

Report

“30 years after Chernobyl: medical-demographic situation in Buda-Koshelevo district of Gomel region of Belarus, affected by Chernobyl disaster”

International congress IPPNW (German office) “International Physicians for the Prevention of Nuclear War” (Germany, Berlin, 26 – 28.02.2016)

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Buda-Koshelevo district is situated in the north-east of Gomel region of Belarus and is 1,6 thousand square kilometers (km²). The length of the district from the north to the south is 56 kilometers; from the west to the east is 46 kilometers. The administrative center of the district is town Buda-Koshelevo, situated 50 kilometers to the north-west from Gomel, 260 kilometers to the south-east from Minsk and 250 kilometers to the north from Chernobyl.

As of 31.12.2014, the total population of Buda-Koshelevo district is 31 771 people, including rural population – 20 959 people, working-age population – 16 839 people, children and teenagers – 6 146 people.

There are 242 settlements in the district. The district takes the leading position in Gomel region by the number of settlements and share of rural population there. These objective features of the district create certain difficulties in arranging medical, social, trading and other facilities to the population.

Depending on the density of soil contamination by radionuclides and the degree of radiation exposure on population (value of the effective dose), according to the criteria determined by the Law of Republic of Belarus № 385-Z of 26.05.2012 “About the legal regime of the territories which underwent radioactive pollution as a result of accident on the Chernobyl NPP”, **areas of radioactive pollution of Republic of Belarus (RB)** are divided into zones of radioactive pollution:

evacuation zone (alienation) – the area around the Chernobyl NPP where all the population was evacuated in 1986 (30-kilometer zone) and the territory where additional resettlement was conducted because of the density of soil contamination with radionuclides strontium-90 (⁹⁰Sr) above 111 kBq/m² (3 Ci/km²) and plutonium-238 (²³⁸Pu), ²³⁹(²³⁹Pu), ²⁴⁰(²⁴⁰Pu) above 3,7 kBq/m² (0,1 Ci/km²);

the zone of primary resettlement – the area with the density of soil contamination with radionuclides cesium-137 (¹³⁷Cs) from 1480 kBq/m² (40 Ci/km²), or ⁹⁰Sr, or ²³⁸Pu, ²³⁹Pu, ²⁴⁰Pu, respectively, 111, 3,7 kBq/m² (3, 0,1 Ci/km²) and more;

the zone of subsequent resettlement – the area with the density of soil contamination with radionuclides ¹³⁷Cs from 555 to 1480 kBq/m² (from 15 to 40 Ci/km²), or ⁹⁰Sr from 74 to 111 kBq/m² (from 2 to 3 Ci/km²), or ²³⁸Pu, ²³⁹Pu, ²⁴⁰Pu from 1,85 to 3,7 kBq/m² (from 0,05 to 0,1 Ci/km²), where the average annual dose of public exposure may exceed (over the level of natural and technogenic background) 5 mSv and other areas with lower density of contamination with the radionuclides mentioned above where the average annual dose of public exposure may exceed 5 mSv;

the zone with the right of resettlement – the area with the density of soil contamination with radionuclides ¹³⁷Cs from 185 to 555 kBq/m² (from 5 to 15 Ci/km²), or ⁹⁰Sr from 18,5 to 74 kBq/m² (from 0,5 to 2 Ci/km²), or ²³⁸Pu, ²³⁹Pu, ²⁴⁰Pu from 0,74 to 1,85 kBq/m² (from 0,02 to 0,05 Ci/km²), where the average annual dose of public exposure may exceed (over the level of natural and technogenic background) 1mSv and other areas with lower density of contamination with the radionuclides mentioned above where the average annual dose of public exposure may exceed 1 mSv;

living zone with periodical radiation control – the area with the density of soil contamination with radionuclides ^{137}Cs from 37 to 185 kBq/m² (from 1 to 5 Ci/km²), or ^{90}Sr from 5,55 to 18,5 kBq/m² (from 0,15 to 0,5 Ci/km²), or ^{238}Pu , ^{239}Pu , ^{240}Pu from 0,37 to 0,74 kBq/m² (from 0,01 to 0,02 Ci/km²), where the average annual dose of public exposure should not exceed (over the level of natural and technogenic background) 1mSv.

There are no areas with non-polluted settlements (0 Ci/km²). Recently there has been issued a decision of the Council of Ministers of RB № 9 on 11.01.2016 which approved «The list of localities and objects in areas of radioactive contamination...». **By the degree of contamination all the settlements and people** living there in 2011 in comparison with 2016 are distributed in Buda-Koshelevo district as follows:

№	Contamination (Ci/km ²)	Years			
		2011			2016
		Number of settlements in 2011	Population (people)		Number of settlements in 2016
Total	Including children and teenagers				
1.	0 - 1	28	516	0	49
2.	1 - 5	185	28 066	4 572	177
3.	5 - 15	28	4 816	1 852	15
4.	15 - 40	1	0	0	1
5.	Over 40	0	0	0	0
Total:		242	33 398	6 424	242

Since 1986 11 localities of the district have been resettled, resettlement of the people stopped in 1996. During that time 436 people were resettled. The number of settlements with the average annual dose of exposure over 1 mSv per year is 16, including over 5 mSv per year – 1 settlement (village Lipa where no one lives legally).

