

Creation and development of the State Registry of persons exposed to radiation as a result of the Chernobyl accident and other radiological emergencies in the Republic of Belarus

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ABSTRACT

Introduction: Creation and development of a national database of persons from Belarus affected by the Chernobyl catastrophe has been an important and actual challenge. Its aim is to help health care professionals make an objective evaluation of this group's health status and monitor it prospectively. Updated data on creation, development, objectives and challenges of operating the State Registry of persons exposed to radiation as a result of the Chernobyl accident and other radiation emergencies (State Registry) are presented.

Material and methods: Analysis of the system used by registrars to collect and process information in the State Registry. General ways to improve the process, define strategic objectives of

the registry's functions and categories of persons affected by the Chernobyl catastrophe have been suggested.

Results: State Registry is a unique medical information system in terms of volume (more than 200,000 people registered thus far) and territorial scope (whole territory of Belarus).

Conclusion: State Registry provides long-term personalized account of changes in state-observed contingents and forms the basis for an objective evaluation of the disaster's real impact on the health of the affected population in Belarus.

Key words: affected population, State Registry, Chernobyl catastrophe.

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INTRODUCTION

The Chernobyl nuclear plant accident is one of the most significant technological disasters of the second half of the 20th century in terms of radiation levels and population and territory exposed. As a result of this accident a vast territory of the former Soviet Union, even at a great distance from the plant had been contaminated with a complex mixture of radionuclides. Belarus, Ukraine and Russia were affected the most [1, 2]. From the first days after the accident, the government of the former Soviet Union, organized and carried out extensive activities to estimate the radiation and examine and protect the population. In June 1986 the All-Union Distributed Registry of Persons Exposed to Radiation Following the Accident at the Chernobyl Nuclear Power Plant (AUDR) was created. The purpose of the AUDR was to provide long-term, automated, personal account of persons exposed to radiation from the Chernobyl accident, their children and future generations, doses, assessment of health status and its changes.

In 1987, were developed and approved by the Statute of Union a distributed registry of persons exposed to radiation from the Chernobyl accident, the basic registration and accounting forms registry and instructions for their completion. In accordance to its Statute the State Registry included observations on four levels: union, republic, region and district. Many scientific institutions were involved in the creation of AUDR.

At the district level AUDR was positioned in the hospitals directly involved in the medical care of the affected population. This level included collection, accumulation, storage and updating information on individuals by filling out registration and account forms and sending them to higher level (regional) registry.

One of the main objectives of AUDR was to establish a database of individual annual doses and identify categories of observation. State Registry also included data on chronic conditions from before the accident and, changes in health after the accident.

The volume and quality of recorded medical and dosimetric information, organizational structure, interdepartmental and territorial cooperation in the AUDR allowed to assume that it would have become the first objective database on the radiological consequences the Chernobyl accident based on direct radiation-epidemiological studies in liquidators and population of the contaminated territories.

However, in 1991, following the collapse of the Soviet Union, AUDR ceased to exist. Since December 1991, this database has expanded to include personal medical and dosimetric information on 659 292 people, including 284 919

participants of liquidation of the consequences of the catastrophe. More than 47% registered are from the Russian Federation (22.5% - in Russian liquidators) and Belarus (26.5% - the population of the affected areas of the country) [1,2].

In the most affected countries: Belarus, Ukraine and Russia independent personalized registries have been created, including only the citizens from those countries. Information on the population of Belarus affected by the Chernobyl catastrophe from AUDR has been passed on to Belarus.

The purpose of this study is to present an update on the creation, development, objectives and challenges of operating the State Registry of persons exposed to radiation from the Chernobyl and other radiation emergencies.

MATERIAL AND METHODS

Since 1992, improvement of the former Belarusian part of AUDR has been assigned to the Belarusian Center of Medical Technology, Computer Science, Management and Health Economics. First of all, while maintaining continuity, the registration and accounting documents and registries, instructions for their completion, medical ambulatory cards have been revised. The most important strategic goal - computerization of all levels of the registry, was carried out by entering the information into the database directly from primary medical records.

In 1992-1993 new software was created allowing for automatization of data collection, statistical reporting, converting and up-loading data from clinical examination. New software passed the experimental stage, which revealed various inaccuracies, errors, later adjusted [2 - 4]. At the same time work was carried out on the testing accounts from the registry and medical records. Additions and changes in accounting forms of the registry, medical records, obtained during testing were developed in 1994.

