

# **HEALTH AND INFORMATION IN CHERNOBYL CONTAMINATED REGIONS**

## **A synthesis on health aspects in GERIRAD project**

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The health of the population still living in Chernobyl contaminated regions remains a matter of both controversies and concerns. WHO, in collaboration with local and international medical teams, deals with scientific uncertainties and data collection. His activity aims to constitute a basis for further decision making. Closer to the concerned people, Red-Cross groups and UNESCO centres work to bring them medical, practical and psycho-social help. However lay people's difficulties to understand the specific issues related to health and radiation protection constitute an obstacle to manage the situation in collaboration with concerned persons. This synthesis will focus on the way in which the population in contaminated regions can integrate information concerning health and radioactive contamination, paying attention to their life conditions and to the conceptual frame.

### **Sources**

Data has been gathered from previous GERIRAD reports, scientific meetings and field research activities (in chronological order):

- interdisciplinary desk-study by the team of Geneva university,
- first LASAR report<sup>1</sup>,
- data from 135 pre-test questionnaires answered by pupils and adults in contaminated and clean area in Moghilev Oblast,
- scientific conference in Geneva: *Health and Information - From Uncertainties to interventions in the Chernobyl contaminated regions*,

- interviews, in collaboration with the team of F. Brinkman<sup>2</sup>, with experts, professionals and lay people (parents), and focus group discussions with teachers, nurses and pupils during the both visits in contaminated area<sup>3</sup>,
- cases studies based on dose rate and activity measurement in contaminated villages,
- interface meeting in Amsterdam.

## **Outcomes**

### **Global health situation**

The health situation in Chernobyl contaminated regions is loaded by several changes. In comparison with Soviet's period, the direct and indirect effects of the catastrophe interfere with a global diminution in public health services and social security, including pensions for elderly and free preventive cares. The epidemiological situation is characteristic of a "Transition" society, with problems of developed (e. g. chronic degenerative diseases) and developing countries (e. g. diphtheria or cholera epidemics) in the same time<sup>4</sup>.

In a broad point of view the dramatic change in lifestyle and perspectives needs a special attention. Some of them are common for all former Soviet Union; other are linked to the response to the catastrophe as evacuations or restrictions in diet and outside activities.

The scientific community recognises only thyroid cancer as specific pathology related to the radioactive contamination after the catastrophe. Uncertainties still remain concerning other malignancies (e.g. leukaemia), genetic effects, diabetes or cardio-vascular disease, including hypertension and sudden death.<sup>5</sup> The early identification of possible new pathologies would demand special equipment and well trained team, but budget is decreasing.

Whatever proved diagnosis or not, maybe without evident elucidated causes, the health status is often quite poor. Local doctors report increased frequency of infectious diseases, blood abnormalities, a poor nutritional status and several cases of thyroid cancer and leukaemia among children.

The question of mental health and the role of stress in the development of pathologies are controversial. Firstly charged with the responsibility of the apparition of any unusual health problems, a diagnosis of stress is often considered by victims as a denial of real damage by local healthcare providers or authorities. Nevertheless a chronic distress with a loss of quality of life was reported in exposed population, but no significant change in psychiatric disorders, including PTSD<sup>6</sup>.

Shortly said the health situation is characterised by quick changes, uncertainties in diagnosis and attributed causes and lack of means to face new problems.

### **Perception of health topics by people and healthcare providers in contaminated region**

This subject was investigated by questionnaires and half-directive interviews during 4 visits in contaminated area by GERIRAD teams. People's perceptions of their own health needs show clear differences with age and zone (please see fig. 1 to 5 in annex). The most frequent item is "food" in any zone and for any age, which is commonly found in Western Europe. Precision's are more specific : not contaminated, pure, enough, rational, etc..

But clear differences between the zones, more dramatic in heavy contaminated village, let show the awareness of the victims about the environment (clean air, ecology) and the life conditions, including economy. Moreover they express an increased demand for medicine (healthcare services and public health), to be cured, sanatorium once a year...), an attention to rhythm and psycho-social conditions (calm, no stress or less troubles, rest).

Through the concerns for economics topics (salaries, subsidies, costs), the burden of the precautions and cares in relation with the contamination is obvious. The necessity to buy clean food and treatments, the ban for forest activities and resources creates specific economical difficulties.

### **Health and responsibility**

Although population's attitude concerning health in ex-Soviet union has currently been described as passive or even fatalistic, outcomes from our enquiries reflect a disposition to handle their life. Their answers to the question "Who is responsible for your health?" show that most of them are ready to take personal and familial responsibility. The more enthusiastic are adolescents (fig. 6). This tendency was confirmed in detail by group discussions.