According to the resolution of Ministry of Health of RB № 28 on 16.03.2010 «About the order of the organization of dispensary inspection of the citizens affected by accident on Chernobyl NPP and other radiation accidents ...», dispensary inspection of the people living in areas contaminated with radionuclides is organized in **groups of primary account (GPA) of the Chernobyl State Registry:**

1st GPA – participants of liquidating Chernobyl accident consequences:

subgroup 1.1: people taking part in liquidating the consequences of the accident on Chernobyl NPP in 1986-1987 in evacuation zone (alienation) or occupied with other work at the NPP at that period;

subgroup 1.2:

- people taking part in liquidating the consequences of the accident on Chernobyl NPP in 1988-1989 in evacuation zone (alienation) or occupied with other work at the NPP at that period;

- people taking part in deactivation, construction and life-support of the population in 1986-1987 in the zones of primary and subsequent resettlement.

2nd GPA – people who were evacuated, resettled from the evacuation zone(exclusion zone) or left the area of radioactive contamination in 1986;

3rd GPA – people constantly living in the areas of radioactive contamination in the zones of primary and subsequent resettlement (including babies being in fetal condition) as well as resettled people and those who left these zones independently except the people who came to that area after 01.01.1990;

4th GPA – children (later – teenagers and adults) who were born from persons of the 1st-3rd GPA except the people included into the 3rd GPA;

5th GPA – people constantly living in the areas of radioactive contamination in the zones with the right of resettlement, living zones with periodical radiation control as well as people constantly living in the settlements excluded from the above listed zones according to the legislation of RB, except the people who came to that area after 01.01.1990;

6th PAG – participants of liquidating the consequences of other radiation accidents and their children.

As of 31.12.2014, population of Buda-Koshelevo district is distributed into the groups of primary account of Chernobyl State Registry as follows:

Groups of primary account	Population (people)	
	Total	Including children and teenagers
I	776	0
II	348	0
III	317	13
IV	544	261
V	29 585	5 874
VI	0	0
Total:	31 570	6 148

In order to make timely diagnostics, treatment of the diseases and evaluation of health state of the citizens on the affected areas the following groups of high radiation risk (GHRR) are singled out from GPA of Chernobyl State Registry:

GHRR «A» - citizens listed in the 1st, 2nd GPA of the State Registry, who were within the evacuation zone in 1986;

GHRR «B» - citizens listed in the 3rd and 5th GPA of the State Registry aged from 0 (who got fetal exposure) to 18 at the moment of the accident at Chernobyl NPP (1968-1986 years of birth);

GHRR «C» - citizens having frequent radiation exposure of increased dose 1 mSv per year within 2 and more years.

According to the Addition № 2 to «Instructions to the order of the organization of dispensary inspection of the citizens affected by accident on Chernobyl NPP and other radiation accidents» approved by the resolution of Ministry of Health of RB mentioned above, there was determined «**The Scheme of dispensary inspection of the citizens affected by accident on Chernobyl NPP and other radiation accidents**»:

GPA of the State Registry	Age categories	Compulsory dispensary inspections	
		medical examination by specialist doctors	diagnostic investigations
1	From 18 years old	Therapist (general practitioner), endocrinologist	General clinical blood test (GCBT), electrocardiography (ECG), ultrasound investigation (USI) of the thyroid gland (TG)
2	From 18 years old	Therapist (general practitioner), endocrinologist	GCBT, USI of TG
3	Up to 18 years old	Paediatrician (general practitioner), endocrinologist	GCBT, USI of TG, inspection on the counters of person's radiation (CPR-inspection)

GPA of the State Registry	Age categories	Compulsory dispensary inspections	
		medical examination by specialist doctors	diagnostic investigations
	From 18 years old	Therapist (general practitioner), endocrinologist	GCBT, USI of TG, CPR-inspection
4	Up to 18 years old	Paediatrician (general practitioner)	GCBT
	From 18 years old	Therapist (general practitioner)	GCBT
5	Up to 18 years old	Paediatrician (general practitioner)	GCBT, CPR-inspection
	From 18 years old	Therapist (general practitioner), endocrinologist	GCBT, USI of TG, CPR-inspection
6	From 18 years old	Therapist (general practitioner)	GCBT

30-year anniversary of Chernobyl disaster is coming, which is the first period of half-decay (30, 17 years) of the main dose-forming radionuclide ^{137}Cs . The first period of half-decay (29, 12 years) of another dose-forming radionuclide ^{90}Sr finished. Such radionuclides as ^{239}Pu (half-decay period of 24 360 years) and ^{240}Pu (half-decay period of 6 580) have settled down in Byelorussian land steadier than others, some short-living radionuclides (iodum-131 (^{131}I , - 8,0 days), ^{237}Pu (45,6 days), ^{89}Sr (50,5 days) и others) stopped their existence long ago.

