Republican Research and Practical Center for Radiation Medicine and Human Ecology

MEDICAL AFTERMATHS OF CHERNOBYL DISASTER IN BELARUS

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The contaminated area in the Republic of Belarus consisted of 3600 settlements (including 27 cities), where 2.2 million people lived. Currently, there live about 1.5 million people related to the affected population.
Purpose of the State Registry of persons affected due to the Chernobyl accident

- Radiation affected population monitoring;
- Obtaining the reliable data on the medical and biological effects of the Chernobyl accident;
- Provision of information to support dispensary examination, planning and carrying out therapeutic measures.
The objectives of the State Registry

- Maintenance of a personalized automated records of persons affected by the accident;
- Dynamic replenishment of necessary information about the persons affected by the accident;
- Development of normative-legal acts for the medical monitoring of the various categories of the affected citizens.
Groups of observation

1 GPR - persons who participated in the liquidation of the Chernobyl accident and its consequences, divided into two subgroups

2 GPR – persons evacuated or who left the areas of evacuation on their own in 1986;

3 GPR – people living or working in the areas of primary and subsequent resettlement, as well as those who were resettled or who left these areas after the accident on their own;

4 GPR - persons born from people of 1-3 groups, except for children belonging to the 2 and 3 groups;

5 GPR - people living or working in areas with the right of resettlement and of periodic radiation monitoring, as well as residents of other settlements, where the average equivalent radiation dose exceeds 1 mSv per year.

6 GPR - persons who participated in the liquidation or affected by the accidents and their consequences at other nuclear facilities of civil or military purposes, as well as the victims of these accidents or as a result of trials, tests or other work related to nuclear facilities, including nuclear weapons;

7 GPR – disabled people due to the Chernobyl NPP accident from the number of people who have no status “affected due to the Chernobyl NPP accident”, as well as children and adolescents upon detection of diseases of blood-forming organs (acute leukemia), thyroid gland (adenoma, cancer) and malignant tumors if they are not assigned to other groups of primary accounting.
## NUMBER OF PEOPLE IN STATE CHERNOBYL REGISTRY

<table>
<thead>
<tr>
<th>GPR</th>
<th>Total number</th>
<th>UnderObservation at 01.01.2015</th>
<th>Number of Cancer Cases (1986-2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1GPR (Liquidators)</td>
<td>99 693</td>
<td>55 425</td>
<td>11 431</td>
</tr>
<tr>
<td>2GPR (Evacuees)</td>
<td>13 101</td>
<td>4 310</td>
<td>828</td>
</tr>
<tr>
<td>3GPR (Residents)</td>
<td>139 470</td>
<td>56 593</td>
<td>6 731</td>
</tr>
<tr>
<td>4GPR (Offspring)</td>
<td>28 487</td>
<td>19 963</td>
<td>96</td>
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</tbody>
</table>
Total number of affected people

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Children</th>
</tr>
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<tbody>
<tr>
<td>1992</td>
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<tr>
<td>2014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
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</tbody>
</table>
Distribution of Affected People by Regions

- Gomel Region [ПРОЦЕНТ]
- Brest Region [ПРОЦЕНТ]
- Mogilev Region [ПРОЦЕНТ]
- Grodno Region [ПРОЦЕНТ]
- Minsk Region [ПРОЦЕНТ]
- Minsk city [ПРОЦЕНТ]
- Gomel Region [ПРОЦЕНТ]
NUMBER OF PEOPLE IN STATE CHERNOBYL REGISTRY

Residents
Liquidators
Offspring
Evacuees
Birth and mortality rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Birth Rate</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>8.15</td>
<td>14.3</td>
</tr>
<tr>
<td>2012</td>
<td>8.51</td>
<td>13.4</td>
</tr>
<tr>
<td>2013</td>
<td>8.66</td>
<td>12.20</td>
</tr>
<tr>
<td>2014</td>
<td>8.74</td>
<td>12.50</td>
</tr>
<tr>
<td>2015</td>
<td>8.89</td>
<td>12.50</td>
</tr>
</tbody>
</table>

Per 100,000
Age standardized mortality rates

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belarus</td>
<td>849.5</td>
<td>873.7</td>
<td>794.1</td>
<td>781.8</td>
<td>712.9</td>
<td>701.9</td>
<td>679.6</td>
<td></td>
</tr>
<tr>
<td>Liquidators</td>
<td>776.5</td>
<td>698.7</td>
<td>750</td>
<td>712.5</td>
<td>682.6</td>
<td>629</td>
<td>631.7</td>
<td>606.9</td>
</tr>
<tr>
<td>Evacuees</td>
<td>848.3</td>
<td>895.1</td>
<td>724.8</td>
<td>850.4</td>
<td>772</td>
<td>734.6</td>
<td>582.8</td>
<td>533.9</td>
</tr>
<tr>
<td>Residents</td>
<td>942.9</td>
<td>881.1</td>
<td>848.1</td>
<td>781.3</td>
<td>700.3</td>
<td>715.7</td>
<td>618.9</td>
<td>634.6</td>
</tr>
</tbody>
</table>
Structure of Mortality 2015

Affected

- Cardiovascular diseases: 59.5%
- Neoplasm: 16.1%
- Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified: 9.4%
- Injury, poisoning and certain other consequences of external causes: 6.9%

Belarus

- Cardiovascular diseases: 56%
- Neoplasm: 14%
- Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified: 12%
- Injury, poisoning and certain other consequences of external causes: 10%

Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
Injury, poisoning and certain other consequences of external causes
Structure of Incidence rates of affected people Belarus population

