

**Health and Care Resort Unitary Enterprise «Belprofsoyuzkurort»**

**The report  
«Ecological resorts of Belarus»**

*Speakers:*

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Natural therapeutic factors of Belarus (picturesque landscape, rivers, lakes, climatic and weather conditions, mineral waters, mud, etc.) are widely used in sanatorium treatment. Significant massifs of relict coniferous forests together with pristine water basins create a special microclimate that has a healing effect on the organism. For example, the largest remnant of the relict primeval plain forest, which, according to the ideas of modern science, grew on the territory of Europe in prehistoric times, has been preserved here. Almost everywhere it has been cut down, but in a relatively untouched state in the form of a giant massif has been preserved in the Bialowieza region in the territory of modern Belarus and Poland, in the form of large massifs - in Kobrin, Grodno, Shereshevskaya, Nalibokskaya, Lipichanskaya and many other forests of Belarus.

The climate of Belarus is transitional from maritime to continental, a combination of the mild climate of the coastal strip and the continental climate of the East European Plain. It is moderately warm, characterized by mild winters, moderately hot summers, somewhat cool spring and warm autumn. The average annual temperature ranges from +8° C in the southwest to +5° C in the northeast. The average annual precipitation is 550-650 mm. Winds are usually weak - up to 5 m/s. The duration of the warm period is 225-260 days.

The combination of landscape features of the territory, atmospheric and light factors with sufficient insolation allow taking air and sunbaths, sleeping in the air, dosed walks, physical exercises in the air, tourist trips, bathing, swimming in rivers and lakes.

Mineral waters of different ion-salt and gas composition with presence of some or other microcomponents, including ultra-preserved waters, have been found almost on the whole territory of the republic.

### Slide #1.

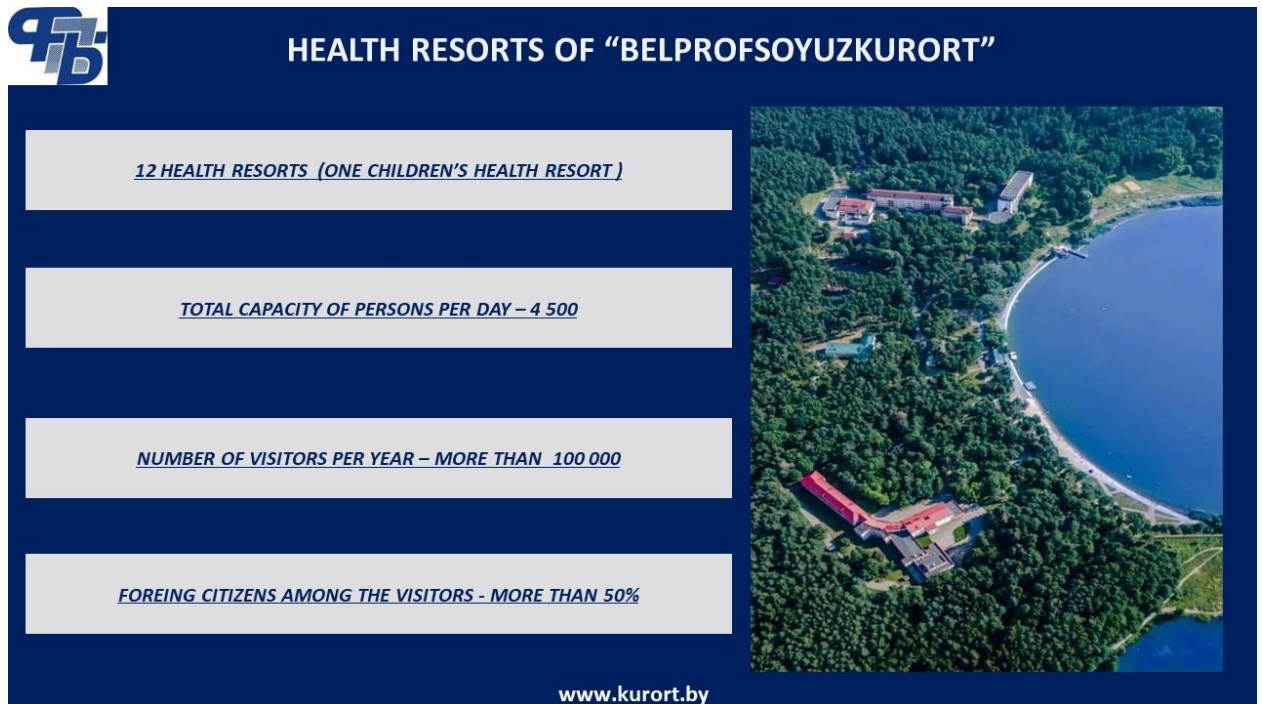
**FEDERATION OF TRADE UNIONS OF BELARUS**