In this regard, perhaps, Byelorussian people and citizens of Buda-Koshelevo district are close to finishing the process of liquidating the consequences of Chernobyl disaster and will probably have ordinary life without any limitations and memories about Chernobyl? But first let's put aside all the prior conclusions and get to learn the facts and figures.

Unfortunately, there won't be any data about the year 2015 in my report as our regional charity public association was refused to present this kind of information.

The dynamics of the basic medical-demographic indices in Buda-Koshelevo district is as follows:

№	Indices	Years				
		1985	1986	1996	2006	2014
1.	Population of the district (thousands of people)	51,1	52,2	44,6	40,2	32,4
	<i>including children and teenagers (thousands of people) .</i>	<i>12,1</i>	<i>10,8</i>	<i>11,0</i>	<i>6,5</i>	<i>6,1</i>
2.	Birth rate (per 1 000 population).	17,2	16,6	9,7	9,1	13,6
3.	Total mortality (per 1 000 population).	12,2	12,4	20,2	21,1	20,4
4.	Coefficient of natural growth / loss (per 1 000 population)	+5,0	+4,2	-10,5	-12,0	-6,8
5.	Share of population aged older than 60 years old (%).	29,5	29,7	39,2	32,6	27,7
6.	Share of children and teenagers (%).	23,7	20,7	24,7	16,3	18,8

The population of Buda-Koshelevo district decreased by 40 % from 1985 to 2014 and is still decreasing annually by more than 1 000 persons. Since 1989 there has been observed negative natural growth of population (its natural loss). Decrease in child population of the district has lately ceased due to the government measures stimulating the birth rate and large families, but in the following years slowing of the birth rate may be noted again because of small quantity of children born earlier in 1991 – 2006 who have already become or will become parents in the nearest future.

Dynamics of the affected population of the district referring to different GPA of Chernobyl State Registry is as follows:

Groups of primary account in Chernobyl State Registry	Population in years (people)			
	1989	2006	2012	2014
1 GPA	34	1 164	799	776
2 GPA	1 588	456	359	348
3 GPA	1 347	415	333	317
4 GPA	83	535	528	544
5 GPA	46 840	30 945	30 373	29 585
Total	49 892	35 521	34 404	31 570

Population registered in 1 – 3 GPA of the State Registry got high radiation exposure in 1986 and the following years. In the «Cards of primary registration in the State Registry» there have been presented the data about the powers of radioactive doses measured at the thyroid gland in every liquidator and evacuated person. In 1986 and the following years these data varied from 100 to 400 microroentgen per hour ($\mu\text{R/h}$).

According to the resolution of Ministry of Health of RB № 51 of 01.06.2011 «About the changes and additions to the resolution of MH of RB № 92 of 12.10.2007» public health state after annual dispensary inspection can refer to **the groups of dispensary dynamic observation**:

D-1 – healthy people having no complaints on their health state and having no any diseases or dysfunctions of organs and body systems as well as those having slight deviations in their health state (without progressing tendency) not effecting their working capacity;

D-2 – almost healthy people having in their anamnesis some risk factors of chronic diseases, acute diseases which may become chronic in the future (including frequent or prolonged sick people suffering acute diseases more than 6 times a year or more than 40 days a year as well as people having chronic diseases in the remission stage, without dysfunctions of organs and body systems);

D-3 – people having chronic diseases, dysfunctions of organs and body systems and recurrent exacerbations;

D-4 – people having disability group.

Distribution of people registered in Chernobyl State Registry into the groups of dispensary dynamic observation in 2014 is as follows:

Groups of primary account in Chernobyl State Registry	Population (people)	Groups of dispensary dynamic observation (people)			
		D – 1	D – 2	D – 3	D – 4
1 GPA	776	0	53	567	156
2 GPA	348	0	104	212	32
3 GPA	317	0	99	194	24
4 GPA	544	0	428	106	10

Groups of primary account in Chernobyl State Registry	Population (people)	Groups of dispensary dynamic observation (people)			
		D – 1	D – 2	D – 3	D – 4
5 GPA	29 585	5 721	11 708	10 058	2 098
Total	31 570	5 721	12 392	11 137	2 320

Chronic morbidity and disability of the population is formed by diseases of all organs and body systems. Quite often a person has several chronic diseases as well as malignant neoplasms of several localizations. For instance: cancer of uterus body and thyroid gland, cancer of blind intestine and urinary bladder, cancer of the upper lip edge and face skin, cancer of thyroid gland and lymph sarcoma. This list can be continued.