In 1993 the Government of Belarus passed a resolution "On creation of the Belarusian State Registry of Persons Exposed to Radiation due to Chernobyl", which approved the Statute of Belarusian State Registry.

The main objectives of the State Registry are:

- collection of personal data of persons exposed to radiation;
- automated registration doses received;
- documentation of chronic diseases from before the accident;
- monitoring of health status of irradiated population after exposure, its changes and results of rehabilitation;

- dynamic long-term updating of the information on the observed contingent;
- creation of information and reference data sets on users request;
- control of the completeness and compliance with the terms of clinical examination of the observed individuals;
- international exchange of medical and dosimetric information.

The purpose of the State Registry was to provide information on the outcomes of clinical examination of the population affected by the Chernobyl accident; therapeutic interventions based on this examination and structure, nature and trends of morbidity and disability in other regions. It also develops recommendations for prevention, diagnosis and treatment of disease; improvement of health care of the population exposed to radiation and scientific studies on health effects of the accident.

RESULTS

Presently the collection of personal medical data is performed annually in more than 200 regional offices of the State Registry on four levels: health care organization, district level, regional and republican level.

Employees of the State Registry collect information about individuals from their medical records, enter data in the State Registry, and are responsible for their quality and reliability. All the information about the victims is concentrated in the medical cards and in the history of the child's development, exactly from these primary documents health information gets directly into the database [5-7].

There are 7 groups of primary accounting (GPA) and 4 risk groups (A, B, C, D) (Table 1).

First group (1 GPA):

1.1 - persons who took part in the 1986-1987 liquidation of the consequences of the Chernobyl catastrophe within the evacuation zone (exclusion) or performed duties there during that period (including temporarily seconded), including military personnel and conscripts;

1.2 - persons who took part in the 1988-1989 liquidation of the consequences of the Chernobyl catastrophe within the evacuation zone (exclusion) or performed duties there during that period (including temporarily seconded or sent), including military personnel and conscripts and persons who took part in the 1986-1987 decontamination of, buildings, livestock in the areas of primary and subsequent resettlement, including military personnel and conscripts.

Second group (2 GPA): persons evacuated or who fled from evacuation zone in 1986.

Third group (3 GPA): persons residing or working in the areas of primary and subsequent

resettlement who resettled on their own or who had left these areas after a disaster.

Fourth group (4 GPA): those born to those in group 1-3, except for children enrolled in groups 2 and 3.

Fifth group (5 GPA): persons residing or working in the area with the right to resettle in the area or stay with periodical radiation control and residents of the settlements where the average annual effective dose exceeded 1 millisievert (mSv) per year.

Sixth group (6 GPA): persons involved in or affected by the elimination of accidents and their consequences in other civil or military nuclear facilities, as well as the victims of these accidents or as a result of tests, exercises or other activities related to nuclear facilities, including nuclear weapons.

Seventh group (7 GPA): disabled as a result of the Chernobyl disaster of the number of citizens who do not have the status of "victim of the Chernobyl catastrophe", as well as children and adolescents with a disease of a blood-forming organ (acute leukemia), thyroid gland (adenoma, cancer) and malignant tumors if they have not been assigned to other groups of primary records.

Risk group A (from subgroup 1.1 GPA): persons who took part in 1986 in the aftermath of the Chernobyl catastrophe within the evacuation zone.

Risk group B (from 2 and 3 GPA): persons who received radiation doses due to external and internal exposure in the first year after the accident from lists generated by the Republican Dispensary of Radiation Medicine.

Risk group C (from 2 to 5 GPA): persons exposed to radioactive iodine as a result of the Chernobyl accident, from 0 (in utero) to 18 years old at the time of the accident (born 1968-86) and not assigned to risk group B.

Risk group D: people who due to internal exposure measurements of human radiation spectrometer during the year exceed the allowable levels and do not tend to decrease.

In the beginning of 2012 the State Registry contained information on more than 200 000 people 1-4, 6, 7 GPA. 149 468 are alive. 12.8% from this number were children 0-17 years old. The largest numbers of registered persons in 1-4, 6, 7 GPA was in Gomel (51.2%), Mogilev (13.2%) and Minsk region (11.3%).