**HEALTH RESORTS OF "BELPROFSOYUZKURORT"**

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The sanatorium-resort unitary enterprise of the Federation of Trade Unions of Belarus "Belprofsoyuzkurort", being the successor of the Belarusian Republican Council on management of trade union resorts, established in 1962, met its 60th anniversary in May 2022. The key to successful export-oriented activity of the largest network of health resort organizations in the country for a long period of time is the improvement of the therapeutic base of trade union resorts with a focus on the use of unique natural factors and advanced domestic medical developments.

### Slide #2.



The system of Belprofsoyuzkurorta includes 12 sanatoriums located in the most picturesque corners of the republic in all regions. Almost all sanatoriums have their own natural sources of mineral waters.

### Slide #3.



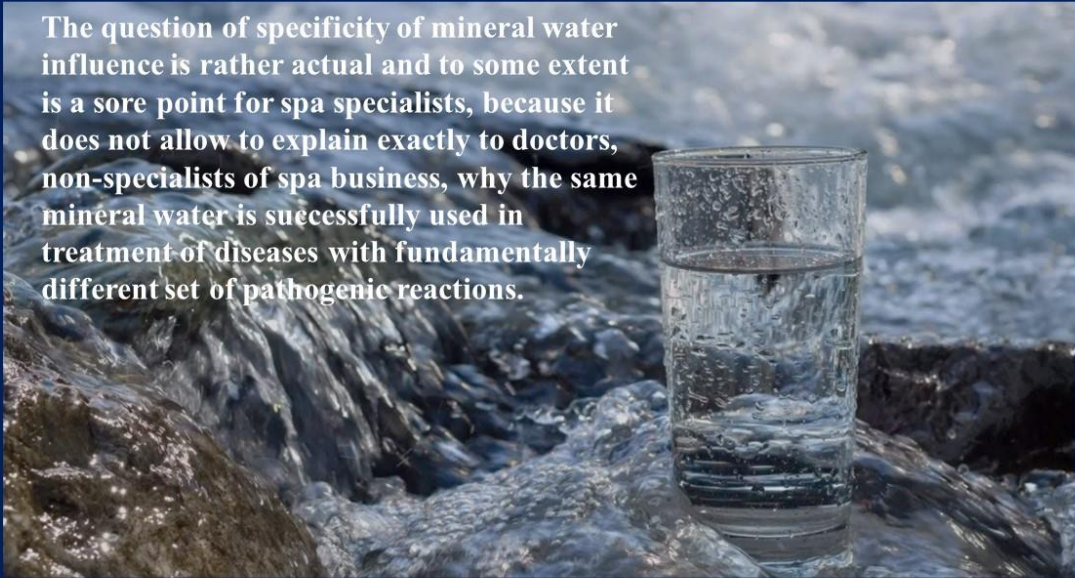
The slide shows the figures of 2022 on the capacity of sanatoriums and turnover.