Primary morbidity of the adult population of the district in 2014 was 35 140,0 cases per 100 000 population. In the structure of primary morbidity of the adult population the following diseases are prevailing: diseases of respiratory organs – 27,6 %, traumas – 10,1 %, diseases of musculoskeletal system – 9,7 %, diseases of circulatory system (DCS) – 8,5 %.

Dynamics of primary morbidity of the adult population with some nosologies in Buda-Koshelevo district (cases per 100 000 people of adult population) is as follows:

№	Diseases	Years			
		2010	2011	2012	2013
1.	Respiratory organs	14 731,8	15 412,8	12 322,3	11 039,2
2.	Circulatory organs	3 817,4	3 269,9	2 824,7	3 476,6
3.	Musculoskeletal system	6 151,9	5 477,4	3 642,1	3 647,9
4.	Malignant neoplasms	581,1	509,7	570,2	506,5
5.	Thyroid gland	2,7	9,0	3,6	7,6
6.	Myocardial infarction	96,8	132,8	144,7	190,4

Overall morbidity of the adult population of the district in 2014 was 131 602,8 cases per 100 000 population. In the structure of overall morbidity of the population in 2014 the first position was taken by DCS (22,2 %), the second position – diseases of the respiratory organs (10,3 %), the third position – diseases of the endocrine system (10,1 %), the fourth position – diseases of the musculoskeletal system (9,7 %).

In 2014 **primary morbidity of children and teenagers** of the district was 153 270,4 per 100 000 child and teenager population. In the structure of primary morbidity of children and teenagers the first position was taken by diseases of the respiratory organs (75,0 %), the second position – skin diseases (5,8 %), the third position – diseases of the musculoskeletal system and infectious diseases (4,4 % equally).

Dynamics of overall morbidity of child population in Buda-Koshelevo district per 100 000 children is as follows:

№	Diseases	Years		
		1999	2004	2010
1.	Circulatory system	2 627,2	3 046,0	8 797,4
2.	Urogenital system	1 619,5	1 803,9	2 606,6
3.	Digestive organs	6 046,1	4 495,0	9 982,2

It's well known that children's health depends mainly on their parents' health. In pre-Chernobyl period **young men validity for military service** was over 75 %. Lately the situation has changed:

Index	Years			
	2006	2010	2013	2014
Young men validity for military service	46,0 %	36,3 %	50,2 %	53,0 %

At the end of 2014 there were 2 218 **disabled people** under observation in Buda-Koshelevo district (in 2013 – 2 153 disabled), among them 77 children and teenagers, or 3,5 % (in 2013 – 91 children, or 4,2 %). The index of overall disability was 702,6 per 10 000 population, which was 5,7 % higher than the same index in 2013 (664,7 per 10 000 population).

149 people (6,7 % of all the disabled people) were the disabled having **the established casual connection of the disability with the accident at Chernobyl NPP** (in 2013 – 158 people (7,3 %)). In the structure of disability related to the accident at Chernobyl NPP disabled people of the 1st group (5 people) were 3,4 % (in 2013 – 3,2 %), disabled people of the 2nd group (44 people) – 29,5 % (in 2013 – 29,7 %), disabled people of the 3rd group (100 people) – 67,1 % (in 2013 – 68,9 %).

Dynamics of the overall adult disability in Buda-Koshelevo district is as follows:

Number of people	Years			
	2009	2010	2011	2013
Total	2 220	1 928	1 920	2 153
<i>Including primary registered</i>	<i>123</i>	<i>140</i>	<i>145</i>	<i>170</i>
<i>Including related to Chernobyl</i>	<i>204</i>	<i>190</i>	<i>175</i>	<i>158</i>

Dynamics of the overall child disability in Buda-Koshelevo district is as follows:

Number of people	Years					
	2009	2010	2011	2012	2013	2014
Total	114	108	106	92	91	77
<i>Including primary registered</i>	<i>9</i>	<i>12</i>	<i>11</i>	<i>6</i>	<i>9</i>	<i>12</i>
<i>Including related to Chernobyl</i>	<i>4</i>	<i>4</i>	<i>4</i>	<i>3</i>	<i>3</i>	<i>2</i>

Distribution of disabled people (including children and teenagers) **having the established casual connection of the disability with the accident at Chernobyl NPP** into the groups of primary account of Chernobyl State Registry is as follows:

Groups of primary account of Chernobyl State Registry	Years			
	2011	2012	2013	2014
1 GPA	114	125	97	89
2 GPA	13	12	11	9
3 GPA	3	3	3	2
4 GPA	1	1	1	1
5 GPA	44	46	46	48
Total	175	187	158	149

Every year there are revealed patients having the diseases resulting in disability which is connected with the consequences of Chernobyl accident. Although lately the number of disabilities connected with the

consequences of Chernobyl accident has decreased. It is mainly due to tightening of legislation of RB in this question.

Therefore, Ministry of Health of RB is now discussing the question of optimization and expediency of functioning Republic and regional interdepartmental advisory councils on establishment of the causal relationship of the diseases which resulted in disability or death at the persons affected by accident on the Chernobyl NPP and other radiation accidents.

