

Proceedings of the Scientific and Citizen Forum on Radioprotection : **from Chernobyl to Fukushima**



**Organised by IndependentWHO
12-13 May 2012, Geneva (Switzerland)**



Scientific and Citizen Forum on Radioprotection: From Chernobyl to Fukushima

Organised by IndependentWHO

12-13 May 2012, Geneva (Switzerland)

Proceedings

Geneva, June 2013

Editors' Note

The document you are about to read is the result of a collective effort by numerous individuals and associations to whom we express our gratitude at the end of this publication. At the outset we wish to explain the approach taken by the editorial board designated by the "Collective IndependentWHO" and for which we assume full responsibility.

As regards the meeting of Saturday 12 May, we have endeavoured to respect to the greatest possible degree the oral presentations of the speakers; parts of their written texts provided before the Forum have, however, served to complete these presentations. In such cases the inclusion of these elements has been checked with the speakers.

The presentations or other interventions made in other languages than English, notably French, Russian and Japanese, have been translated and revised in close consultation with the authors by various members of the editorial board.

The illustrations accompanying the presentations have been reproduced from the Powerpoint projections provided by the speakers.

The verbatim reports of the discussions during the Saturday meeting as well as the report of the debates on Sunday 13 May are based on recordings of the meetings, rendered compatible with the written language by the editors and translators while endeavouring to stay as close as possible to the oral interventions. An effort was made to identify all speakers, sometimes without success.

Finally, the oral and written presentations reproduced in this publication remain the full property and responsibility of their authors.

The Editorial Board¹

¹ **Editorial Board:** Emanuela Andreoli, Françoise Bloch, Maryvonne David-Jougneau, Odile Gordon-Lennox, George Gordon-Lennox (coordinating editor), Alison Katz, Claude Proust, Véronique Ratel, Paul Roullaud, Wladimir Tchertkoff.

Translations: Wladimir Tchertkoff (Russian-French); Line Aldebert, Odile Gordon-Lennox (English-French); David et Susie Greaves, Alison Katz, George Gordon-Lennox (French-English); Satoko Fujimoto (Japanese-French); Miho Kozawa-Hoffmann (Japanese-English).

Revision French texts: Muriel Rusillon.

Photos: Emanuela Andreoli.

Layout: Michel Favre, Le Cadratin.

Website of the Collective Independent WHO: <http://www.independentwho.org/fr>

Foreword

Why this forum?

For more than half a century, **the health consequences** of nuclear disasters, such as Chernobyl and Fukushima, and of nuclear activities in general, have been hidden from the public. A high-level international cover-up, involving governments, the nuclear industry, and international public institutions, has been coordinated by the International Commission on Radiological Protection (ICRP) and the International Atomic Energy Agency (IAEA), one of whose mandates is to promote peaceful use of the atom in the world.

The World Health Organization (WHO) is an accomplice to this cover-up. In fact, according to the agreement signed on May 5, 1959 between WHO and IAEA, WHO is not allowed to disseminate information, undertake research, or provide assistance to populations affected by nuclear accidents, without the approval of the IAEA which itself reports to the UN Security Council. For the past two years, WHO no longer even has a “Radiation and Health” department. This unacceptable situation was confirmed during a meeting between IndependentWHO and Dr Chan, WHO Director-General, on May 4, 2011. It is clear that WHO has abdicated all responsibility in the critically important field of radiation and health.

International radiological protection standards were introduced in 1950 by the International Commission on Radiological Protection (ICRP), and its recommendations are followed by States and international Organizations. But the ICRP model that is used to determine doses and risks of ionising radiation to human health fails to distinguish between the effects of **internal contamination** and those of **external irradiation**: with, as a direct consequence, denial of the morbidity and mortality rates observed among the people who live in contaminated areas.

This explains that the official Chernobyl death toll, of 5 September 2005, co-signed by UN agencies, is around 50 directly linked to the catastrophe, and 4000 *potential* deaths in the long term... At the end of 2009, however, the book “*Chernobyl: consequences of the catastrophe for people and the environment*” by A.V. Yablokov and V. and A. Nesterenko, so far the most complete review on the subject, was published under the aegis of the New York Academy of Sciences. Based upon thousands of studies from all over the world, the authors estimate that there have been hundreds of thousands of deaths as a result of the Chernobyl catastrophe. They also document a significant increase in morbidity, particularly in children, 80% of whom are ill today compared to 20% prior to the accident.

These huge discrepancies in estimates of the number of victims must be investigated. With the Fukushima catastrophe – which is certainly as serious as the Chernobyl disaster – it is all the more urgent and essential today, to critically examine the information that is provided to populations on radioactive contamination and to consider possible radioprotection measures.

In the face of the inadequate response of international institutions, Japanese researchers and citizens have approached independent experts of other countries to request information and advice. The aim of the Scientific and Citizen Forum on Radioprotection was to share knowledge and experience concerning the Chernobyl and Fukushima catastrophes. The question of “standards” was addressed through **a comparison of official data with experience** and with other theoretical models supported by independent scientists. Radioprotection itself was addressed and its field of application and limitations, defined. A radioprotection handbook produced by the Belrad Institute, Minsk (Belarus) has recently been translated into Japanese. The French version of the handbook was launched at the Forum. We know, since Fukushima, that no country or citizen is free from the risk of such an accident.

The Forum was organised by **Independent WHO (IW)**, a group of individuals and associations (*founding associations: Brut de Béton Production, Contratom Genève, CRIIRAD (Commission d’Informations et de Recherches Indépendantes sur la Radiation), IPPNW (International Physicians for the Prevention of Nuclear War), Enfants de Tchernobyl Belarus, Réseau Sortir du Nucléaire, SDN Loire et Vilaine, People’s Health Movement*), supported by a broad coalition of NGOs. IW’s major concern is that the World Health Organization, through its alliance with the IAEA, is unable to fulfil its constitutional mandate “to act as the directing and co-ordinating authority on international health work” and “to assist in developing an informed public opinion among all peoples on matters of health”. IW addresses all citizens of the world and urges international organizations to apply the principles on which they are founded.

Since April 26, 2007, every working day, from 8 a.m. to 6 p.m., IndependentWHO Hippocratic Vigils stand at the crossroads opposite the WHO Headquarters in Geneva to demand the independence of WHO so that it may fulfil its duty to ensure “the attainment by all peoples of

the highest possible level of health”, including in the area of radiation and health. That is why a day of discussions was organised on Sunday, 13 May to also allow exchanges of experiences between IW Vigils, independent scientists, other partners and concerned citizens. A report of this meeting constitutes the second part of these Proceedings.

“The four seasons of the Hippocratic Vigil”



List of the Hippocratic Vigils, see page 145

Table of Contents

Foreword: Why this Forum?	iii
<i>Saturday 12 May 2012 - Programme of the meeting</i>	vii
1. Presentation of the Forum	1
Moderator: Marc Molitor (Belgium)	1
Presentation by Remy Pagani (Switzerland)	1
Presentation by Paul Roullaud (France)	3
Presentation by Roland Desbordes (France)	4
Presentation by Paul Lannoye (Belgium)	6
2. Panorama of contamination in Japan and the health consequences of Chernobyl	13
Moderator: André Larivière (Canada)	
Presentation by Alexei Yablokov (Russia)	13
Presentation by Eisuke Matsui (Japan)	21
Discussion 1	28
3. Radioprotection against internal contamination	31
Moderator: Wladimir Tchertkoff (Italy)	
Presentation by Galina Bandazhevskaya (Belarus)	31
Presentation by Alexei Nesterenko (Belarus)	38
Presentation by Vladimir Babenko (Belarus)	47
Discussion 2	50

4. Management of the catastrophe by the authorities and its effects on society	57
Moderator: Eric Peytremann (Switzerland)	
Presentation by Sophie Fauconnier (France)	57
Presentation by Paul Jobin (France)	62
Presentation by Kolin Kobayashi (Japan)	67
Discussion 3	70
5. Civil society: After Chernobyl and Fukushima, NGOs, private individuals, politicians, doctors and independent scientists are busy	75
Moderator: Marc Molitor (Belgium)	
Presentation by Youri Bandazhevsky (Belarus)	75
Presentation by Wataru Iwata and Aya Marumori (Japan)	87
Presentation by Michèle Rivasi (France)	90
Discussion 4	94
Presentation by Miwa Chiwaki (Japan)	98
Presentation by Chris Busby (United Kingdom)	101
Presentation by Michel Fernex (Switzerland)	108
Discussion 5	111
Concluding remarks – Maryvonne David-Jougneau (France)	114
 <i>Sunday 13 May 2012 – Programme</i>	
6. Round-table meeting and debate	115
Preamble and programme	116
1. Working Group	117
1.1. Group Associations - Extracts and summaries of discussions	117
1.2. Group Scientists- Extracts and summaries of discussions	120
1.3. Group Elected officials - Extracts and summaries of discussions	124
2. Plenary meeting	128
2.1. Reports of the working groups	128
2.2. Discussion	132
3. Summarized conclusions of the Forum	142
Thanks	143

Programme du Forum

PROGRAMME FOR SATURDAY, 12 MAY

Ecumenical Centre, 150, Route de Ferney, 1211 Geneva 2

Morning Session

8:30 a.m.: Registration, distribution of Abstracts

9:00 a.m.: **1. Presentation of the Forum:** Moderator: Marc Molitor (Belgium), journalist, author of *Chernobyl - past denial, future threat?* Published by *Racine-RTBF.be*

Welcome: **Rémy Pagani**, Administrative Councillor of the City of Geneva.