#### Slide #4.



### HEALTH RESORTS OF "BELPROFSOYUZKURORT"

The question of specificity of mineral water influence is rather actual and to some extent is a sore point for spa specialists, because it does not allow to explain exactly to doctors, non-specialists of spa business, why the same mineral water is successfully used in treatment of diseases with fundamentally different set of pathogenic reactions.

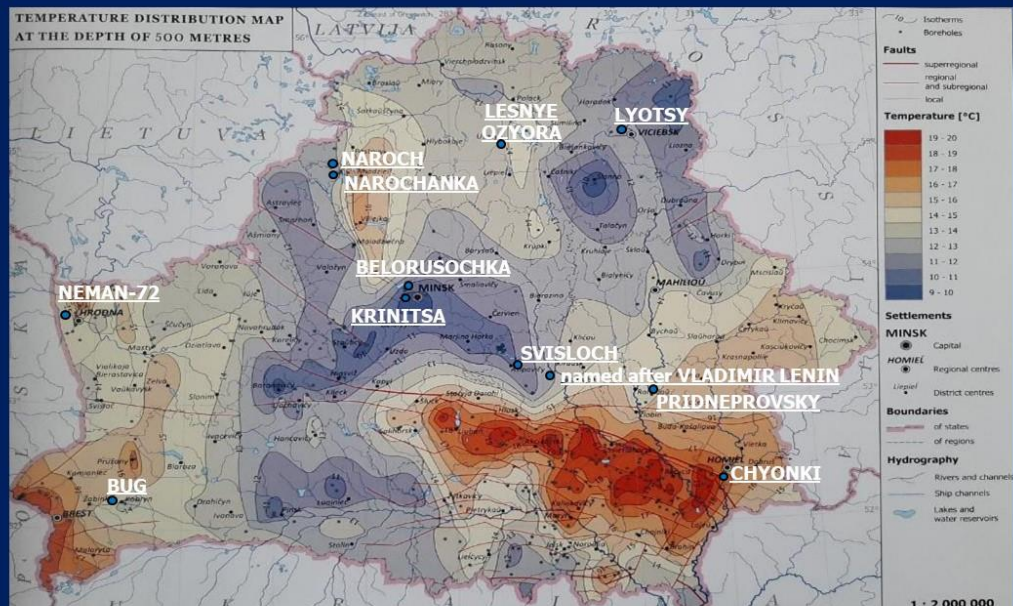


The statistical data by years show an increase in the number of patients who received sanatorium and spa treatment in the sanatoriums of Belprofsoyuzkurort.

#### Slide #5 .




### HEALTH RESORTS OF "BELPROFSOYUZKURORT"



Water is the most important component not only of the external environment surrounding us, but also of the human body. Specialists all over the world recommend to use for therapeutic and health-improving purposes exactly natural mineral water, which is born in the bowels of the earth and filtered only by layers of soil.

To date, a lot of evidence has been accumulated about the therapeutic efficacy of drinking mineral water in various somatic diseases (hereinafter - therapeutic efficacy of mineral water). At the same time, the question of specificity of the effect of mineral water still remains open.

### Slide #6.




Health Resort KRINITSA therapeutic mineral water sulphate-chloride-sodium water of low mineralization (M 2.8-3.1g/l), temperature 8°C

