron deficiency anemia or thalassemia minor) and increased values of antithyroid microsomal antibodies.

## **HEALTH RISKS AND MORBIDITY OF THE POPULATION ON THE BASIS OF OBTAINED RESULTS FORM LABORATORY SCREENING**

### ***A. Dyslipidemias - elevated cholesterol, impaired balance between cholesterol fractions (HDL / LDL), elevated triglycerides.***

The conducted blood test laboratory studies of a random selection of residents of the municipality of Krumovgrad confirm that 58.33% of examined men and 37.53% of examined women have some form of lipid profile disorder. This is a high percentage and it hides serious risks to the health of the population.

#### *Health risks for the population arising from lipid profile disorders:*

- Development of cardiovascular diseases - hypertension, angina, rhythm and conduction disorders, myocardial infarction;
- Development of cerebrovascular diseases - transient cerebral circulatory disorders, stroke;
- Development of early atherosclerosis with total damage to large, medium and small-caliber blood vessels of the peripheral and organ circulation.
- Deterioration of already existing metabolism disorders like diabetes mellitus, metabolic syndrome, obesity, etc.

One of the main risk factors for the development of vascular and metabolic diseases is the inability of the body to combat high cholesterol levels which leads to its deposition on the walls of blood vessels with subsequent destructive effects on the vascular wall.

#### *Reasons for disturbances in the lipid profile:*

- Genetic predisposition;
- Poor nutrition, based on the increased intake of carbohydrates and fats;
- Immobilization or insufficient movement;
- Regular use of alcohol and smoking;
- Stress or emotional tension;
- Physical or mental fatigue;
- Social disadvantages - unemployment, poverty, chronic diseases, disability.

### ***Elevated antithyroid microsomal antibodies and changes in thyroid stimulating hormone levels***

This is one of the most commonly encountered abnormalities in the blood tests of the women from the Municipality of Kardzhali included in the study.

Nearly 19% of the Bulgarian population suffers from an autoimmune disease of the thyroid gland. One in ten persons in our country has a glandular disorder, with most of them having reduced function, while a smaller fraction have increased function and overproduction of hormones.

In the past, Hashimoto's autoimmune thyroiditis was believed to be a relatively rare disease, which is proven by ATPO tests, but the current study disproves this fact. The reasons for this are improved laboratory diagnostics and, in recent studies, the increased background radiation. As it

turns out females are several times more vulnerable to Hashimoto's disease. The percentage rate of morbidity in the study is 23.24% of women and 4.16% of men.

*Risk factors for thyroid disease:*

- Age over 50 years;
- Family history;
- Presence of other autoimmune diseases;
- Unfavorable environment with elevated background radiation parameters.

**C. Low hemoglobin levels - presence of anemic syndrome**

This abnormality in the blood count is mainly found in women, which is also confirmed by the study conducted among the residents of the municipality of Krumovgrad.

Anemic syndrome is quite common among the population of the Eastern Rhodopes. On the one hand, this owes to the presence of congenital anemia, known as Mediterranean anemia (thalassemia), which is endemic in this region and is often asymptomatic (in its milder forms). On the other hand, it is related to the traditionally more frugal nutrition of the population, especially in villages and remote neighborhoods.

*Health consequences of the anemic syndrome:*

- Reduced supply of oxygen to the organs - organism is in a state of oxygen starvation, functioning of the organs suffers;
- Development of fatigue and weakness;
- Apathy and depression;
- Low blood pressure and collapse.

**D. Increased level of liver enzymes**

*Consequences of regular alcohol use and abuse:*

- Liver diseases - steatosis, hepatitis, cirrhosis
- Damage to the central nervous system - psychosis, delirium, encephalopathy;
- Systemic damage to other organs and systems by way of protoplasmic poisoning.

**CONCLUSIONS**

The following conclusions can be drawn from the conducted clinical laboratory tests and questionnaire among the residents of the municipality of Kardzhali:

1. A leading problem among men and women in the municipality of Krumovgrad are lipid profile disorders with a predominantly high cholesterol level among men in more than 50% of the examined subjects. Main causes are eating habits, immobilization and stress. This carries a high risk of cardiovascular disease, including heart attack and stroke. Men are more at risk.

2. In the second place a significant percentage of women have elevated antithyroid microsomal antibodies - data on autoimmune glandular disease, mainly Hashimoto's thyroiditis. In most people it occurs with minimal or no symptoms and is detected accidentally during prophylactic examinations.

3. In the third place among women is the anemic syndrome, arising from genetic factors - the presence of thalassemia or thalassemic conditions or from poor or unbalanced nutrition. It initially occurs in a subdued way, without manifest symptoms, but can occasionally cause the symptomatology of severe anemia, which requires specific treatment.

4. In the fourth place among men are established data for elevated liver enzymes, which is indicative of regular alcohol use and the possibility of physical and mental health damage through permanent intoxication.

The results of the study show that measures need to be taken for promotion of healthy lifestyle from kindergarten and early school age through special programs dedicated to the health education of children adolescents.

Measures are also necessary for increasing health literacy - informing the population of

health risk factors (principles of proper and rational nutrition, incl. recognizing foods with high cholesterol content, harms of smoking, low physical activity and alcohol abuse) by all available means, incl. through modern information technologies, widespread media participation, the Bulgarian Red Cross and other non-profit organizations.

Periodic screening prophylactic tests and examinations are necessary for the early detection of socially significant diseases and risk factors for the health of the population, which should serve for the development of Programmes for integrated prophylactics of chronic non-infectious diseases - Cardiovascular diseases, Endocrine diseases, Malignant diseases, etc., and for the identification of vulnerable groups and the implementation of specific measures for the reduction of morbidity and the development local health policy plans.