Introduction Forum: **Paul Roullaud** (France) co-founder and representative of the collective IndependentWHO: Why organize a scientific and citizen forum?

Roland Desbordes (France) President of CRIIRAD (Commission for Research and Independent Information on Radioactivity): Citizen information: taking responsibility.

Dr. Paul Lannoye (Belgium) Honorary MEP (1989-2004), Commissioner Health, Environment and Consumer Protection: Why have the risks of exposure to radioactivity always been underestimated?

9:50 a.m.: **2. Panorama of contamination in Japan and the health consequences of Chernobyl.** Moderator: **André Larivière** (Canada) representative of *Sortir du Nucléaire* to IndependentWHO.

Alexei Yablokov (Russia) Doctor of Biological Sciences, advisor to the Russian Academy of Sciences, co-author of *Chernobyl - Consequences of the Catastrophe for People and the Environment* ed. New York Academy of Sciences: The diversity of biomedical consequences of Chernobyl.

Eisuke Matsui (Japan) specialist in respiratory diseases and low dose radiation, Director, Medical Institute of Environment at Gifu: Action taken by Japanese scientists and citizens concerned about low-dose internal radiation exposure in Japan.

10:50 a.m.: Discussion – 11:00 a.m.: Coffee break

11:25 a.m.: **Radioprotection against internal contamination.** Moderator: Wladimir Tchertkoff (Italy) journalist and author of *Le crime de Tchernobyl* published by Actes Sud.

Dr. Galina Bandazhevskaya (Belarus) pediatrician, cardiologist: *Health status of children in Belarus since the accident at the Chernobyl nuclear reactor.*

Dr. Alexei Nesterenko (Belarus) Director BELRAD - care of children affected by ionizing radiation, co-author of "Chernobyl - Consequences of the Catastrophe for People and the Environment" published by the New York Academy of Sciences: *The BELRAD Institute's protocol for radioprotection and its Atlas of Contamination of children in Belarus.*

Vladimir Babenko (Belarus) Deputy Director BELRAD: *From Chernobyl to Fukushima... A practical guide to radioprotection.*

12:25 a.m.: Discussion - 12:45 a.m.: Lunch Break

Afternoon Session

2:00 p.m.: **4. Management of the catastrophe by the authorities and its effects on society.** Moderator: Eric Peytremann (Switzerland) committee member, ContrAtom.

Sophie Fauconnier (France) physician author of studies on the health impact of the Chernobyl accident in Corsica.: *Health impact of the Chernobyl accident in Corsica: an independent epidemiological study finally established.*

Dr. Paul Jobin (France) sociologist specialised in Japan, research associate at the Centre for Research on Contemporary Issues in Public Health (INSERM-EHESS): *Fukushima: Radioprotection or "radio-management" by the authorities?*

Kolin Kobayashi (Japan), journalist, correspondent in Paris, *Days Japan: Nuclear energy in Japan, from Hiroshima to Fukushima, and the antinuclear movement.*

3:00 p.m.: Discussion

3:20 p.m.: **5. After Chernobyl and Fukushima, the actions of civil society.** Moderator: Marc Molitor (Belgium).

Dr. Yuri Bandazhevsky (Belarus) Anatomical pathologist, President of the Centre for Analysis and Coordination "Ecology and Health": *From the syndrome of chronic incorporation of long half-life radionuclides to the creation of programs and policies for radioprotection of populations: an example of an integrated model.*

Wataru Iwata and Aya Marumori (Japan) representatives of the Japanese independent laboratory CRMS: *Independent initiatives and actions after Fukushima.*

Michele Rivasi (France) MEP Europe Ecology-Greens, founder of the Committee for Research and Independent Information on Radioactivity (CRIIRAD): *What is Europe doing about radioprotection?*

4:15 p.m.: Discussion ((ten minutes)

Miwa Chiwaki (Japan) Fukushima Mothers Association: *Our struggle for survival continues.*

Dr. Chris Busby (United Kingdom) chemist and physicist specializing in very low doses of ionizing radiation: *Small Area Cancer Epidemiology for the Citizen: some approaches.*

Dr. Michel Fernex (Switzerland) Professor Emeritus of the Faculty of Medicine, Basel, former WHO consultant: *What should the WHO and the Japanese authorities do? Precious time has already been lost.*

Maryvonne David-Jougneau (France) sociologist, member of IndependentWHO – concluding remarks.

5:40 p.m.: Discussion (20 minutes) and Conclusion of the day (for the programme of Sunday 13 May see page 114).

1. Presentation of the Forum

Moderator: **Marc Molitor** (Belgium), journalist,
author of *Chernobyl - past denial, future threat?* Published by Racine-RTBF.be

Welcome



Rémy Pagani, Administrative Councillor of the City of Geneva

Ladies and Gentlemen, Forum organizers, representatives of the scientific world, health professionals, friends, comrades, I am really very honored to open this congress; above all, because it is obviously a success, and this was one of the challenges that the organizers set themselves.

On behalf of the City of Geneva, it is with great pleasure that I welcome you to our city on the occasion of the Scientific and Citizen Forum on Radioprotection.

First of all, I would like to congratulate the organizers because obviously, the theme of the forum is crucial, indeed, I would say, vital for each and every one of us. We who have the great privilege to be able to live on this planet must imperatively, and at all costs, preserve it.

The disasters of Chernobyl and of Fukushima are, of course, still in our memories and they have undoubtedly, touched us, and all of humanity, deeply. Indeed, we could say that they have shocked and even traumatized populations.

But we know also that in this era of zapping and immediacy, each of us tends to “delete” and forget very fast. Each new catastrophe obliterates the last! This is why it is fundamental to remember, to inform and to raise awareness about the terrible consequences of these events, the impact that they have on the environment, on health, and on the lives of affected populations.

I would like to say here that our municipality – and myself personally – have followed the activities

of the people who maintain the Hippocratic Vigil in front of WHO – I would like to thank them from the bottom of my heart – it covers exactly the same period of time as my tenure as City Administrative Councillor and they have been in front of WHO in all weathers. I would really like everyone to applaud them, because it is considerable effort that they have made. Some of them are in this room.

The support offered by the city goes even further. Indeed when we were asked to meet with the Director-General (of WHO) – there was a delegation which went to see her after endless requests, for a meeting – I accompanied the delegation on behalf of the City of Geneva, and unfortunately – well, we know the result. We received a warm welcome but the major problem, which is acute, was perpetually avoided: the submission of WHO to an organization which is more or less pro-nuclear, in fact, it is certainly pro-nuclear. This is the reason why the City of Geneva fully supports your Forum and hopes that your discussions and debates will advance the cause of all those who consider, quite rightly, that civil society must take responsibility and never hesitate to make its voice heard when the stakes are high.

Now, in this particular instance, the stakes are critical and the time is ripe for change. Public opinion is no longer prepared to accept reassuring and soothing speeches, grey zones and, what can only be qualified as disinformation. The nuclear accident of Fukushima, way beyond what happened at Chernobyl, has completely changed the situation and there will be clear consequences for the world's nuclear industry.

Many countries have been forced to reconsider the part, even the existence, of nuclear power in their energy production, as well as the reliability of their installations in the case of an accident.

I cite just a small example for Switzerland: in concrete terms, our city supports the local population living near the nuclear power plant of Muhleberg, which was to have had its license extended by 40 years. We won, it is amazing: the inhabitants appealed and they won in the courts.

Fortunately, this separation of powers exists and we have the possibility of a justice in Switzerland which is, dare I say, I don't mean neutral, but in any case a justice which fulfills its function which is to be a check and balance on power. Unfortunately when the Federal authorities, Federal Councillor Doris Leuthard, decided to stop and not prolong the license of nuclear power plants, a short time afterwards, and

the Federal government appealed the decision and Mrs Leuthard herself appealed the decision of the Swiss courts.

We are in a sort of tango which is really unpleasant: the authorities publicly announce that they are stopping nuclear power, which in any case, as regards the old power plants, they will not extend the license which is 40 years; and then, behind the scenes, or even a couple of months afterwards, they decide to extend the license period. It is extremely disagreeable, and not only disagreeable; we have to take action and resist.

And here is a second example, it is the nuclear power station of Le Bugey in France, just sixty kilometers from here, which was to serve as a temporary storage depot for nuclear waste. The municipal council, in fact the government of the City of Geneva, and, it must be noted, this time also the Government of the Republic and Canton of Geneva, decided to appeal this decision and a few days ago, we lodged an appeal against this depot of nuclear waste.

Ladies and Gentlemen, from now on, one thing is clear: there will be a “before and after” Chernobyl, and a “before and after” Fukushima. Political parties must modify their positions to take into account the wishes of the population.

Furthermore, it is going to become more and more complicated to develop new projects for nuclear power plants and, in fact, it is imperative that we make it more and more complicated, even impossible. Finance will become more and more difficult to find and local opposition will inevitably put a brake on installation of new plants.

And I take the opportunity here of adding that the question of military uses of nuclear power is also essential; it is a question of slowing and then completely stopping the use of nuclear power as a weapon of deterrence. The moment is particularly well chosen and I repeat, your initiative is extremely important.