Characterization of ionic composition of groundwater from well bore No. 2/69				Characterization of ionic composition of groundwater from well bore No. 4			
Ions	Content per liter			Ions	Content per liter		
	mg	mg-eq	% mg-eq		mg	mg-eq	% mg-eq
Na <sup>+</sup>	1060,0	46,11	92,0	Na <sup>+</sup>	950,0	41,32	93,1
K <sup>+</sup>	13,8	0,35	0,70	K <sup>+</sup>	12,3	0,31	0,70
Ca <sup>2+</sup>	41,7	2,08	4,15	Ca <sup>2+</sup>	31,3	1,56	3,52
Mg <sup>2+</sup>	19,3	1,59	3,17	Mg <sup>2+</sup>	14,4	1,18	2,66
Fe <sup>2+</sup>	<0,01	-	0,00	Fe <sup>2+</sup>	<0,06	-	0,00
TOTAL	1134,81	50,13	100	TOTAL	1008,06	44,37	100
Cl <sup>-</sup>	1325,6	37,38	74,67	Cl <sup>-</sup>	1170,6	33,01	73,45
SO <sub>4</sub> <sup>2-</sup>	376,5	7,83	15,64	SO <sub>4</sub> <sup>2-</sup>	333,2	6,93	15,42
HCO <sub>3</sub> <sup>-</sup>	295,8	4,85	9,69	HCO <sub>3</sub> <sup>-</sup>	298,9	4,9	10,90
Br <sup>-</sup>	0,00	0,00	0,00	CO <sub>3</sub> <sup>2-</sup>	3,0	0,1	0,22
TOTAL	1997,9	50,06	100	TOTAL	1805,7	44,94	100
Mineralization – 3132 mg/l				Mineralization – 2814 mg/l			
Other definitions – pH 7.4 (slightly alkaline reaction)				Other definitions – pH 7.4 (slightly alkaline reaction)			

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The territory of Belarus is geologically located in the western part of the Precambrian East European Platform. Compared to the young platforms of Central and Western Europe, the Precambrian platforms are colder. Thus, the geological structure of the territory of Belarus determines a very interesting geothermal feature of the MV. Namely, the geothermal map shows large regions where the MB temperature at depths up to 500 meters does not exceed 9°C. The noted geothermal peculiarity of the Belarusian MVs predetermined the location of the largest sanatoriums of the "Belprofsoyuzkurorta" system: Krinitza, Pridneprovsky, Lesnye Oзера, Belorusochka, Lettsy, Naroch and others.

### Slide #7.



Health Resort PRIDNEPROVSKY therapeutic mineral water sulphate-chloride-sodium water of medium mineralization (M 6.2 g/l), temperature 7°C

Characterization of ionic composition of groundwater from well bore No. 3-P			
Ions	Content per liter		
	mg	mg-eq	% mg-eq
Na <sup>+</sup>	1057,0	46,02	42,84
K <sup>+</sup>	37,5	0,96	0,93
Ca <sup>2+</sup>	721,6	36,03	33,8
Mg <sup>2+</sup>	235,8	21,4	20,93
Fe <sup>2+</sup>	1,37	0,49	0,48
TOTAL	2053,27	104,9	100
Cl <sup>-</sup>	2540,0	71,63	68,6
SO <sub>4</sub> <sup>2-</sup>	1509,0	31,39	30,06
HCO <sub>3</sub> <sup>-</sup>	85	1,4	1,34
TOTAL	4134	104,42	100
Mineralization – 6187 mg/l			
Other definitions – pH 7,3 (slightly alkaline reaction)			
Mineralization – 3132 mg/l			
Other definitions – pH 7,4 (slightly alkaline reaction)			

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We made an attempt to study the results of treatment with mineral waters of similar chemical composition and physical characteristics of various somatic diseases in sanatoriums Krinitsa and Prydniprovsky.

The first problem was to find a criterion for objectivization of the treatment result. The fact is that the duration of sanatorium treatment (and thus of CF intake) varies considerably and rarely exceeds 17 days. Since sanatoriums do not treat acute conditions, even with sufficiently developed diagnostics, it is difficult to choose such a sensitive and at the same time universal indicator of homeostasis that its changes serve as a reliable scale for assessing the therapeutic effect. As for physical examination and assessment of general well-being, in this case it is extremely difficult to exclude the subjective factor, especially in view of the fact that, according to the questionnaire data of our patients, the effectiveness of spa treatment is about 97%.


The second problem of objectivization was inaccessibility of assessment of any remote results of sanatorium treatment.