- Diseases of the respiratory system: 49.8%
- Cardiovascular diseases: 25%
- Diseases of the musculoskeletal system and connective tissue: 10%
- Diseases of the skin and subcutaneous tissue: 5%
- Injury, poisoning and certain other consequences of external causes: 5%
- Other: 4.0%
- Affected: 9.1%

Belarus:
- 52%

Other: 4.0%

5.9% 4.2%
From 1986 to 2014 the number of registered cases of cancer in Belarus increased from 23,200 to 46,467 (2 times).
In general there were many speculations, assumptions and predictions about the role of Chernobyl accident in cancer growth in Belarus. Most assumptions have been varying with the time. And till the present the question about role of Chernobyl accident has not been answered. But the growth of Thyroid cancer has been evident.
From 1978 to 2014 the number of registered cases of cancer in Belarus increased from 16,895 to 46,467.
The left scale is for incidence rates of stomach cancer (males, females). The right scale is for incidence rates of lip cancer.
Trends in malignant neoplasm incidence rates with insignificant changes

Years

Rate per 100,000 population

Lip (females)
Esophageas (females)
Larynx (females)
Lung (females)
Pancreatic (females)
Liver (females)
Urinary bladder (females)
Incidence rates of malignant neoplasm, that trend were growing relative uniformly.

The right scale is for incidence rates of breast cancer. The left scale is for all presented sites.
Incidences rates of malignant neoplasm with a positive trend, that have become stable since 1990s

The right scale is for incidence rates of lung cancer (males). The left scale is for all presented sites.
Malignant neoplasm incidence rates with strongly pronounced positive trend over the past 10 years.
SIR
Offspring of Affected People

Leukaemia (C91-C95)
Chronic myeloid leukaemia (C92.1, C93.1, C94.1)
Acute myeloid leukaemia (C92.0, C93.0, C94.0, C94.2, C94.4-C94.5)
Acute lymphatic leukaemia (C91.0)
Non-Hodgkin lymphoma (C82.0-C85.9, C96)
C00-C96 All malignant
C81 Hodgkin lymphoma
C73 Thyroid
C71 Brain
C69 Eye
C67 Bladder
C64 Kidney
C62 Testis
C43 Melanoma of skin
C22 Liver
C20 Rectum
C07-08 Salivary glands
Thyroid Cancer Incidence

- **Children (0-14 years at diag.)**
- **Adults (14+ years at diag.)**
- **All**


PER 100,000
Incidence rates of thyroid cancer by age groups (0-19) females (per 100 000)
Incidence rates of thyroid cancer by age groups (0-19) females (per 100 000)
Incidence rates of thyroid cancer by age groups (0-19) females (per 100 000)
Incidence rates of thyroid cancer by age groups (0-19) females (per 100 000)

They were born in 1982-1986
SIR
0-4 years at time of the accident

- Leukaemia (C91-C95)
- Chronic myeloid leukaemia (C92.1, C93.1, C94.1)
- Acute myeloid leukaemia (C92.0, C93.0, C94.0, C94.2, C94.4-C94.5)
- Acute lymphatic leukaemia (C91.0)
- Non-Hodgkin lymphoma (C82.0-C85.9, C96)
- C00-C96 All malignant
- C81 Hodgkin lymphoma
- C73 Thyroid
- C71 Brain
- C69 Eye
- C67 Bladder
- C64 Kidney
- C62 Testis
- C43 Melanoma of skin
- C22 Liver
SIR Evacuees
0-4 years at time of the accident

- Leukaemia (C91-C95)
- Chronic myeloid leukaemia (C92.1, C93.1, C94.1)
- Acute myeloid leukaemia (C92.0, C93.0, C94.0, C94.2, C94.4-C94.5)
- Acute lymphatic leukaemia (C91.0)
- Non-Hodgkin lymphoma (C82.0-C85.9, C96)
- C00-C96 All malignant
- C81 Hodgkin lymphoma
- C73 Thyroid
- C71 Brain
- C69 Eye
- C67 Bladder
- C64 Kidney
- C62 Testis
- C43 Melanoma of skin
- C22 Liver
- C20 Rectum
- C07-08 Salivary glands

Non-Hodgkin lymphoma (C82.0-C85.9, C96)
Acute lymphatic leukaemia (C91.0)
Acute myeloid leukaemia (C92.0, C93.0, C94.0, C94.2, C94.4-C94.5)
Chronic myeloid leukaemia (C92.1, C93.1, C94.1)
Leukaemia (C91-C95)
SIR Residents
0-4 years at time of the accident

Leukaemia (C91-C95)
Chronic myeloid leukaemia (C92.1, C93.1, C94.1)
Acute myeloid leukaemia (C92.0, C93.0, C94.0, C94.2, C94.4-C94.5)
Acute lymphatic leukaemia (C91.0)
Non-Hodgkin lymphoma (C82.0-C85.9, C96)
C00-C96 All malignant
C81 Hodgkin lymphoma
C73 Thyroid
C71 Brain
C69 Eye
C67 Bladder
C64 Kidney
C62 Testis
C43 Melanoma of skin
C22 Liver
C20 Rectum
C07-08 Salivary glands
Thyroid Cancer Incidence
The contamination of the territory of Belarus with iodine-131 (reconstruction) estimated 10 May, 1986.
LEUKEMIA ASR (C91-C95) IN BELARUS

APC=0,3% в год
SIR leukemia (C91-C95) of affected people

SIR Chronic myelocytic leukemia (C92.1, C93.1, C94.1) of affected people
SIR Chronic lymphocytic leukemia (C91.1)
SIR Acute myeloblastic leukemia (C92.0, C93.0, C94.0, C94.2, C94.4-C94.5)

THANK YOU FOR YOUR ATTENTION