Ladies and Gentlemen, in welcoming you here, the City of Geneva, the most active multilateral and diplomatic centre in the world, fulfills its role as host.

It reaffirms the values to which it is particularly attached: openness to the world, dialogue between peoples, discussion of ideas. I hope that this two-day forum in Geneva will allow you to make significant progress so that together we may protect the planet and its peoples.

Thank you for your attention. ▀

Why organize a scientific and citizen forum?



Paul Roullaud (France), Co-founder and representative of the Collective IndependentWHO

We have come together today because all over the world, people are suffering the effects of radiation, whether from the fallout from nuclear weapons testing, from the explosion of the nuclear reactors at Chernobyl, at Fukushima and other accidents, from the use of depleted uranium weapons, or from the so called “normal” emissions, in water or air, produced by the nuclear industry. We have chosen to meet here, 200 metres from the World Health Organization headquarters because this international institution, in contemptuous disregard for its own constitution, adds insult to injury by denying the victims’ suffering.

There is a large body of research documenting the suffering of radiation victims but the WHO, continuing to disdain scientific rigour, chooses to ignore it. This scandalous attitude has been regularly denounced over the years but in 2006, a group of people from all over Europe decided that not a day should go by in which the criminal consequences of WHO’s implacable and intolerable denial of so much suffering, not be denounced as a crime. Many months of preparation went by and then on 26 April 2007, the first Hippocratic Vigil, as it came to be called, was held, 22 years after the start of the Chernobyl health catastrophe.

Since then, more than 300 people have taken part in the Vigil in front of the WHO’s headquarters, demanding that this CRIME not be met with indifference one single day more. The Collective IndependentWHO makes sure that this silent vigil is maintained, through rain, wind, snow and ice.

For five years, we have denounced this crime, without changing WHO’s attitude. From the first day, we knew it would be a very long battle because we are challenging a very powerful international lobby. These five years of the Vigil have at least begun to reveal to the public the relationship between the WHO and the IAEA. WHO’s lack of independence from the IAEA, dates from the agreement WHA 12-40, which the two agencies signed on 16 May 1959.

At our twice yearly annual general meetings we unanimously and enthusiastically agree to continue with the Vigil. It would be untrue to say, however, that we never get discouraged or exhausted, and this is mainly because we still have not really got any political support. Yet it is our belief in political change that leads us to challenge WHO on its work in the area of radioprotection. It is quite easy to sum up WHO’s policy and action in radioprotection. There is none – which is, in part, the reason we are holding this Forum.

On behalf of the Collective Independent-WHO, I would like to thank all our speakers today, and especially those who have travelled very long distances from Japan, from Russia, Ukraine and Belarus. It was very important to us that you participate in the Forum, so that we can hear about your experiences, listen to your views, and retain all this information in writing and in film, so that it can be disseminated as widely as possible. But we also wanted you here at the Forum so that scientists, citizens, journalists and politicians could meet, plan future actions together in the development of radioprotection for citizens and strengthen our campaign for the independence of WHO. Because, lest there be any misunderstanding, we support WHO and share the objectives inscribed in its constitution. We are determined, with the support of elected politicians, to return WHO to its primary mission: the protection of populations, which cannot be achieved unless WHO abandons its current mission: the protection of the nuclear industry, to which it has awarded a clean bill of health, to the detriment of people’s health.

Over the next few days, in the time we spend together – sitting on WHO’s doorstep – we will provide heartfelt witness to those who are suffering in Japan, to those who are suffering in the areas affected by Chernobyl, and to all victims of radiation.

On behalf of the Collective Independent-WHO, I want to thank you once again for your presence here today. ■

Citizen information: taking responsibility



*Roland Desbordes (France) President of CRIIRAD
(Commission on Independent Research and Information
on Radioactivity)*

Thank you for being here, and thanks in particular to the organizers of this Forum. I think it is important and symbolic that it is taking place here, in Geneva, so close to the World Health Organization and related institutions.

It is true that many of you, and CRIIRAD in particular, have been to Geneva several times to challenge the authorities. I remember in 2002, it was for the liberation of Yuri Bandazhevsky, who is here today and at that time was in prison. It was the first of a series of actions, with the encirclement of WHO, some time later. I think it is very important for people to mobilize to get public demands heard by decision makers. This is what we are trying to do, with the means available to each of us, coming together and adding weight.

I'm going to start with current events and look at the Fukushima-Daichi accident which started just over a year ago and then come back to Chernobyl. This is the time period of CRIIRAD's existence, 26 years; this long journey of ours. When the Fukushima accident happened we were just about to commemorate the 25 years of Chernobyl as well as the 25 years of CRIIRAD, which we had planned to commemorate by organizing our General Assembly as well as conferences and discussions in Paris. The Fukushima accident obviously turned everything upside down and we were plunged straight away into the same situation that the oldest members of CRIIRAD's team had lived 25 years earlier: searching for information and hearing disinformation.

I'm making this parallel because, just like in 1986, we lacked, and we still lack proper information from industry and the authorities on the extent of the contamination. Initially in order to get some information, we made contact with Japanese friends, certain of whom are present today and I thank them for having made the journey to be with us. So, this is how they came to know about our project, the one we initiated 25 years ago to get the tools we needed to "develop" for ourselves the information that had been confiscated by the authorities in the accident situation.

It is clear that all States will adopt more or less the same attitude, ie., hiding the truth from the public in order to avoid taking protective health measures. We lived it with Chernobyl and we're seeing it again with Japan. So Japanese citizens were interested in CRIIRAD and its activities and with our first contacts we were able to provide them with the means to get information themselves, the simplest tool being the Geiger counter that we sent them. Curiously, in a country as highly developed as Japan, where our most sophisticated instruments are produced, it was almost impossible to get a Geiger counter. That is worrying! The Geiger counter, in these situations is a remarkable instrument – it is even a "weapon of deterrence" in relation to the authorities, because it can be put into the hands of people.

Afterwards, in May/June last year (2011), a team from CRIIRAD went to Japan at the request of Japanese citizens. Two scientists from our laboratory went there, were given a guided tour by our Japanese friends and were deeply traumatized. It was the first time that I saw our employees come back so upset, not just by the measurements they had made, but psychologically from the daily life of the local population. And that I had never seen before! Still today the director of the laboratory of CRIIRAD, cannot talk about his stay in Fukushima without being overcome with emotion. It is true that it is very difficult to reply to people living there who ask for results of measurements undertaken which indicate a level of contamination that would necessitate certain measures being taken. When these people ask: "So what's the result?", "What about levels in the surrounding area?" obviously we give the results, we tell the truth and they thank us. Sometimes they just say "Thank you" but also several times, they said "I was in the dark before and now I am enlightened. I didn't know that I should leave, not so much for me but for my children, now

I know what I have to do”. This is the kind of key information that the people who live in these areas, need!

Our partnership with Japan continues of course and will be further strengthened next June. Our Japanese friends have been very, very efficient. I am full of admiration, really, for the way in which they have managed to find and buy material, get themselves trained even though they have no scientific background. They have learned extraordinarily fast, being highly motivated to understand and take action, so that they could set up radiation measuring stations.

I told you that the Japanese accident took us back 25 years to what we lived at the time of the Chernobyl accident, in Belarus. There too, CRIIRAD succeeded in making contact with citizens, despite the political difficulties, through an association, the Institute Belrad, the only local counterforce that was really able to take action and take measurements. We followed their activities closely – Professor Nesterenko, Director of the Institute, was a scientist – and we provided as much assistance as we could. Today, it is not over, we have to continue to support these initiatives, otherwise it leaves the field open to disinformation, from States of course but also from international organizations. We have to support these initiatives and I am very happy that today representatives from these countries can testify to what they saw and to the assistance that we offered.

What happened in Fukushima a year ago, was a surprise of course, no one expected it to happen in the most industrially developed country in the world. We were led to believe that Chernobyl was a Soviet accident and not even “nuclear” but due to its “political system” and that it could never happen in a developed country. Today it cannot be denied – for those still in doubt – that such an accident can happen here in Western Europe. We must never forget that.

CRIIRAD then was set up in 1986, a laboratory that should be a tool available to all. It is an association, under the French law of 1901, and so its members are its strength and the guarantors of its independence. That is important. Scientific competence is essential, of course, but to be in “association” brings the strength of activists to mobilize alongside citizens to denounce radioactive pollution (uranium mines, depleted uranium...). We note that the WHO is completely absent from these problems even though they are serious.

CRIIRAD is active not just on the question of nuclear power plants but on all the problems related to radioactivity.

Before leaving the floor to other participants, I would like to say that CRIIRAD supports the initiatives here in Geneva, including the Vigil. We were present, we spread the information. I think this is how we will succeed in denouncing WHO’s denial in relation to ionising radiation. I refer to all ionizing radiation not just radioactivity, all ionizing radiation. The absence of WHO in these areas leaves the field free for those who have the means, such as the IAEA. There is of course the 1959 Agreement but WHO has never shown the slightest desire to address these issues and as you know, nature abhors a vacuum and – and unfortunately that vacuum is occupied by others whose objective is not the protection of populations. The result is the 2005-2006 Report on the 20th anniversary of Chernobyl which is a scientific scandal of course.