In other areas, records contain almost the same number of people affected by Chernobyl (Minsk city - 8.5%, Brest region - 5.5%, Vitebsk region - 5.1%, Grodno - 5.2%). The distribution of the affected population from the Chernobyl accident is presented in

Table 1. Population of the Republic of Belarus according to the group of primary accounting (GPA)

GPA	%
1	41.4%
2	3.1%
3	42.3%
4	12.1%
6	0.2%
7	0.9%

DISCUSSION

Compared with year 2000, the number of persons registered at the national level of the State Registry decreased by 17.3%, which is associated mainly with natural population decline. Considering that cohort of persons of the 1-4 GPA is "closed" and will continue to age over next few years, we should expect accelerated decline, primarily due to natural causes (death). It is therefore essential to carry out studies to assess the medical and biological consequences of the Chernobyl catastrophe at the union level and collect information on persons living in the areas with the right to resettlement and periodic radiation control (5 GPA). This will provide unique, up-to-date data on the health of individuals residing in the territories of radioactive contamination and exposed to chronic irradiation in low doses from 1986. Such data collection (5 GPA) has not been conducted at the union level.

In addition, the State Registry does not include radiation doses not only for people currently or previously living in the contaminated areas, but also the liquidators. It makes it impossible to conduct an in-depth radiation-epidemiological analysis. 113000 people from Belarus participated in the liquidation of the consequences of the Chernobyl catastrophe, of whom 94798 people have been registered in the State Registry. Radiation doses are known only for about 7000 of registered liquidators, i.e. less than 10% of all liquidators. In addition, these doses varied greatly from a few mSv to several hundred mSv in individuals in the same conditions exposed to radiation in the same locality and at the same time. So far, dose verification has not been completed and no consensus on dose reconstruction exists among dosimetry specialist [8].

Thus, 25 years after the Chernobyl catastrophe, Belarus has no reliable information on individual radiation doses (including in liquidators) which would render itself suitable for scientific analysis.

CONCLUSIONS

State Registry is a unique medical information system in terms of volume (more than 200,000 people registered) and territorial scope (whole territory of Belarus). It gives us hope that this personalized, longitudinal database of health status changes in Belarusian population will answer the question about the real health costs of the Chernobyl accident.

Improvement in the functioning of the State Registry needs to include:

- maintaining continuity and support at the appropriate level of State Registry,
- ascertainment of individual radiation doses of the general population and liquidators,
- improved staffing levels and technical support,
- collection and analysis of the information on persons from 5 GPA at the union level.

A unique complex of medic-organizational measures (a form of medical-preventive action) on liquidation of consequences of the Chernobyl accident is developed. The complex operation and development of multifunctional systems registry ensures and is a reliable information base of radiation, health and social protection and rehabilitation people of the Belarus, exposed to ionizing radiation and large-scale epidemiological studies can be carried out.

Conflicts of interest

The authors have declared no conflicts of interest.

REFERENCES

1. Polyakov CM, Grakovich AA, Malakhova IV. Chernobyl registry - the main data base for studying the health status of populations affected by of the Chernobyl accident. Medical and biological aspects of the Chernobyl accident. 2005 Jan; 20-24.
2. Bennett B, Repacholi M, Carr Z. Health Effect of the Chernobyl Accident and Special Health Care Programmes. Report of the UN Chernobyl Forum Expert Group "Health". Geneva: World Health Organization; 2006; 160 p.
3. Antipova S, Denisevich N, Lomath L. Methodical guidelines for collection and control of information about persons, be taken into account in the Belarusian State registry of persons exposed to radiation as a result of the Chernobyl accident. Minsk; 2001; 35 p.
4. Nadolnik L, Netsetskaia Z, Vinogradov V. Effect of long term exposure to low dose gamma irradiation on the rat thyroid status. Radiats Biol Radioecol. 2004 Jan-Feb; 44(1): 76-80.
5. Tsyb AF, Dedenkov AN, Ivanov VK, Stepanenko VF, Pozhidaev VV. [The

- development of an all-Union registry of persons exposed to radiation resulting from the accident at the Chernobyl atomic power station]. *Med Radiol (Mosk)*. 1989 Jul; 34(7):3-6. (Russian)
6. Baverstock K, Williams D. The Chernobyl accident 20 years on: an assessment of the health consequences and the international response. *Environ Health Perspect*. 2006 Sept; 114(9):1312-17.
 7. Sasnouskaya A. Health status of the Republic of Belarus affected by of the Chernobyl accident. Gomel. 2006; 250 p.
 8. Shevchuk VE, Gurachevsky VL. 20 years after Chernobyl accident. Consequences in Belarus and their overcoming. Minsk. 2006, p. 96-104.