Nowadays, the current regulatory document, allowing the citizens of RB or their relatives to claim to connection of the diseases (disability, death) with Chernobyl, is resolution of MH of RB № 73 of 26.06.2009 «About the approval of the list of diseases which emergence is connected with direct radiative effects, the list of diseases which emergence can be connected with accident on the Chernobyl NPP, other radiation accidents,...».

According to the addition № 2 «**The list of diseases which emergence can be connected with accident on the Chernobyl NPP, other radiation accidents**» is approved by this resolution of MH RB:

№	Name of disease	Categories of citizens having the established casual connection of the diseases resulting in partial loss of working capacity, disability or death, with the accident on Chernobyl NPP, other radiation accidents	Compulsory conditions for establishing the casual connection of the diseases resulting in partial loss of working capacity, disability or death, with the accident on Chernobyl NPP, other radiation accidents
1.	Cancer of thyroid gland	<ul style="list-style-type: none"> • Citizens listed in article 13 (<i>liquidators</i>), paragraphs 2 and 3 of article 14 (<i>evacuated from evacuation (exclusion) zone, those who left and lived in the zones of primary and subsequent resettlement</i>), article 15 (<i>working adults (employees, assigned people), under-age children studying on the radioactive contaminated areas, children of the affected citizens, citizens living in the zones with the right of resettlement and periodical radiation control</i>) of the Law of RB of 06.01.2009 «About social protection of the citizens affected by accident on Chernobyl NPP, other radiation accidents» 	<ul style="list-style-type: none"> • Pathomorphological confirming of the disease. • Residence (work) on the areas contaminated with radionuclides from 26.04 to 30.08.1986
2.	Acute leucosis, chronic myeloleucosis, myelodysplastic syndromes, multiple myeloma	<ul style="list-style-type: none"> • Citizens listed in subparagraph 1.1 of paragraph 1 (<i>liquidators of 1986 – 1987 in the evacuation (exclusion) zone</i>) and in paragraph 3 (<i>liquidators of other radiation accidents</i>) of article 13 of the Law of RB «About social protection of the citizens affected by accident on Chernobyl NPP, other radiation accidents» • Citizens who were evacuated, resettled and left independently the areas of 	<ul style="list-style-type: none"> • Clinical-laboratory and morphological confirming of the disease in the state establishment «Republican research center of hematology and transfusion» of MH of RB, in specialized departments of regional hospitals

№	Name of disease	Categories of citizens having the established casual connection of the diseases resulting in partial loss of working capacity, disability or death, with the accident on Chernobyl NPP, other radiation accidents	Compulsory conditions for establishing the casual connection of the diseases resulting in partial loss of working capacity, disability or death, with the accident on Chernobyl NPP, other radiation accidents
		radioactive contamination from the evacuation (alienation) zone.	
3.	Cancer of the stomach, colon, lung, bronchi, mammary gland, urinary bladder, kidney	<ul style="list-style-type: none"> • Citizens listed in subparagraph 1.1 of paragraph 1 (<i>liquidators of 1986 – 1987 in the evacuation (exclusion) zone</i>) and in paragraph 3 (<i>liquidators of other radiation accidents</i>) of article 13 of the Law of RB «About social protection of the citizens affected by accident on Chernobyl NPP, other radiation accidents» • Citizens who were evacuated, resettled and left independently the areas of radioactive contamination from the evacuation (exclusion) zone. 	<ul style="list-style-type: none"> • Pathomorphological confirming of the disease. • Taking into account the place, terms and character of the performed work for liquidating the consequences of the accident on Chernobyl NPP, other radiation accidents
4.	Congenital defects of development	<ul style="list-style-type: none"> • Children born from the citizens listed in article 13 (<i>liquidators</i>), paragraphs 2 and 3 of article 14 (<i>evacuated from evacuation (exclusion) zone, those who left and lived in the zones of primary and subsequent resettlement</i>), article 15 (<i>working adults (employees, assigned people), under-age children studying on the radioactive contaminated areas, children of the affected citizens, citizens living in the zones with the right of resettlement and periodical radiation control</i>) of the Law of RB of 06.01.2009 «About social protection of the citizens affected by accident on Chernobyl NPP, other radiation accidents» 	<ul style="list-style-type: none"> • Documents are examined by the Republican interdepartmental advisory councils on establishment of the causal relationship of the diseases which resulted in disability or death at the persons affected by accident on the Chernobyl NPP and other radiation accident. • Casual relationship of partial loss of professional working capacity, disability or death with the accident on Chernobyl NPP, other radiation accidents is <u>excluded</u>: <ul style="list-style-type: none"> - if the citizen (proband) and one of his / her parents has got corresponding congenital defects of development; - if the citizen (proband) and his / her brother or sister has got corresponding congenital defects of development; - in case of congenital defects caused by influence of non-