Fortunately there are other initiatives that are shifting things: Yablokov’s book, Marc Molitor’s book and many others are being published, documentaries and I sense a change. Unfortunately, while Fukushima woke up the whole world for a time, one year later I am a lot less optimistic about the change, in France at least. Things were said at the beginning like “Nothing will ever be the same again”. Everyone says that but after the shock, the lobbies, States, the nuclear industry... quickly scramble back up to say “OK there was Fukushima, but it’s not so serious, and we’re going to start nuclear power up again”. In France, stress tests on ageing reactors weren’t even done, just “complementary safety evaluations”. So we are going to modify our nuclear power plants and make them safer than before, when they were already as safe as they could be! They will be safer than safe. The official line is starting to get the upper hand again and I have a feeling that it will take demonstrations and events like today in order to avoid being trapped by the lobbies and their disinformation on nuclear power.

It is plain that a nuclear catastrophe is not manageable for populations. We have the testimony of Chernobyl, we have that of Fukushima. The authorities have learned the lessons of Chernobyl; you can keep populations in contaminated areas. All European research programmes (ETHOS, CORE...) are taking that approach. The Japanese government has also learned well from Chernobyl: in case of catastrophe they say, the best solution is to keep populations in contaminated areas.

As citizens, we find that totally scandalous and criminal. Today, this Forum is the opportunity to say so. So this is the testimony that I present. Thank you. ▶

Why have the risks of exposure to radioactivity always been underestimated?



Paul Lannoye (Belgium) Honorary Member European Parliament (1989-2004), Commissioner Health, Environment and Consumer Protection.

Good morning everybody. I am going to provide you with some history, because I believe that if one does know the history, there is a risk of making the same mistakes as those who have preceded us. To know where we started from will help also to understand the functioning of today's society.

Ever since the discovery of X-Rays by Roëntgen in 1895, it has been known that exposure to ionising radiation is not risk-free. In 1896, Edison and Tesla were already issuing warnings about the harm caused by X-Rays. Clarence Dally, an assistant of Edison, was a victim of X-ray dermatitis, which resulted in his having an arm amputated but still dying of complications arising from the disease in 1904.

However, between 1925 and 1929, it was a different kind of consequence which became apparent among young women working in the clock-making industry. Given the job of painting the clock-hands with radio-luminescent paint, they used their lips to get a fine point on their brushes. H. Martland, a New Jersey pathologist, identified radiation from the radium as the cause of the many cases of cancer

of the jaw that were being diagnosed among the young women.

At around the same time, in 1927, Herman Muller demonstrated that X-Rays caused genetic damage among drosophila ('fruit flies'): he received the Nobel Prize for his work.

It was in 1928 that the first international scientific commission was set up in order to establish basic standards of radioprotection. The IXPRC (International X-Ray and Radium Protection Commission), which was made up of 7 permanent members, was in operation between 1928 and 1937, in a context where the image of radioactivity in world public opinion was universally positive.

So it was that X-Rays and radium, with their apparent quasi-miraculous curative powers, came to be used in the treatment of any number of health problems (heart conditions, arthritis) as well as for serious pathologies (cancer).

The benefits of radioactivity were even used for publicity purposes, advertising toothpaste and skin-creams containing radium, and even radioactive mineral water.

The IXPRC, which was principally concerned with the risks involved in the field of medicine, set the safety limits for annual exposure at 360 millisievert/year (at the time, the unit of measurement of dosage was the rem, with 1 Sievert being equivalent to 100 rem).

The war years, which culminated in the dropping of the atomic bombs on Hiroshima and Nagasaki, put an end to the work of the IXPRC.

However, under pressure both from America's National Council on Radiation Protection and Measurements (NCRP), set up in 1946 to deal with the new risks of radiation being faced by the army and by research institutes, and also by the USSR, a new international Commission was created, the ICRP (International Commission on Radiological Protection).

It had become obvious at this time that a new scientific body was needed, with sufficient credibility to establish itself as the supreme authority in matters of radiation risk.

It was in fact necessary to revise the existing safety limits for exposure to X-rays in order to extend their scope to include the new risks related to external gamma radiation that resulted from research into weapons development and from exposure to nuclear bomb testing. It also became necessary to establish limits for exposure to internal radiation from the large number of newly

discovered radioisotopes, which were being produced and processed by workers and released into the environment. [1]

The ICRP was officially created in 1950. Made up of 13 members, it carried on the work started by the NCRP and adopted their proposed safety limits of 150 mSv/ year for workers, and 15 mSv/ year for the general public.

During this period, there was little information available on the effects of prolonged exposure to low-dose radiation; moreover, as Karl Z. Morgan [2] recalls, concerns mainly focused on the damage caused by acute doses of radiation, such as skin erythema, and on establishing the limit above which radiation sickness (Acute Radiation Syndrome) appeared – possibly resulting in death – which was somewhere in the region of a few hundred rem or several Sievert (1 Sv= 100 rem).

It should be added that both the NCRP and the ICRP were under pressure from the AEC (Atomic Energy Commission), which was reluctant to see American ambitions compromised. In 1952, President Eisenhower launched the “Atoms for Peace” programme with the aim of convincing his fellow countrymen and the world at large of the benefits of nuclear power, not only as an effective weapon of deterrence but also an unrivalled means of producing cheap energy when harnessed for purely civilian purposes.

This was the origin of the slogan “Nuclear power, too cheap to meter”, which proclaimed the unlimited abundance of energy.

Against this background of euphoria, the AEC, a civil body that was largely under the control of the military, increased the number of new initiatives and spent a great deal of money on developing civilian uses of nuclear energy. In 1957, the AEC set up its Project Plowshare (Ploughshare), to demonstrate to the world that nuclear technology is perfectly safe. Shortly afterwards, on 14th July 1958, Edward Teller, father of the H-Bomb, travelled to Alaska to announce the beginning of Project Chariot, designed to carve out a new port on the Alaskan coast by exploding 6 H-bombs. The project also aimed to develop a nuclear-powered aeroplane, which resulted in the loss of billions of dollars... [3]

None of these projects were ever realised but they reveal something of the thinking that prevailed at the time of the launch of the civil nuclear industry and which shaped the attitudes of the scientific establishment.

It was not politically correct at that time to question or even worse, raise doubts about what was presented as a fact: nuclear energy is potentially a good thing for humanity and nuclear technology should be developed in order to meet the legitimate desires of the people.

In 1957, the Euratom Treaty, signed by the six founding members of the European Community, and still in force today, said nothing to the contrary.

Article 1 of this treaty declares that the contracting parties shall set up a European Nuclear Energy Community (Euratom). It states that the aim of this Community is to contribute, by creating the conditions necessary for the establishment and the rapid growth of nuclear industries, to the raising of the standard of living within the Member States and to the development of trade between them.

Article 30 states that “Basic standards shall be laid down within the Community for the protection of the health of workers and the general population against the dangers arising from ionizing radiations”.

These norms were indeed established, modelled to a large extent on the recommendations of the ICRP, and therefore based upon the same principles.

The three basic principles set out by the ICRP and reiterated in the Euratom norms [4] are:

- **Justification** – the usefulness of any practice leading to exposure needs to be established
- **Optimisation** – the resulting exposure needs to be as low as possible (the ALARA principle: as low as reasonably achievable).
- **Limitation** – safety limits are proposed as to what constitutes an acceptable risk

Paragraph 29 of the ICRP’s 1958 recommendations, amended and revised in 1962 [5] reflects the spirit of the times perfectly: “Any modification of the environment in which humans evolved may cause the appearance of adverse effects. Therefore one can assume that prolonged exposure to ionizing radiation, in addition to naturally-occurring radiation, does involve certain risks. However, human beings cannot abstain entirely from using ionizing radiation. In practice, the problem is therefore how to limit the radiation dose so that the risk created is acceptable to the individual and the population at large. This dose is called ‘the permissible dose.’”

On the question of the genetic effects, Paragraph 32c states, “The Commission has therefore recommended a maximum permissible genetic

dose of 5 rem (50mSv), based upon the principle that the social consequences would be acceptable and justified when balanced against the likely increasing benefits of extending the practical applications of nuclear energy.”

The ICRP adds, matter-of-factly, “that it is aware of the fact that it is not yet possible to make an exact assessment of the risks and benefits, because to do that it would be necessary to be able to quantify potential biological damage and possible benefits, which cannot actually be done at the present time”.

There is a clear bias underlying this statement which refers on the one hand to potential biological damage and secondly, to the likely benefits, without reference to either the identity or the social class of potential victims of biological damage, or of the recipients of the possible benefits. In fact it was perfectly clear that the damage and the benefits were not potential or likely, they were certain. However, it is clear from the safety limits applicable to workers in the nuclear industry that the harmful effects are experienced by the workers and the benefits accrue to those who run the industry.

The ICRP’s function is to evaluate the biological damage; it is in no way competent to quantify the possible benefits of nuclear activities.

During this period of pro-nuclear euphoria (the 1950s and early 60s), it was not the done thing to publish data that went against the prevailing consensus about the scale of the risks. At that time, there was no mention of the risks of low-dose radiation or delayed effects, which is why, when the British epidemiologist Alice Stewart published a study showing an increased risk of the incidence of cancer in children irradiated *in utero* as a result of X-Ray examinations [6], the ICRP was sceptical and chose to ignore it.

As for the specific risks associated with contamination by radioisotopes, it was already clear at that time that the approach based on absorption of energy per unit volume was only applicable in the case of uniform irradiation. The model does not apply when the received dose in an organism is heterogeneous, so it is not reliable when dealing with internal radiation. However, the need to rapidly adopt a practical methodology prevailed over scientific rigour. This methodology, which cannot explain facts in terms of doses which it has itself calculated, is still in force at the present time.