Finally, the specificity of sanatorium treatment is the use of a complex of procedures, in which, in addition to CF, other therapeutic natural factors are used, including preformed ones, reflexotherapy, hyperbaric oxygenation, balneotherapy, apparatus physiotherapy, etc. (about 500 therapeutic techniques are used in BOD sanatoriums), up to drug therapy (if necessary) - and all this influences the therapeutic effect.

At the same time, the analysis of medical records of sanatoriums of the Belprofsoyuzkurorta (BPC) system revealed a clear pattern. Namely, if all other procedures are prescribed taking into account indications, contraindications, patient's preferences and financial possibilities, then MB was prescribed to all 100% of patients receiving sanatorium treatment. Thus, we extrapolated the results of complex sanatorium treatment to estimate the therapeutic efficacy of CF with the approximation allowed for preliminary evaluation. However, we tried to strictly objectify the medical effect of complex sanatorium treatment. Thus, the indisputable, in our opinion, criterion of persistent positive therapeutic effect is the fact that the patient consciously chose for treatment one sanatorium 2 or more times during 3 years: from 01.01.2020 to 31.12.2022 (hereinafter referred to as repeat patients). The choice of sanatoriums with a prevailing share of exports (up to 70%), which excludes such reasons for repeat visits as lack of choice, orientation to budget niches or step territorial accessibility, also contributes to objectivity. To conclude the objectivization factors, it is important to note that the statistical cutoff affects the pandemic period. We remember that the period 2020-2021 was characterized by strict sanitary requirements for crossing the state border, which significantly limited the flow of those wishing to come for sanatorium treatment in the Republic of Belarus.

The study was conducted through sampling and estimation of the specific weight of certain nosologies in the group of repeated patients. The aim was to identify the relationship between the physicochemical characteristics of a particular CF and its therapeutic effect and to determine the nosologies in which such CF is most effective.

**Slide #8. (error - medium mineralization).**


 Health Resort KRINITSA  
proportion of nosologies in the group of repeat patients

No.	Diagnosis	Frequency of occurrence in the group	
1	E 01 Iodine-deficiency-related diffuse (endemic) goitre	1,5%	4,1%
1	E 10 Type 1 diabetes mellitus	0,7%	
2	E 11 Type 2 diabetes mellitus	1,9%	3,9%
3	G 20 Parkinson disease	0,4%	
4	G 35 Multiple sclerosis	0,4%	
6	G 90 Idiopathic peripheral autonomic neuropathy	3,1%	24,3%
7	I 10 Essential (primary) hypertension	7,0%	
8	I 11 Hypertensive heart disease	1,9%	
9	I 11.9 Hypertensive heart disease without (congestive) heart failure	1,1%	
10	I 20 Unstable angina	3,0%	
11	I 25 Chronic ischaemic heart disease	11,3%	
13	J 06 Acute upper respiratory infections of multiple and unspecified sites	0,4%	
15	J 35 Chronic tonsillitis	1,1%	
16	J 42 Unspecified chronic bronchitis	2,2%	
17	J 45 Predominantly allergic asthma	1,9%	
18	K 21 Gastro-oesophageal reflux disease	1,1%	
19	K 26 Duodenal ulcer	3,0%	
20	K 29 Acute haemorrhagic gastritis	4,9%	0,4%
21	L 20 Besnier prurigo	0,4%	
22	M 42.9 Spinal osteochondrosis, unspecified	29,9%	52,7%
23	M 15 Primary generalized (osteo)arthrosis	22,8%	100%
	Total	100%	

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In sanatorium Pridneprovsky for drinking water is used mineral therapeutic sulfate-chloride-sodium water of average mineralization (M 6,2 g/l) of weakly alkaline reaction from well No. 3-P. The depth of the well is 340 meters. Water temperature in the well is t 7<sup>0</sup> C.