№	Name of disease	Categories of citizens having the established casual connection of the diseases resulting in partial loss of working capacity, disability or death, with the accident on Chernobyl NPP, other radiation accidents	Compulsory conditions for establishing the casual connection of the diseases resulting in partial loss of working capacity, disability or death, with the accident on Chernobyl NPP, other radiation accidents
			radiation teratogenic factors
5.	Hereditary diseases	<ul style="list-style-type: none"> Children born from the citizens listed in article 13 (<i>liquidators</i>), paragraphs 2 and 3 of article 14 (<i>evacuated from evacuation (exclusion) zone, those who left and lived in the zones of primary and subsequent resettlement</i>), article 15 (<i>working adults (employees, assigned people), under-age children studying on the radioactive contaminated areas, children of the affected citizens, citizens living in the zones with the right of resettlement and periodical radiation control</i>) of the Law of RB of 06.01.2009 «About social protection of the citizens affected by accident on Chernobyl NPP, other radiation accidents» 	<ul style="list-style-type: none"> Documents are examined by the Republican interdepartmental advisory councils on establishment of the causal relationship of the diseases which resulted in disability or death at the persons affected by accident on the Chernobyl NPP and other radiation accident. Casual relationship of partial loss of professional working capacity, disability or death with the accident on Chernobyl NPP, other radiation accidents is <u>excluded</u>: <ul style="list-style-type: none"> - in case of hereditary diseases with recessive type of inheritance; - if the citizen (proband) and one of his / her parents has got corresponding hereditary disease - in case of chromosome diseases caused by numeral changes or inherited structural chromosome rebuilding.

In the **structure of the overall mortality of the affected population** in 2014 the first rank position was taken by DCS, their share is 56,9 % out of all death causes. The second rank position was taken by the symptoms, signs and deviations – 17,8 %. The third rank position was taken by malignant neoplasms (8,8 %).

For reference: The conditions included in the division “Symptoms, signs and deviations revealed on clinical and laboratory investigations and non-classified in other divisions” (R00 – R99 «ICD - 10») are the following: a) the cases in which more precise diagnostics was impossible even after studying all the actual data; b) the cases of appearing new-coming symptoms or signs which causes were impossible to determine; c) the cases of making initial diagnosis which was impossible to confirm because of the patient’s absence for further examination or treatment; d) the cases of directing the patient to another establishment for examination or treatment before making the final diagnosis; e) the cases when more precise diagnosis wasn’t made because of some other reason; f) some symptoms containing additional information having no value for giving medical aid.

Dynamics of the overall mortality of the population in Buda-Koshelevo district is as follows:

№	Number of the dead (people)	Years		
		2010	2011	2014
1.	Total	770	665	662
2.	<i>Including in the working age</i>	22,1 %	23,7 %	20,2 %
3.	<i>Including in the non-working age</i>	77,9 %	75,4 %	79,2 %

The overall mortality from the major causes among all the population in Buda-Koshelevo district:

№	Causes of death by the classes of diseases	2014		2013	
		Indices	Share (%)	Indices	Share (%)
1.	Infectious and parasitic diseases	0,2	1,1	0,2	1,1
2.	Malignant neoplasm	1,8	8,8	1,9	9,1
3.	Diseases of circulatory system	12,0	57,0	11,6	56,6
4.	Diseases of respiratory organs	0,4	1,8	0,4	2,1
5.	Diseases of digestive organs	0,7	3,2	0,7	3,5
6.	Diseases of urogenital system	0,1	0,3	0,1	0,5
7.	Symptoms, signs and deviations	3,7	17,8	3,0	14,9
8.	Traumas and poisoning	1,8	8,5	2,1	10,5

Mortality of the working population from the major causes in Buda-Koshelevo district:

№	Causes of death by the classes of diseases	2014		2013	
		Indices	Share (%)	Indices	Share (%)
1.	Infectious and parasitic diseases	0,4	5,2	0,3	4,4
2.	Malignant neoplasms	1,1	13,4	1,1	14,1
3.	Diseases of circulatory system	2,2	28,4	2,0	25,9
4.	Diseases of respiratory organs	0,3	3,7	0,2	2,2
5.	Diseases of digestive organs	0,6	8,2	0,7	9,6
6.	Diseases of urogenital system	0,1	0,8	0,0	0,0
7.	Symptoms, signs and deviations	0,7	9,0	0,3	4,4
8.	Traumas and poisoning	2,2	27,6	2,5	33,3

Pregnancy and delivery process is developing normal in about 10 – 15 % of the pregnant women of Buda-Koshelevo district, others are having different diseases, including extragenital pathology resulting in abnormalities of the delivery process and post-delivery complications both in a mother and in a baby.

In the recent years there has been observed an increase in the number of genetic disorders among the descendants of the affected population in Buda-Koshelevo district.