This methodology is none the less very strongly criticized by the “European Committee on

Radiation Risks (CERI – the French acronym)”, a group of scientists which was constituted at the end of the 20th century. Initiated by Chris Busby – who is with us here today – the CERI published in 2003 a book of Recommendations in which there is a very meticulous and in-depth analysis of the consistent errors of the CIPR regarding radiation risks. It proposes a quite different approach based notably on the epidemiological studies undertaken over a number of years in the field, but also on the chemical and physic-chemical properties of a whole series of radio-isotopes disseminated in the environment and which are to be found in living organisms. [7]

Experts under pressure to conform

In the early 1960s, while the major nuclear powers (USA, Britain, USSR, France) were performing more and more atmospheric nuclear tests, the consequent release of deadly radioisotopes harmed millions of people worldwide without provoking any reaction at all from the ICRP. Karl Z. Morgan, former head of the ICRP, does not mince his words when speaking about it: “At the time, most members of the ICRP were either working directly for the military nuclear industry, or were receiving essential funding for their research from them. Of course they were not going to bite the hand that fed them!”.

During the Second World War and the two decades following it, the intensive mining of uranium gave rise to the massive exposure of thousands of miners to radon and its by-products, which the industry claimed were perfectly harmless. Neither the NCRP nor the ICRP, which should have played a leading role in limiting workers’ exposure and preventing many cases of lung cancers that ensued, took any action. In truth the cold war climate was not conducive to a slowing down of the arms race and indeed most members of the ICRP were from the uranium producing countries and were themselves heavily involved in the arms race (USA, Canada, UK and France). I refer once again to Karl Morgan who did not hesitate to declare that this period constitutes one of the darkest pages of human history [8].

Radioprotection standards regularly revised downwards... but too late and too little

The ICRP has consistently lowered the limits for exposure to radiation, as can be seen from reading the successive recommendations issued since it was

set up, but has always taken care to avoid putting constraints on the industry.

In its Publication 26 of 1977 [9] the ICRP suggests that since, as far as carcinogenic and genetic effects are concerned, no danger threshold has been proven, the absence of a threshold should be considered to be a simplifying assumption.

The dose limit was set at 50 mSv per year for workers and at 5mSv/year for the general public. These figures can be compared with data published by Mancuso et al. [10] concerning workers at the Hanford plutonium plant who died of cancer after receiving a cumulative dose of 30mSv throughout their career. The safety limits were clearly too high when they were set ... probably by a factor of ten. Furthermore, contrary to statements issued by the ICRP, it seems that the low dose risk is much higher than suggested by the linear model and by extrapolation from the effects of high doses.

The ICRP Publication 60 [11] of 1991 at first sight appears to represent a tightening up of radio-protection measures, since the safety limits have now become respectively, 100mSv over 5 consecutive years (or 20 mSv / year on average) for workers and 1 mSv / year for the general public.

The ICRP recognises that the existence of a danger threshold is highly unlikely. It states, with regard to safety limits, that in no way do they constitute a dividing line between harmless and dangerous. The carcinogenic effects are revised upwards; in addition, the ICRP admits that fetuses and young children are particularly sensitive to ionizing radiation.

However these statements cannot hide the serious shortcomings of the recommendations in ICRP Document 60:

- A concentration on fatal cancers as an effect of radiation ignores all the other non-specific diseases caused by radiation.
- The effects on reproductive health are not taken into account.
- Foetuses and young children, recognised as being at greater risk, receive no special protection.
- Genetic effects are greatly underestimated.

Moreover, the grossly simplistic model for calculating the impact of internal irradiation still remains in use, even as the weaknesses of the model are beginning to appear.

Indeed, a number of epidemiological studies showing a heightened risk of leukaemia and

cancer among children living near nuclear facilities were published in the 1980s, notably in the United Kingdom (Sellafield in 1983, Dounreay in 1986; Aldermaston in 1987 and Hinkley in 1988). All these studies report significant releases of radionuclides into the atmosphere, the sea and rivers. The model of ICRP risk cannot explain the findings, which in fact correspond to levels of radiation of between 100 and 1000 times higher than those suggested by the ICRP model.

The most recent publication of the ICRP (Publication 103 in 2007) makes no changes to the previous recommendations [12].

It takes no account of new epidemiological studies published since 1990 which confirm the previous data, pointing to an increase in cases of leukaemia and cancer in children living near nuclear sites. Such an increase is inconsistent with the estimated overall dose level arrived at by using the ICRP's risk model.

This dose would be an underestimate by a factor of between 100 and 2000 as shown by the earlier studies mentioned above [13].

Even more serious is the fact that the large number of studies published after the Chernobyl disaster have done little to make the ICRP and its experts think again about their position.

Since most of these studies have been published in Russian or Ukrainian, they have all simply been ignored.

In 2006, three scientists whose reputations are beyond question published a monumental text in Russian which brings together much of this work. This book was translated into English in 2009 [14]. The main lessons to be drawn are:

- Genomic instability and the bystander effect at low doses (0-500 mSv) have been clearly demonstrated; the bystander effect is a change in the genome of cells which have not been directly affected by radiation.
- The incidence of non-cancer diseases has increased significantly in the population; mainly consisting of conditions affecting the heart and stomach. Neurological diseases are also a somatic effect of low dose radiation.
- The infant mortality rate has increased in all contaminated areas and notably by 15.8% compared with the trend over the period from 1976 to 2006.
- In all affected areas, the birth rate has declined significantly, especially for male children.

- Numerous studies from Russia, Belarus and Ukraine confirm that ionizing radiation accelerates the ageing process. The proposed explanation is as follows: ionizing radiation influences both the structure and function of cells at the molecular and cellular level. The effects are similar to the biological mechanisms at work during the normal aging process.

The latest ICRP recommendations take no account of this data and therefore have no relevance for the protection of people against ionizing radiation.

Recent data confirm the need to review the current risk model

Two recently published studies, which show an increased cancer risk in the vicinity of nuclear power plants in Europe, once again challenge the ICRP and Radiation Protection Agencies. The first, published in Germany in 2007, reveals a 50% increase in the risk of cancer for children under 5 years old within 5Km of nuclear power plants for the period 1980-2003, with leukaemia being the most common type of cancer. [15]

In January 2012, the GeoCAP study of areas surrounding French nuclear power plants revealed a 90% increased risk of developing acute leukaemia in children living within 5km of nuclear power plants compared to those living 20 km away or further. [16]

Experts are unable to explain these results in terms of the current risk model. Either they do not dare or do not want to conclude that the model needs to be revised because it cannot explain the statistically significant facts. They prefer to invoke other causes for this inconvenient correlation, without being able to identify them.

Conclusion

By now, it has become obvious that the risk assessment model and the ICRP recommendations on radioprotection are seriously inadequate in light of the accumulation of epidemiological data obtained during the 1980s and especially as a result of the Chernobyl disaster.

This situation is likely to cause serious harm to people's health and that of nuclear workers.

The basic principles of radiation protection drawn up over 50 years ago, at a time when nuclear

energy was seen almost universally as a source of future well-being of humanity, are now obsolete.

There is no valid reason for the activities of the nuclear industry to be given special status and be exempt from the application of the precautionary principle as adopted in Rio in 2002 at the UN Special Summit on the Environment (which should be confirmed in a few days since there is a Rio+20 which is to take place in June 2012).

The precautionary principle requires an end to the release of toxic, persistent and bio-accumulative substances into the environment, such as radioisotopes with a long (in fact very long) half-life.

Moreover, the lack of scientific consensus on a risk model for contamination by different radioisotopes released by the nuclear industry and the various practices associated with it does not justify the refusal of the ICRP and Radiation Protection Agencies to act.

It is both right and prudent provisionally to adopt the recommendations of CERI (The European Committee on Radiation Risks) published in 2003 and completed in 2010. [17]

The principle of precaution must therefore be the dominating principle and not the principle of justification, of minimisation of doses and of limitation, which are the principles which serve to protect the nuclear industry but in no way to protect the population and even nuclear workers. My conclusion is: we must stop accepting implicitly, without necessarily saying it, that radioprotection is effective. Radioprotection above all protects the nuclear industry, it does not protect the population. We must overturn that logic and combat by all possible means.