Among adult, personal involvement in health was also the most frequent answer, but often tainted with some disillusion. The main obstacle to the management by the population of their own health cannot be attributed to any lack of involvement from concerned people themselves.

Contrariwise healthcare professionals and -institutions show less availability toward new style of sharing responsibility. The school nurses are faithful to their traditional role in healthcare

providing. The doctors and nurses working in the Red-Cross regional and local offices and Mobile Laboratory express more motivation for health education. Thus the place for it in their activities is not clear. They are already loaded with helping people to face various problems. On one hand specific pathologies related to the catastrophe need special screening (thyroid echography). On the other hand they have to help people to face the growing burden of new forms of misery, in particular the tragic situation of elder people, with no incomes and huge difficulties to cope with the lifestyle changes, after the evacuation from their land. As epidemiological data show increased thyroid cancer as far as 300 km from Chernobyl NPP, the task is enormous<sup>7</sup>.

### **Perception of personal health status and projection into the future**

The answer to the question "What do you think of your health now?" range from "very bad" and "lousy" to "excellent" and even "wonderful". The main differences are due to age: most adolescents consider that their health is good to excellent, adult appreciate it mainly from bad to good (table 7 and 8). No wonder : children being the centre of attention from both parents and state (and in addition of themselves), their needs are better taken into account. Pupils, in contaminated village, received in the school canteen better-balanced meals than elsewhere, or at other age. On the other hand, the test was given at school; severely ill and invalid children are kept at home or in the hospital.

The differences between zones are not obvious (fig. 9). In the clean zone, as in the less contaminated villages, a part of the population are resettled from the evacuation zone. At any place in the region, testimonies and interviews revealed that people suffered from the consequences of the catastrophe, either through radioactive contamination, or due to social disruptions and economical troubles. Some of them recovered, others did not.

The answers to the following question : "How do you think your health is going to develop in the next years and why do you think so?" (fig. 10 to 12) give more detail on the manner in which than consider radioactive contamination. Many people are pessimistic in reasons of the consequence of the Chernobyl catastrophe. Moreover, in the most contaminated village, thirty years old people already expect bad effects of ageing! Other concerns are related to food shortage and lack of medical services and treatments in the villages. Unlike in conversation where they expressed a good mood, their written answers show a damaged view of future, until sometimes considering a premature death as welcome...

### **Popular models to understand health effects of radioactivity**

The results of cognitive tests on contamination issues brought poor results<sup>8</sup>. Most people at any age cannot describe the transfer of caesium between environment and man (fig. 13 and 14). Moreover they are not aware of Caesium excretion. They can seldom give a definition of contamination (fig. 15). Unlike the domain of health where they expressed plenty of ideas, they often gave no answer or "I don't know" in the items concerning radioactive contamination. As they try to answer, they use metaphoric comparisons, that they do not distinguish from reality. Anyhow, their representations do not follow a clear pattern in place and time: i.e. they often think that contamination is still coming from the air now.

Peoples difficulties to perceive and understand radiation issues are not unexpected. This domain is complex, phenomenon usually lacks of visibility and the effects are often delayed. The scientific concepts are not available for lay people, neither in physics nor in bio-medicine. In particular the notion of risk does not belong to their logic. For them, bad effects of any contamination are certain, immediate, and contamination always stays in the body, unless you travel to clean area.

Firstly the interview by sociologists, then the answers to the questionnaires and pupils' interviews at school allowed to identify and document several popular models, in use in Belarus in attempt to help learning and understanding radiation issues. The most frequent seems to be the epidemic model: radiation is compared to a kind of bacteria or to a virus. An alternative suggests insects. Although this picture looks naive, it was revealed than it is deliberately taught, with help of official school manuals, instead of simple correct explanations (fig. 16).

The hygienist discourse is often associated to the epidemic model to propose "solutions", for example to wash hands and vegetables (fig. 17) or to boil to disinfect... The radioactivity is seen as dirtiness, mostly as apparent spots, dust or mud. Pupils' mis-conceptions are very similar to the contents of booklets with tables of derived level in food and recommendations for people living in contaminated zone. As an example, we can found in a booklet still in use: "Before eating products (cultivated plants) it is necessary to implement the most simple purification process, which diminish the contamination 2 to 10 times (...) Before eating or preparing cultivated plants, the following rules have to be observed: to clean carefully

vegetables and fruits, to remove 3 or 4 upper leaves of cabbage, to clean carefully the mud from edible roots"<sup>9</sup>.

Another popular model sees ionising rays as warriors. Their aggressive figures are also in use in children books illustrated with cartoons (fig. 18).