The share of the congenital diseases among all the diseases resulting in child disability tends to increase: 2005 – 40,0 %, 2006 – 39,7 %, 2011 – 38,3 %, 2012 – 39,0 %, 2014 – 42,2 %.

Among the congenital diseases there is noted a high **share of chromosome diseases** (Down' disease, phenylketonuria, mucoviscidosis, spinal atrophy of Werdnig-Hoffman): 2005 – 3,6 %, 2006 – 4,4 %, 2011 – 10,3 %, 2012 – 11,0 %, 2014 – 10,0 %.

Among the congenital diseases there is noted a high **share of congenital heart defects**: 2005 – 6,4 %, 2012 – 7,0 %, 2014 – 14,2 %.

In order to see how Chernobyl disaster influenced the life quality of the affected population, we can consider the example of Galina and Vladimir' family who were evacuated from the village Putchin in Bragin district of Gomel region to the village Shirokoe of Buda-Koshelevo district in 1986.

Galina and Vladimir are field workers. In 1986 they were 44 and 42 respectively. They were a healthy, hard-working family and had three children.

On evacuation, 05.05.1986, they were performed dosimetric investigations – the power of the dose at the thyroid gland was up to 260 $\mu\text{R/h}$. According to «The catalogue of the average annual effective radiation doses of the settlements of RB situated in the zones of radioactive contamination» in 2004, the village Shirokoe where they were resettled was on the territory with the contamination density of ^{137}Cs – 4,78 Ci/km^2 . The dose of the external exposure – 0,62 mSv/year , the dose of the internal exposure – 0,40 mSv/year , the total dose – 1,02 mSv/year .

On medical inspections at Buda-Koshelevo district polyclinic in 1986 – 1989 they were revealed signs of vegetative-vascular dystonia, joint pains, enlargement of the thyroid gland, fatigue, weakness.

In 2003 Galina was revealed cancer of the thyroid gland, she was operated. In the post-operative period there was revealed postoperative hypothyreosis, hypoparathyreosis, later - ischemic heart disease with the failure of mitral and tricuspid valves. In March 2015 she suffered acute myocardial infarction resulting in pulmonary and arterial hypertension.

Moreover, now Galina has got the following diagnoses: dyscirculatory encephalopathy, initially deforming osteoarthritis of major joints of the limbs, as well as – bilateral gonarthrosis of II degree, osteochondrosis of the backbone, chronic pyelonephritis, kidney cysts, nephroptosis, ulcerous disease of the duodenum, chronic cholecystitis, angiopathy of the retina in both eyes, thrombophlebitis of deep veins of the left shin, uterus myoma, polyps of the cervical canal of the uterus cervix. Now Galina is 73, she is a Chernobyl invalid.

In 1986 Galina's husband, Vladimir, didn't have any chronic diseases. Now he is 72, he is an invalid of the 3rd group, he was also established casual connection of disability with Chernobyl accident. The disease resulting in disability is acute impairment of cerebral circulation, dyscirculatory encephalopathy of II degree and complex genesis with Parkinson's syndrome, chronic mild vestibular dysfunction. He is also diagnosed: ischemic heart disease, atherosclerotic cardiosclerosis, arterial hypertension, bilateral sensorineural hearing insufficiency of II degree, primary cataract, myopia, varicose veins of the lower limbs, benign hyperplasia of the prostate gland.

Galina and Vladimir's children:

- daughter Diana, 15.11.1978. At the moment of the accident she was 8 years old. The power of the dose at the thyroid gland was 240 $\mu\text{R/h}$ (05.05.1986). Now she is 37, married, has two children. Her diseases are chronic pyelonephritis, kidney cysts, cholelithiasis, chronic gastritis, initially deforming osteoarthritis of major joints of the limbs, osteochondrosis of the backbone, fatty hepatosis.

- daughter Valentina, 12.12.1980. In 1986 she was 6 years old. The power of the dose at the thyroid gland was 120 $\mu\text{R/h}$ (05.05.1986). Now she is 35, single, has no children. On medical inspections in 1986-1988 she was diagnosed the following diseases: vegetative-vascular dystonia, neurocirculatory dystonia, hypertrophy of palatine tonsils. Since 1993 she has been revealed chronic tonsillitis, polyarthritis, thyroid hyperplasia. In 1995 she was diagnosed adenocarcinoma of the thyroid gland and was operated: thyrectomy with excision of paratracheal cellular tissue. Then she underwent chemo- and radiotherapy. In 2002 she was revealed hypothyreosis of severe degree. In 2007 – hypoparathyreosis, diffuse mastopathy, chronic periodontitis, sleep disturbance. In 2009 – vertebrogenic cervicocranialgia, mild pain syndrome, heart aches not related to physical exercise, headaches, increase of arterial pressure, pains in hip joints and back, spasms of the fingers and their numbness, memory decrease, sleepiness, pains in the abdomen, frequent colds.