**Slide #9.**

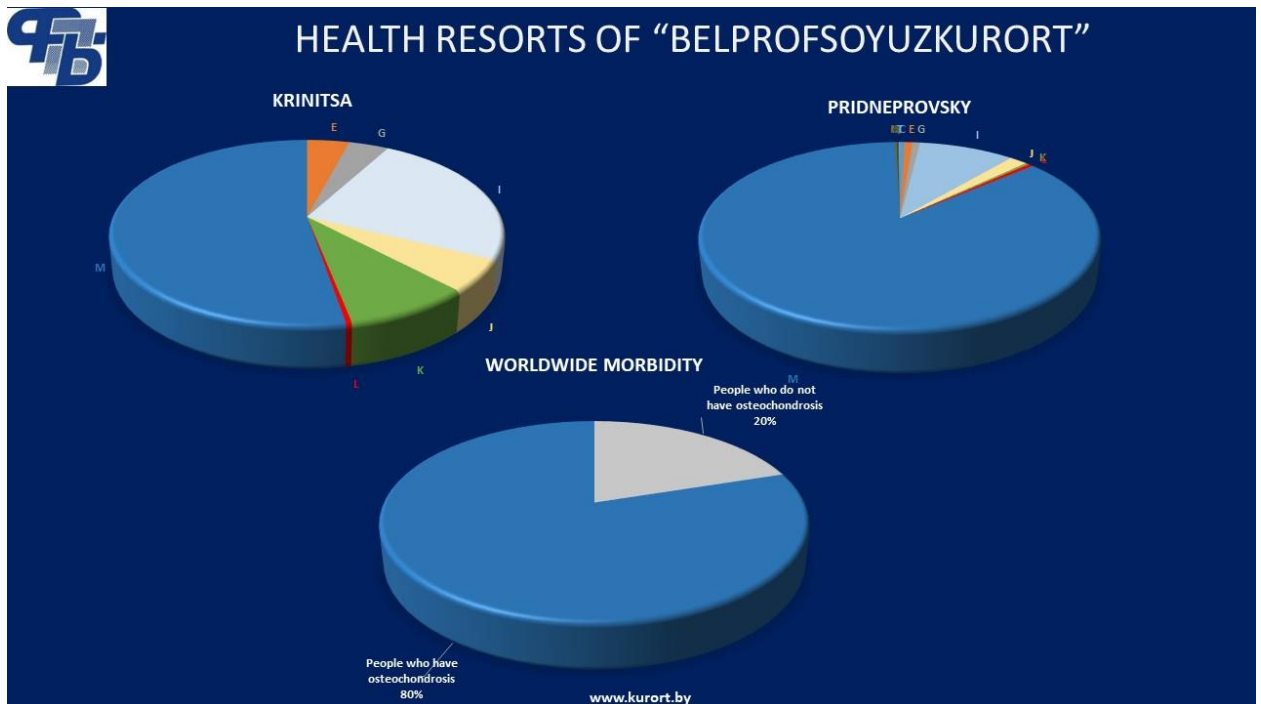
 Health Resort PRIDNEPROVSKY  
proportion of nosologies in the group of repeat patients