Thanks. ▶

References

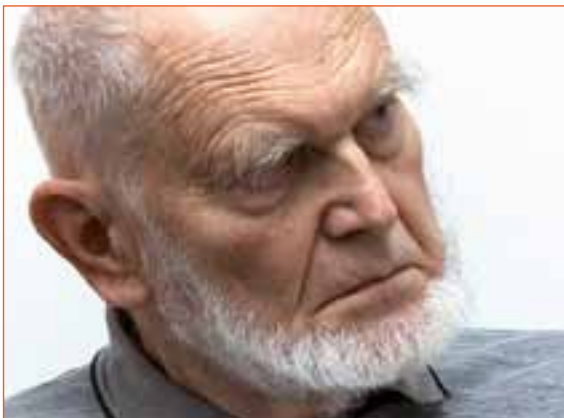
- [1] Chris Busby (ed.): ECRR 2003 Recommendations of the European Committee on Radiation Risk; Green Audit; Brussels, 2003. Cf. Chris Busby (ed.) ECRR 2010 Recommendations of the European Committee on Radiation Risk. <http://www.euradcom.org/2011/ecrr2010.pdf>
- [2] K.Z. Morgan: Desirable changes in the way international radiation protection standards are established; Global Radiation victims Conference; Berlin; 1992.
- [3] H Peter Metzger: The Atomic Establishment; Simon and Schuster, New York, 1972
- [4] See Council Directive 96/29/ Euratom; 13 May 1996; J.O. n° L159/1. http://ec.europa.eu/energy/nuclear/radioprotection/doc/legislation/9629_en.pdf
- [5] Recommandations de la Commission internationale de protection radiologique; Gauthier-Villars, Paris, 1963.
- [6] Stewart A, Webb J; Giles B.D., Hewitt D: "Malignant diseases in Childhood and Diagnostic Irradiation in utero"; Lancet, ii447, 1956
- [7] Chris Busby et al...
- [8] Karl Z. Morgan, quoted by P. Montague in Nexus, August – September 2000.
- [9] Annals of the ICRP, publication 26, Pergamon Press, Oxford, 1977.
- [10] Mancuso Thomas F. and others: Radiation exposures of Hanford workers dying from cancer and other cause; Health Physics, vol. 33, Nov. 1977.
- [11] Annals of the ICRP, Publication 60, Pergamon Press, Oxford, 1991.
- [12] The 2007 Recommendations of the International Commission on Radiological Protection, ICPR Publication 103, Elsevier, 2007.
- [13] Chris Busby et al: ECRR 2003 Recommendations of the European Committee on Radiation Risk; Green Audit; Brussels, 2003
- [14] A. Yablokov, V.Nesterenko et A. Nesterenko: Chernobyl, consequences of the catastrophe for people and the Environment; Academy of Sciences; New York, 2009.
- [15] Spix C. et al, Case-control study on childhood cancer in the vicinity of nuclear power plants in Germany 1980-2003, European journal of Cancer, 44 (2008) 275-284.
- [16] Sermage Cl. et al., Childhood leukemia around French nuclear power plants – The Geocap study, 2002-2007, International Journal of Cancer, 2012
- [17] ECRR 2010, Recommendations of the European Committee on Radiation Risk: "The health effects of exposure to low doses of ionizing radiation; Regulators Edition; Brussels, 2010.



2. Panorama of contamination in Japan and the health consequences of Chernobyl

Moderator: André Larivière (Canada) representative of *Sortir du Nucléaire* to IndependentWHO

The Diverse Bio-medical Consequences of the Chernobyl Disaster



Alexei Yablokov (Russia), Doctor of Biological Sciences, Advisor to the Academy of Sciences in Russia, co-author of "Chernobyl – Consequences of the Catastrophe for People and the Environment", published by the New York Academy of Sciences.

It has already been mentioned here at the Forum that there is a significant divergence of opinion about the consequences of the radioactive emissions

between, on the one hand, the view expressed by the IAEA, by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and by the World Health Organization, and on the other hand, the observed effects documented in the scientific literature. The WHO and the nuclear lobby are linked by a special agreement signed in 1959, and presented below is one of the key clauses from Article 3 of the Agreement.

WHO minimized the consequences of radiation resulting from nuclear catastrophes because of the stringent terms of its agreement with IAEA, permitting hiding of any information:

Article III - Exchange of information and documents

The International Atomic Energy Agency (IAEA) and the World Health Organization (WHO) recognize that they might have to take certain restrictive measures to ensure the confidentiality of information that were provided to them.

Agreement WHO-IAEA from May 28, 1959 (Resolution WHA 12-46)

Yablokov, 2012

After Chernobyl the discrepancy between official estimates and observed effects from Chernobyl increased considerably. At least 10,000 studies have been published over the last 25 years

in scientific journals on the medical consequences of Chernobyl. Official sources refer only to a very small number of these publications, usually those that reveal very little danger. The publications that do show the danger are not referred to, under a variety of different pretexts. One of the principle pretexts used is the absence of a correlation, in the studies, between the dose received and the illness observed. But what correlation can be made when, using the current concept of dose, it is impossible to determine correctly the true radioactive load?

How is it possible to determine individual doses today? The quantity of radionuclides that have entered the body can only be determined by averaging out statistical data: how much has an “average” person breathed in the open air in a given locality, how much water or milk have they drunk, how many leafy vegetables or root vegetables have they eaten, how much meat or fish did they eat in the first few days and then in the period following the radiological disaster? Even if we could put our trust in the extremely dubious data used in the inquiry, this sort of calculation for each individual is impossible and this is why we have to depend on these sorts of “average coefficients”.

In Belarus, for example, after Chernobyl, doses were calculated on the basis of questioning one thousandth of the population (a tenth of 1 per cent) and then extrapolating, in a totally unscientific manner, to the whole population. Likewise, we need to remember that only a small number of the various radionuclides taken into the body were considered. In any nuclear accident, whether Fukushima or Chernobyl, dozens of different radionuclides are released. Among these are: radioactive iodine-131 which is short lived (80 days), caesium-134 (radioactive for about 2 years), caesium-137 (radioactive for about 300 years), plutonium (radioactive for 24,000 years), and dozens of other radionuclides, active during the first hours, days, months or years. The radioactive dose is almost always calculated using iodine-131 and caesium-137, even though we know that these are not the only radionuclides involved. It is much more complicated to collect information about the distribution of other radionuclides. In fact, that information does not exist: the only European “atlas” of the radioactive contamination from Chernobyl is based exclusively on caesium. This does not mean that plutonium, strontium and dozens of other radionuclides did not fall all over Europe but rather that it was impossible to measure their presence everywhere at the

time: in the air, in water, in soil, in food and in the people’s bodies.

Among the many problems with the concept of dose is the uncertainty about the distribution of ionising radiation once it is inside the human body. This distribution is calculated using coefficients obtained on the basis of experiments using a container full of liquid, *an imaginary figure*. This imaginary figure is a man, aged twenty, white and in good health. The average dose for everyone is calculated on the basis of radioactive effects on a healthy, white, male twenty year old.

The difference in the effect of radiation on women and men, on babies and old people, on ill people and healthy people, and on different ethnic groups, is not taken into account. In other words, variation in individual radio-sensitivity (radio-sensitivity can vary from one individual to another by factors of up to ten or more) is not taken into account in the current concept of dose. This is not the place to enumerate the other faults in the conception of dose. It is only important to understand that the official concept of dose is very far from the standards demanded by scientific method. This is why it is scientifically incorrect to subscribe to WHO/IAEA’s requirement to prove a necessary correlation between a dose that is evaluated so imprecisely, and illnesses that can be diagnosed in precise detail.

The difficulty in determining the effects of Chernobyl

Why is it difficult to determine the effects of Chernobyl? Some people say “there is nothing serious” while others say “it is very serious”. In my view, the two main reasons are as follows: the use of an unscientific concept of dose and blatant falsification of the data. From the first few days of the Chernobyl disaster, as we are seeing today at Fukushima, there was secrecy, there were lies. For three and a half years, information about Chernobyl in the Soviet Union was officially classified as top secret. It was only in May 1989 that the government declassified the information by special decree. For three and a half years, orders were given not only to *keep the information hidden*, but even worse from the point of view of establishing the consequences scientifically, *doctors were forbidden from establishing any link between observed illnesses and radiation exposure*. [1] We know that medical data was routinely and irrevocably falsified.

The same cover up of the facts (basically falsification) was used after Hiroshima and Nagasaki when the fundamentals of radiological risk from radiation were being established: again, we are looking at censorship! American occupying forces forbade the gathering of information and testimony about the damage done by radioactivity. This censorship, on the part of the Civil Censorship Detachment (CCD) lasted up until the end of 1949. None of the official data from the so-called “Japanese cohort” (victims of the atomic explosions) was collected before 1950. And now we are told “*these figures show the objective risk of radioactive radiation*”. This is how the official data is falsified.

How can we obtain the real figures?

So how can we find out about the consequences of ionising radiation? It can be done by comparing the state of health of people living in identical areas from an economic, geographical (even the same natural environment, same economy, same ethnic composition) differing only in the level of radioactive contamination. It can be done using Geiger counters to compare the total amount of extra radiation released following radiological accidents, to background gamma radiation in the soil and atmosphere. It can be done by comparing the morbidity and mortality of neighbouring territories, when the level of radioactive contamination is different. In the same group of inhabitants, morbidity and mortality before and after the disaster can be compared.

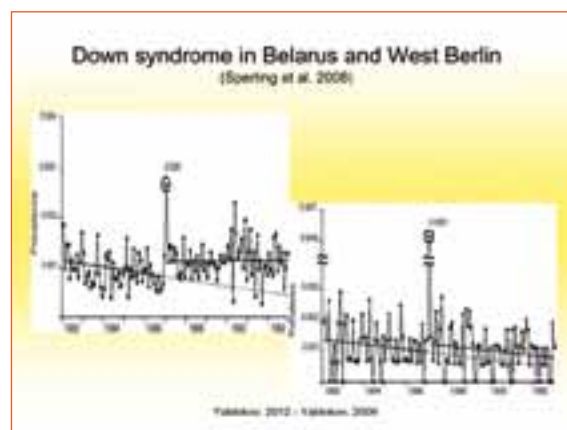
All of this gives us an overall picture of the consequences of radioactive contamination.