- son Alexander, 20.08.1982. At the moment of the accident he was 4 years old. The power of the dose at the thyroid gland was 140 $\mu\text{R}/\text{h}$. Now he is 33, married, has 5 children, served in the army. He was operated twice for thyroid cancer. He has hypothyreosis and hypoparathyreosis, backbone osteochondrosis, chronic tonsillitis.

The example of this family affected by Chernobyl consequences shows that Galina and Vladimir didn't have any chronic diseases before the accident, their children were healthy. Now they are Chernobyl invalids.

Their children got considerable radiation exposure in 1986 and lived in the contaminated areas. Now, by the age of 33 – 37 they have a number of chronic diseases typical for old age, two of them have thyroid cancer, two of them are invalids. Their childhood, adolescence and youth weren't happy and carefree as they spent a lot of time in hospitals where they underwent operations and treatment, they felt pain and fear for their future.

This large family lived and is still living in constant anxiety because of newly revealed diseases in their parents, children and grandchildren. Therefore they are suffering psychological conflicts and financial difficulties because of long-lasting treatment in regional and republican hospitals and medical centers. All these factors greatly influence the life quality of the family making it worse.

In Buda-Koshelevo district there is a great number of such families not only among the liquidators and the evacuated or resettled citizens, but also among other population categories.

On analyzing medical-demographic statistics related to Buda-Koshelevo population affected by the accident on Chernobyl NPP, it's possible to state that the health state of the population in this district is getting worse and worse from year to year. Thirty years after Chernobyl accident people living in this area think that the main reason of the negative situation connected with the state of their health is the influence of radionuclides fallen in the first year after Chernobyl and daily constant exposure of small radiation doses at present.

Based on the above presented report, it's possible to make the following **conclusions**:

1. Thirty years after Chernobyl disaster vast areas of fertile land in Buda-Koshelevo district remain contaminated with radionuclides, and in some areas – not suitable for living within many years ahead. Danger of Chernobyl consequences remains considerable both for adult and child population of the district. Adamovich's phrase "Chernobyl is not behind, it's ahead" is quite actual nowadays.

2. Radiological situation in Buda-Koshelevo remains rather complicated, zonality with "periodic radiation control" is preserved. The average annual effective doze of population exposure mainly doesn't exceed 1mSv per year. CPR-inspection carried out in district policlinics is of practical importance only for evaluating the collective dose of internal accumulation. It's a pity to state that radiation safety in the district is "out of date". In the information space this theme arises only in cases of fires and illegal hunting in the forbidden zones.

3. Population of Buda-Koshelevo district lives in the regime of constant exposure of "small" radiation doses. Scientists investigating the consequences of nuclear accidents for the nature and the man recommend reducing any radiation exposure especially on a child.

4. Tendency towards population decrease in Buda-Koshelevo district is preserved and caused by:

- demographic problems, high mortality and low birth rate;
- social-economic problems – reduction of workplaces at the industrial and agricultural enterprises;
- outflow of human resources, especially from the village;
- absence of district objects providing modern types of services for recreation and development of young people.

5. There is observed deterioration of health state and life quality of all age groups. Every year there are revealed invalids, including children, whose diseases are connected with Chernobyl.

6. In the structure of the overall child morbidity in Buda-Koshelevo district there is observed growth of circulatory and digestive diseases, and in adults – malignant diseases, diseases of circulatory system including insults, brain infarctions and myocardial infarctions.

7. Primary disability of the adult population in Buda-Koshelevo district has increased and malignant diseases are talking the first rank place.

8. In the structure of child disability in Buda-Koshelevo district there is observed growth of congenital diseases including congenital chromosome diseases.

9. There isn't tendency towards decreasing adult mortality including that of working people as well as number of death cases from external factors: suicides, alcohol, fires.

Our **suggestions**:

1. In terms of consequences of the accident on Chernobyl NPP we should speak to the population about radiation using the language of science without exaggerating and underestimating its value for people's health. And this language should be heard and understood by everyone. Complacency, indifference, carelessness, deceit and fear are the way to "nowhere", to diseases and misery.

2. Measures which are necessary for improving the radiation and medical-demographic situation in Buda-Koshelevo district in the future are the following:

- decreasing radiation exposure on population connected with a complex of measures of radiation protection and control (isn't fully realized);
- reducing alcoholism of the population, conscious leading a healthy lifestyle (can't be realized for different reasons);
- prevention of diseases, annual conscious voluntary medical inspection of the health state, timely correction of the revealed abnormalities as well as qualitative treatment and rehabilitation of the patients (there are all the necessary conditions).

3. As for Buda-Koshelevo regional charity public association RCPA "Help for Chernobyl children" it will be very important to go on finding all the necessary resources for conducting radiation child monitoring with the further active information-explanatory work on radiation safety among the population. It's also necessary to continue rehabilitation of children abroad and realizing the projects having social relevancy in our district.

4. Being the head of one of the structural units of state health care institutions (Buda-Koshelevo district polyclinic) I will contribute to conducting this important work.

Thanks for your attention!