No.	Diagnosis	Frequency of occurrence in the group		
1	C 32 Malignant neoplasm of larynx	0,11%	0,46%	
2	C 44 Other malignant neoplasms of skin	0,05%		
3	C 54 Malignant neoplasm of corpus uteri	0,09%		
4	C 64 Malignant neoplasm of kidney, except renal pelvis	0,16%		
5	C 73 Malignant neoplasm of thyroid gland	0,05%	0,78%	
6	E 11 Type 2 diabetes mellitus	0,71%		
7	E 23.2 Diabetes insipidus	0,07%	0,72%	
8	G 20 Parkinson disease	0,21%		
9	G 56.2 Lesion of ulnar nerve	0,08%		
10	G 71 Muscular dystrophy	0,06%		
11	G 80.0 Spastic quadriplegic cerebral palsy	0,16%		
12	G 90.9 Disorder of autonomic nervous system, unspecified	0,16%		
13	G 99 Other disorders of nervous system in diseases classified elsewhere	0,05%		
14	I 10 Essential (primary) hypertension	4,62%		9,27%
15	I 20-25 Ischaemic heart diseases	4,44%		
16	I 67 Other cerebrovascular diseases	0,21%		1,72%
17	J 09-18 Influenza and pneumonia	0,32%		
18	J 35 Chronic diseases of tonsils and adenoids	0,38%	0,35%	
19	Chronic lower respiratory diseases (J40-J47)	1,02%		
20	K 25 Gastric ulcer	0,09%	0,16%	
21	K 26 Duodenal ulcer	0,1%		
22	K 29 Gastritis and duodenitis	0,16%	86,13%	
23	L 40.0 Psoriasis vulgaris	0,07%		
24	M 42.9 Spinal osteochondrosis, unspecified			
41	N11 Nonobstructive reflux-associated chronic pyelonephritis	0,11%	0,11%	
42	Q 90 Down syndrome	0,06%	0,06%	
43	R 26 Ataxic gait	0,08%	0,08%	
44	S 43 Dislocation, sprain and strain of joints and ligaments of shoulder girdle	0,15%	0,16%	
45	S 72 Fracture of neck of femur	0,05%		
46	S 90 Superficial injury of ankle and foot	0,05%		
47	N11 Nonobstructive reflux-associated chronic pyelonephritis	0,15%	100%	
	Total	100%		

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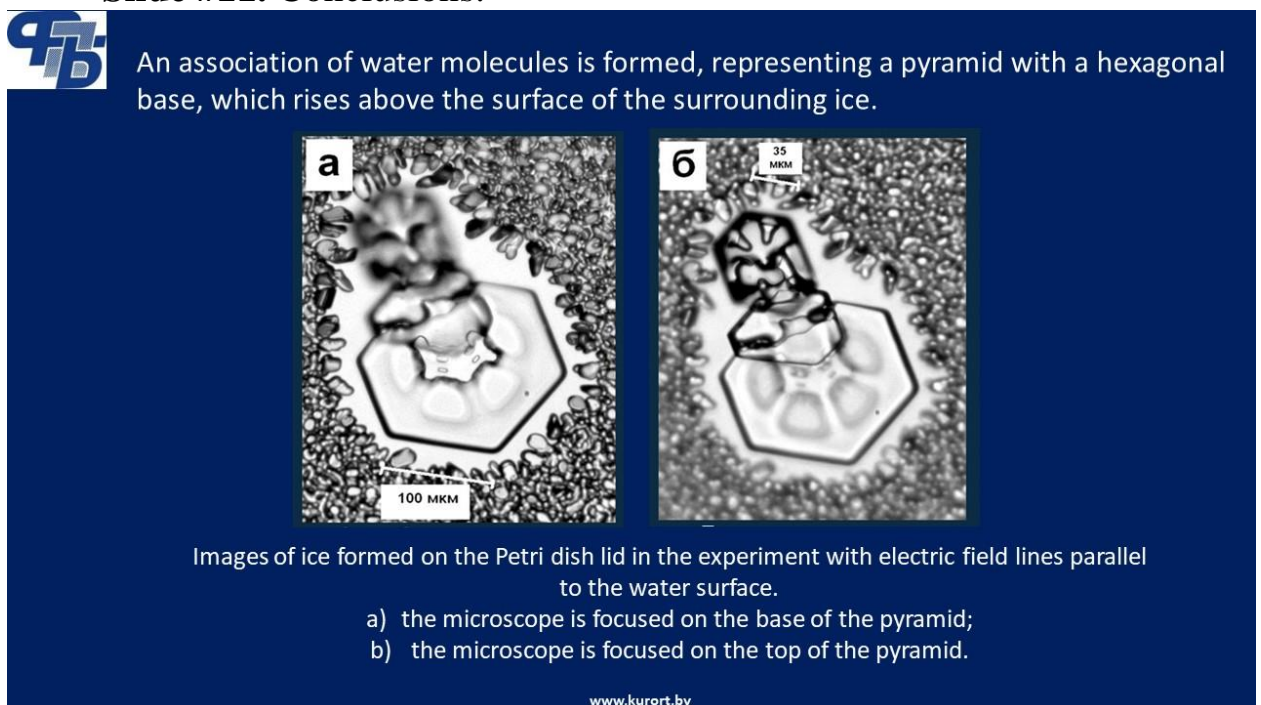
For the period from 01.01.2020 to 31.12.2022 in sanatorium Krinitsa received sanatorium treatment 18412 people, of which 4598 people were treated in the sanatorium two or more times, which amounted to 24.97%.