Toxic model is used by farmers which process contaminated mushroom according to traditional recipes currently used in the region for poisonous mushrooms. In analogy, lot of products are managed in the same way, or said to be so, for example meat. Nurses also advise to use these recipes with suspect foodstuffs.

## **Discussion**

### **The side effects of epidemic metaphors**

As soon as we consider the possible consequence of the epidemic model for victims, the danger is obvious: it can lead to consider people from contaminated area as infectious. It is likely to destroy their image, to increase rejections and disturb rehabilitation. In addition, victims can fear to be harmful for their children...

Furthermore the functional quality of the epidemic model is poor: understanding the cycle of radio-nuclides is not facilitated by this way. In particular radioactive decay and biological elimination of caesium are not accessible. Children get an aggravated conception of radioactivity, as they think that radioactivity propagates by her own, and is transmitted from a person to another.

The advice to remove the (external) contamination from products by simple washing is confusing. It constitutes an obstacle to understand internal contamination as well as to be aware of the actual situation. The first version of illustrated sheets to popularise this topic were probably conceived in the time of the iodine cloud, in this time, it was pertinent. However they are actively diffused et re-edited until now. In interviews as well as in test, washing hands, products and even dishes are considered as the way to diminish radioactivity. But some pupils criticise this advice: they already wash hand and cannot understand how it could work!

These metaphoric models are frightening. It is a deliberate strategy in attempt to stimulate people involvement? Far from being more motivated, people which has a worse idea of

situation get stronger difficulties to cope and often escape into denial. The subject being already very sensitive, lets avoid to overdo it!

### **Health implications of contamination zoning**

The contamination zone are considered both by the population and the authorities as a main issue. They have been defined in early management to constitute a basis for evacuation decision and subsidies. However we have to pay attention that in this region, heavy contaminated forests are close to clean villages and small town (a few km). It is very easy to walk up from a clean village to a contaminated location and local people will more likely take shortcuts and escape the controls. In the autumn 1986, people had no idea of contamination in their region. Some of them, which had their health badly damaged after wandering in the forest and eating mushrooms and berries, are still in a very poor status yet.

For most people nowadays, poverty is the main reason to go on harvesting in the forest. Lots of them confessed going on to pick berries and mushrooms. The complete deficiency of detailed picture of the repartition of Caesium at village scale and the scarcity of any maps contribute to makes the forests completely forbidden, including uncontaminated places. The pressure of necessity alters the protective power of zoning and controlling the radiation borders. Anyhow the region has been cordoned off. We cannot consider it only as a protective countermeasure against spreading contamination. We may also understand this decision as a symbolic sign, in comparison with the way to face an old age epidemic plague, as to exorcise the evil. As the quarantine is going to last over 200 years, we can easily perceive the following side effect. The enclosure is turning the contaminated zone into a ghetto, a trap. It is likely to make worse the stress, the rehabilitation difficulties, to destroy the equipment and services (for example school and bus transportation), and diminish the opportunities to build a positive life project on the spot. In conclusion the isolation of victims could become a major concern for the future.

### **Perspective for health education**

According to conventional ideas on education and knowledge, pupils first don't know, then they learn; teachers know first, then they teach, which means that they tell what they know to pupils, which learn. Pupils need to be motivated to learn, but teachers never need help to approach a difficult subject.

According to conventional ideas on health and cares, lay-people have emotions and psychological difficulties make them suffer; specialists only study problems, but never suffer from them.

According to conventional ideas on science and technology, experts know very accurately; as they write book, the content is true. Experts found the decisions on rational basis, never on emotions, to which they use to escape, at least in their professional life.

To go further in trying to help solving problems, we have to give up these pre-conceptions. Events contradict them. Here are some examples. Pupils are much more motivated for health education and food subjects in biology than teachers and nurses altogether. Shall we ask teachers and nurses to educate pupils in these subjects? New methods, compatible with this paradox, are still to invent.

Lots of books written by experts are not usable. Of course nobody is expert in the human life of people in contaminated zone. It could help!

Twelve years after the catastrophe, public and private managers seem to encounter persistent acceptance difficulties, as testify several attempts to act as if it was not so bad, trying to erase the trace of both the catastrophe and the human life there before. It is time to admit that the loss are beyond repair and, if possible, to ask for forgiveness<sup>10</sup>. It will help those who have to build a new life.