It was the publication by the IAEA and WHO in 2005 of the “Chernobyl Forum”, a “scandalous” document, as described here already, on the consequences of the Chernobyl disaster, that forced me, in collaboration with the remarkable Belarusian physicist Vassili Nesterenko¹, to prepare an analytical report bringing together the enormous number of scientific studies that have been undertaken on the serious consequences of the Chernobyl disaster. The book was published by “Naouka” (Science) in St Petersburg in 2007. In 2009 an extended version in English was

published by the New York Academy of Science, and in 2011, a third edition, revised and updated was published in Kiev. A Japanese translation is in preparation with the publisher “Ywanami”. The book contains about five and a half thousand published studies on the consequences of radioactive contamination from Chernobyl on people and the environment [2].

What are those consequences? We now know that all vital organ systems of people living in areas that were heavily contaminated by Chernobyl show negative effects: the cardiovascular system, the endocrine, immune, respiratory, urogenital, musculoskeletal, digestive and nervous system and others – all the vital organ systems without exception.

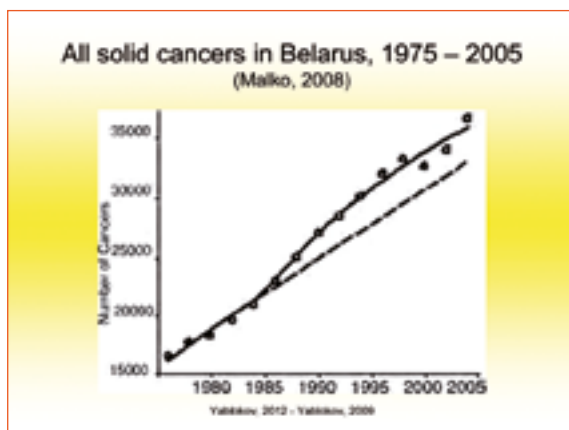
I will just give you a few examples. The first is the increase in cases of Down’s Syndrome.



Down’s Syndrome (or Trisomy 21) is caused by an extra chromosome in the 21st pair of chromosomes in humans. On the left hand side of the graph are the figures for Belarus, and on the right for West Berlin. [3] In both cases, in the second half of 1986, there is a sudden increase in the numbers of new born babies with Down’s Syndrome. The Berlin figures are more precise. It is the only place in Europe that kept weekly records of the numbers of babies born with this condition. Why the sudden upsurge of Trisomy 21 after May 1986? The only acceptable explanation is the increased radioactive contamination from Chernobyl – iodine, strontium, plutonium, caesium and other radionuclides. It is not possible to isolate the action of individual radionuclides, but their overall effect is obvious.

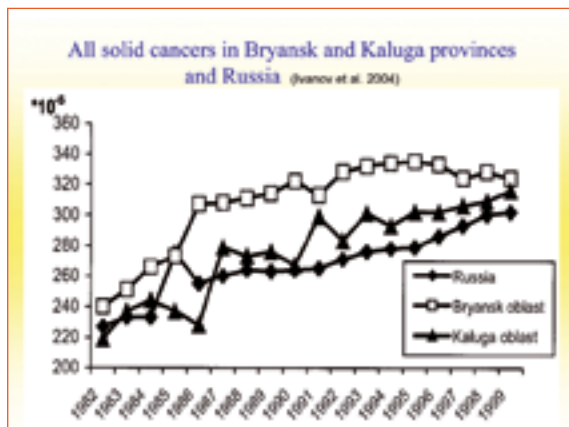
Second example: the increase in cancer in Belarus (it is well known that Belarus had the most precise and up to date oncological statistics of any of the countries in the ex Soviet Union).

¹ After Chernobyl, he stopped his work developing atomic reactors and created the radioprotection institute “Belrad”



This graph shows the increase in the number of all solid cancers in Belarus (in other words all cancers except cancers of the blood). Cancer is on the increase all over the world. This is due to chemical, electromagnetic and radioactive pollution world wide. For hundreds of years to come, the radionuclides from nuclear weapons testing will fall from the atmosphere, so that is already causing an increase in cancer. But, against this background increase, an additional increase is clearly visible in Belarus following Chernobyl.

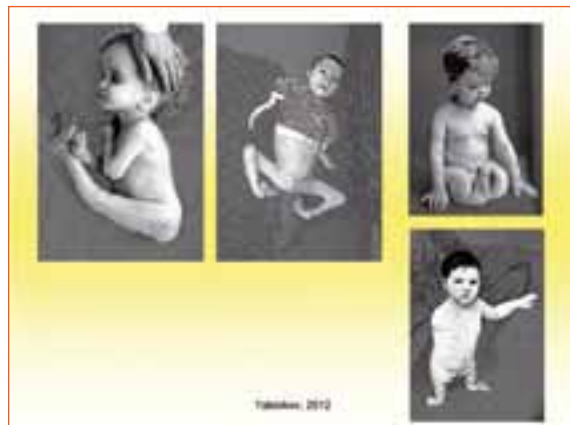
The following graph shows more detailed data about the increase of cancer in Russia.[4]



The lower curve shows the incidence of cancers for the whole of Russia (the number of new cancers appearing in 10,000 people per year). The middle curve shows the incidence of cancer in the Kalouga region which is moderately contaminated by radioactivity from Chernobyl. The upper curve shows the incidence of cancer from the Briansk region, the most contaminated area of Russia following the disaster. Apart from the effects of radioactive contamination from Chernobyl, nothing can explain

the difference in scale in the increase in cancers revealed by these three curves.

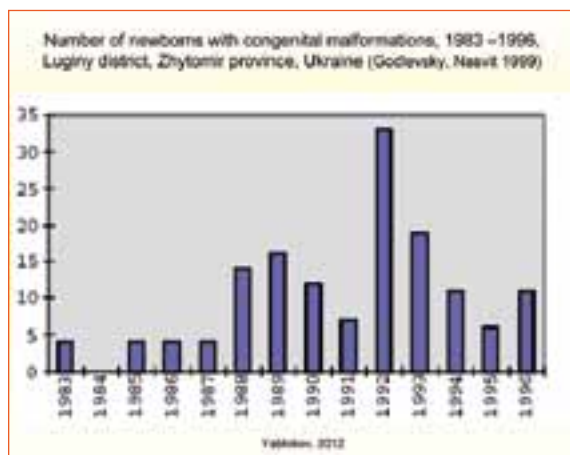
Some of the most terrible consequences of Chernobyl are the birth defects. No-one wants to talk about these, and it pains me to do so. It breaks my heart to have to present the following image, but it is important that people know what really happens with increased radiation.



The birth deformities from Chernobyl are very particular: the most frequent are cases of multiple deformities, not separate, as they are recorded in the official statistics. Among the effects that are typical of increased radiation, are the webbed feet shown in one of the photographs.

In those areas worst affected by Chernobyl special homes have been set up to care for these children. It is difficult to prove that each of these cases is due to the increased levels of radiation but the overall picture is clear: in the more contaminated territories, there are more congenital deformities.

The following graph shows an example of the post-Chernobyl increase in congenital deformities in one of the administrative districts of Ukraine. [5]



The doctors are the same, the monthly check-ups are conducted in the same way, the number of inhabitants is around 30,000 and there are nearly 1000 births per year. After 1987, the number of new born babies with congenital anomalies has clearly increased. It is impossible to explain it other than by the increased levels of radiation to which the mothers were exposed. But officially, it is not recognised as a consequence of Chernobyl.

Among the many consequences of the increased radiation from Chernobyl (as with any other radiation) there is accelerated aging. Symptoms of aging appear in adolescent boys and girls: the physiological age of adults is often 3 to 5 years in advance of chronological age. A number of mutations are appearing: polymorbidity, in which several illnesses occur at the same time in the same individual. All of this is a consequence of radiation.

The radioactive fallout from Chernobyl in Europe

Finally, cancers and death. We know more or less the amount of radionuclides released during the

Chernobyl disaster. The table shows the results of calculations made by the Belarusian doctor and epidemiologist M. Malko, on the number of new cancers that will appear in the “Chernobyl generation”, in other words, before 2056, in all the countries of Europe. [6] These calculations are based on official figures for the fallout of caesium 137 from Chernobyl on each of the following countries [7] and uses the most conservative estimates (in my view) of the radiological risk.