**Slide #10.**



For the period from 01.01.2020 to 31.12.2022 in the sanatorium Prydniprovsky received sanatorium treatment 45501 people (it is 2.5 times more than in Krinitsa), of which 7576 people were treated in the sanatorium two or more times, which amounted to 16.65%. Within the group of 7576 noted cases the specific weight of diagnoses is shown in the table.

**Slide #11. Conclusions:**



- Cold ( $t$  7-8<sup>0</sup> C) mineral sulfate-chloride-sodium waters of small and medium mineralization (slightly alkaline reaction) at drinking application directly at the places of their reception provide reliable (confirmed by remote -3



calendar years-results) expressed (not less than in 17-25% of cases) and stable positive therapeutic effect;

- Against the background of a fairly uniform distribution of the specific weight of various nosological groups (rubrics according to ICD 10) among the patients who repeatedly chose sanatorium treatment in the sanatorium, the prevalence of diseases of the musculoskeletal system and connective tissue (M), namely osteochondrosis, draws attention. However, this circumstance is easily explained by the prevalence of osteochondrosis in the population. According to statistics, osteochondrosis is one of the most common diseases on Earth: it occurs in 50-70% (according to some data, even 75-80%) of people. In particular, statistical data of Klara I. Shapiro K.I. (R. R. Vreden Research Institute of Orthopedics, St. Petersburg) indicate that osteochondrosis in the Russian Federation begins to be diagnosed from the age of 14-15 years old and in older people - by the age of 50-59 years old - the incidence of osteochondrosis reaches 89%.

Proceeding from the above, the results of the study have shown that climate and water treatment in sanatoriums of Belarus can be recommended to the overwhelming majority of patients with somatic diseases. Moreover, as the number of observations increases (Prydniprovsky sanatorium), the distribution of morbidity among patients with positive long-term results approaches and eventually almost coincides with the frequency of its occurrence in the population.

Even taking into account the inevitable statistical errors associated with the used extrapolation of the results, the obtained data allow us to associate the positive long-term results of treatment with drinking mineral water with non-specific restoration of resources of functional systems of the organism.



## CONCLUSIONS

1. It is an undeniable fact that we have a colossal therapeutic natural factor in the form of mineral water and do not know the exact mechanism of its influence on the human body.
2. The considered hypothesis of the key role of natural fields in triggering the cascade of mechanisms of therapeutic action of mineral water (drinking application) on the human body does not contradict the results of statistical studies and analysis of scientific literature available in this field.
3. It is impossible to stop technical progress, natural waters are filtered, heated, cooled, saturated with carbon dioxide, disinfected, bottled, etc. Therefore, the proposal is only to preserve for the present and future generations, along with the achievements of progress, the possibility, if desired, to use natural mineral water that has not been subjected to any external influences, or subjected to minimal physical influences under gentle extraction technologies.



HEALTH RESORTS OF "BELPROFISOYUZKURORT"

THANKS FOR YOUR ATTENTION!

YOU ARE ALWAYS WELCOME TO OUR SANATORIUMS  
FOR REST, TREATMENT AND HEALTH IMPROVEMENT!



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