## **Acknowledgement**

We are indebted to the University Centre for Human Ecology and Environmental Science, in Geneva, for having supported the early stage of the project and the mid-time conference, to the European commission and the Swiss office of education and science for their financial support, to the team of the Institute of Sociology in Minsk for their collaboration, to the population and the professionals in Moghilev Oblast and Minsk, to the Institute of Applied Radio-Physics in Lausanne, for the technical resources and advice and to all the colleagues who participated to our investigations.

## **Illustrations (in annex)**

Fig. 1. Perception of health needs by adults, controlled zone 37 to 185 kbq/m<sup>2</sup> (1-5 Ci/km<sup>2</sup>)

Fig. 2. Perception of health needs by adults, zone 185 to 555 kbq/m<sup>2</sup> (5-15 Ci/km<sup>2</sup>)

Fig. 3. Perception of health needs, adults, contaminated zone > 555 kbq/m<sup>2</sup> (>15 Ci/km<sup>2</sup>)

Fig. 4. Perception of health needs - teenagers in "clean" zone < 37 kbq/m<sup>2</sup> (<1 Ci/km<sup>2</sup>)

Fig. 5. Perception of health needs (any age), zone 185 to 555 kbq/m<sup>2</sup> (5-15 Ci/km<sup>2</sup>)

Fig. 6. Who is responsible for my health?

Fig. 7. What do you think of your health now? (teenagers all zones)

Fig. 8. What do you think of your health now? (adults all zones)

Fig. 9. What do you think of your health now? (tendencies in contamination zones)

Fig. 10. How do you think your health is going to develop in the next years? (teenagers)

Fig. 11. How do you think your health is going to develop in the next years? (adults)

Fig. 12. Perception of health evolution in the future (tendencies in contamination zones)

Fig. 13. Cesium's transfer seen by teenagers

Fig. 14. Cesium's transfer seen by adults

Fig. 15. Define what is 'contamination'

Fig. 16. "Radiological hygiene", illustration in a booklet on health education in use at school

Fig. 17. Popularised advices in a booklet on radiation for children

Fig. 18. Popular presentation of alpha rays, illustration in a booklet on radiation for children

## **Internet address**

<http://www.unige.ch/fapse/SSE/teachers/giordan/gerirad/>

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## Notes

<sup>1</sup> Boceno L., Grandazzi G., Lemarchand F. and Dupont Y., University of Caen.

<sup>2</sup> Huisman L. and Kivits L., hogeschool Holland, The Netherlands.

<sup>3</sup> Professionals which deal with nutrition, education and health issues were also interviewed, in particular heads of school canteen and food commission, in Minsk, Kostiokovici and contaminated area 185-555 kbq/m<sup>2</sup>, school nurses in Kostiokovici and contaminated area 185-555 kbq/m<sup>2</sup>, school teachers in contaminated area 185-555 kbq/m<sup>2</sup>, food safety control (Kostiokovici), Agricultural management and information Institute and Institute for Soil science and Agrochemistry, in Minsk, Red-Cross nurses, psychologist and physicians at various levels: International delegation, Moghilev Oblast, Mobile Laboratory and at local level, nurse and doctors from local Polyclinic and Red-Cross group of the rayon.

In a further stage of the project, 6 meetings with teachers in Kostiokovici and Klimavici rayons offered new opportunities to better understand their concerns about health and radioactivity. Questions were collected.

<sup>4</sup> J.-P. Revel: Health Concerns in the Ex-USSR In: Hussy C. and Adler D. ed. *Health and Information - From Uncertainties to interventions in the Chernobyl contaminated regions*. Proceeding of the 2<sup>e</sup> International Conference on Consequences of Chernobyl Catastrophe. 13-14 nov. 1997. University of Geneva. University Centre for Human Ecology (CUEH). Cahiers no 2. 1999. p. 27.

<sup>5</sup> Rosa I. Goncharova Ionising Radiation Effects on Human Genome and its Transgeneration Consequences p. 49. Op. cit

<sup>6</sup> Havenaar J. M. (1996) *After Chernobyl*. Psychological factors affecting health after nuclear disaster Ph D thesis, Utrecht University, The Netherlands.

<sup>7</sup> Abelin T., Bleuer J., Prudyvus I., Kofler A., Averkin Y. I. Uncertainties concerning effects of small doses : an Epidemiologist's Point of View. In: Hussy and Adler 1999. Op. cit

<sup>8</sup> Kivits L., Brinkman F., Huisman L., and Tarassov V., *Pupils' conceptions about food in contaminated areas*. Draft version of paper presented at the ERIDOB-conference in Goteborg. November 1998.

<sup>9</sup> Booklet: *Pervitchnaia podgotovka* (p. 9-10).

<sup>10</sup> Cf. P. Girard, Round-Table. Op. cit p. 155-159.