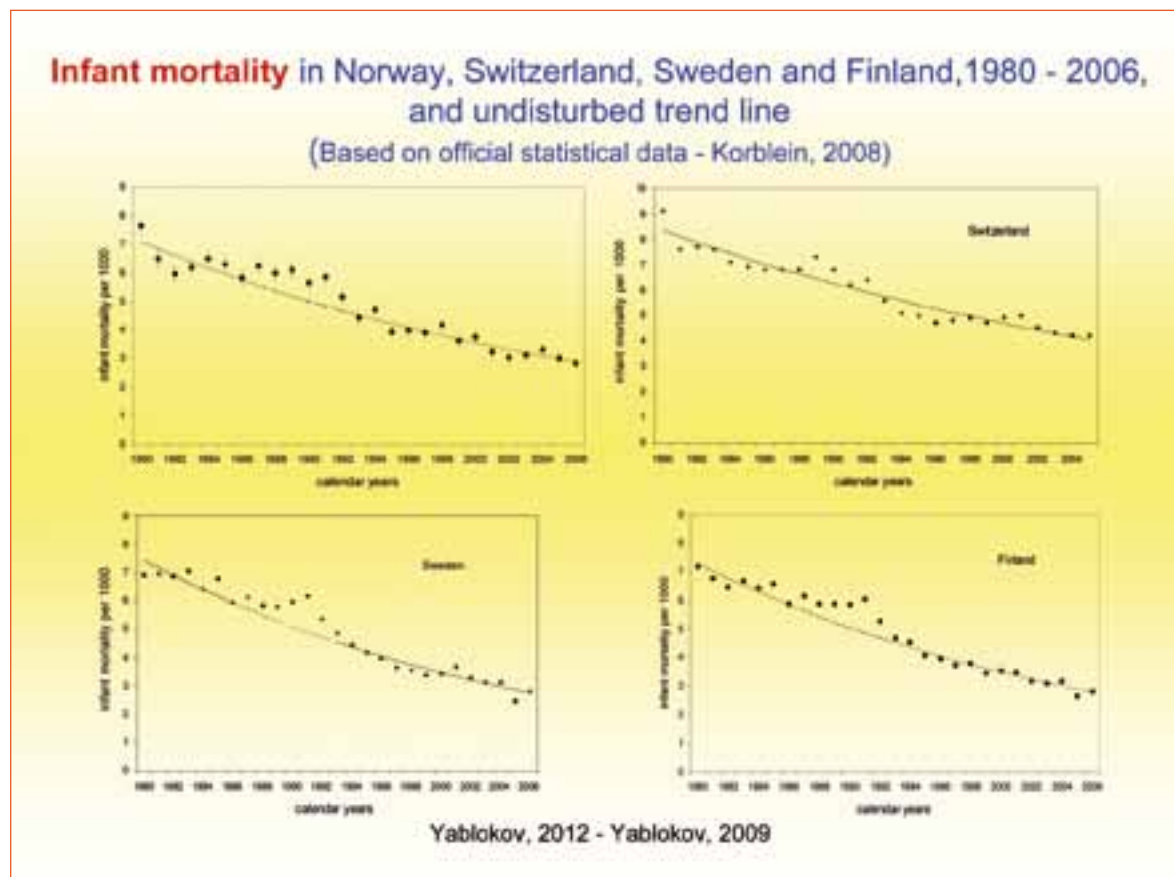
In Switzerland, for example, there will be 1,500 extra cases of cancer (of which about 900 will be fatal).

In the 2005 Chernobyl Forum Report, the WHO stated that the total number of additional deaths from Chernobyl might reach 9000. But the facts reveal a much higher number. The following graphs show the statistical data from Switzerland, Norway, Sweden and Finland. There had been a trend, year on year, showing a reduction in infant mortality, but we can see, after 1986, an increase in these deaths. It is difficult to explain this increase in infant mortality, other than by the effects of the Chernobyl disaster.

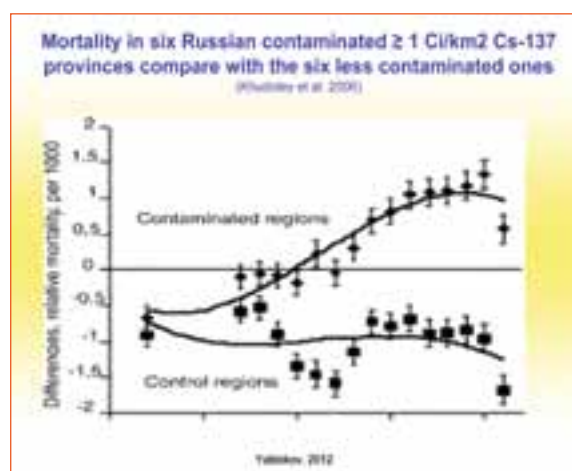
Forthcoming Chernobyl cancers and death toll in the Europe during 1986 - 2056 (Malko, 2007)

Belarus	28,300	17,546	France	1,220	756
Ukraine	28,300	17,546	Slovenia	960	595
Russia	25,400	15,748	Norway	920	570
Germany	9,280	5,754	Slovakia	715	443
Romania	5,220	3,236	Croatia	630	391
Austria	5,050	3,131	Hungary	625	388
Great Britain	4,280	2,654	Lithuania	420	260
Italy	3,770	2,337	Ireland	375	233
Bulgaria	2,920	1,810	The Netherlands	135	84
Sweden	1,980	1,228	Belgium	110	68
Greece	1,880	1,166	Spain	80	50
Poland	1,755	1,088	Latvia	75	47
Finland	1,600	992	Denmark	70	43
Switzerland	1,530	949	Estonia	60	37
Czech	1,410	874	Luxembourg	15	9
Moldova	1,320	818	Europe total	130,405	89,851

Yablokov, 2012



The following graph shows more detailed data from Russia.



A group of researchers from St Petersburg (Khudoley et al. 2006) [8] compared the overall mortality in six areas that were heavily contaminated by radioactivity with six neighbouring areas that were less contaminated. In the 15 years following

Chernobyl, mortality in the contaminated areas was 4% higher. This 4% represents 237,000 additional deaths. Even a cautious extrapolation from these figures (taking into account the number of inhabitants in different countries and the density and distribution of the fallout from Chernobyl in the northern hemisphere) suggests that over the first 15 years following the nuclear accident, Chernobyl has caused not 9000 additional deaths but nearly a million (about 0.1% of the total mortality).

Additional Chernobyl mortality for the first 15 years

Belarus, Ukraine, Russia (43% radionuclides) ...	237 000
Other Europe (37% radionuclides) :	
> 1 Ci/km ²	185 000
< 1 Ci/km ²	277 000
Asia, Africa, North America (20% radionuclides)	
0,1 – 1 Ci/km ²	331 000
WORLD total	1 030 000

Yablokov, 2006

Radiophobia

To conclude: radiophobia. The nuclear lobby explains the increase in illness in those areas contaminated by radioactivity, by “radiophobia”. And now they are talking about radiophobia in Japan. But can mice, rats, frogs, that are showing the same chromosomal alterations, and many of the

same illnesses, including cancers, as the inhabitants of the contaminated territories, experience radiophobia?

The talk of radiophobia is pronuclear propaganda. It is not a scientific explanation.

For more detailed information about the consequences of the Chernobyl disaster I advise you to read our book. ▶

What happened with some voles, birds, and insects in the Chernobyl zone shows what can happen with humans in coming generations:

- increasing mutation rates,
- increasing morbidity and mortality,
- reduced life expectancy,
- decreased rate of reproduction,
- changes in male/female ratios,
- etc...

Yablokov 2012

The Chernobyl catastrophe demonstrates

that the nuclear industry's willingness to risk our planet with nuclear power plants will result, not only theoretically but practically, in the **same level of hazard to humanity and the Earth as nuclear weapons.**

Yablokov 2008

Vassily Nesterenko, A.Yablokov, Geneva, 26 April 2008



Yablokov 2008

References

- [1] Kovalevskaya L. (1995) *Chernobyl "For Official Use"; Consequences of Chernobyl* – ed. Abris, Kiev, 328 p. (in Russian – ‘Chernobyl “DSP”; Posledstviia Chernobylia’)
- [2] Yablokov AV, Nesterenko W. and Nesterenko A. (2009) *Chernobyl: consequences of the catastrophe for people and the environment* – *Ann. New York Acad. Sci.* Vol. 1181
- [3] Sperling K, Neitzel H. & Scherb H. (2008) *Low dose irradiation and nondisjunction: Lessons from Chernobyl* – 19th Annual Meeting of the German Society of Human Genetics, April 8–10, 2008, Hanover, Germany
- [4] Ivanov VK, Tsyb AF. (2002) *Medical Radiological Effects of the Chernobyl Catastrophe on the Population of Russia: Estimation of Radiation Risks* – Moscow, Meditsina, 389 pp.
- [5] Godlevsky I. & Nasvit O. (1999) *Dynamics of Health Status of Residents in the Luginy District after the Accident at the ChNPS*. In: Imanaka T. (Ed.) *Recent Research Activities about the Chernobyl NPP Accident in Belarus, Ukraine and Russia* – KURRI-KR-79 (Kyoto University, Kyoto), pp. 149–157
- [6] Malko M.V. (2007) *Assessment of Chernobyl medical consequences accident* – In: Blokov I., Sadovnichik T., Labunska I. & Volkov, I. (Eds.) – *The Health Effects on the Human Victims of the Chernobyl Catastrophe* (Greenpeace International, Amsterdam), p. 194–235
- [7] *Atlas des dépôts de césium 137 en Europe après l'accident de Tchernobyl* (Atlas of Caesium Deposition on Europe after the Chernobyl Accident). Rep. 16733, Office for Official Publications of the European Communities, Luxembourg (1998), De Cort M. and Tsaturov Yu.S. (eds)
- [8] Khudoley V.V., Blokov I.P., Sadovnichik T. & Bysaro S. (2006) *Attempt to estimate the consequences of Chernobyl catastrophe for population living in the radiation-contaminated territories of Russia*. In: Blokov I.P. (Ed.), *Consequences of the Chernobyl Accident: Estimation and Prognosis of Additional Mortality and Cancer Diseases* (Center for Independent Environmental Assessment, Greenpeace-Russia, Moscow), p. 3–19

Research and Activities of Scientists and Citizens in Japan who are Concerned about Low Dose Internal Radiation Exposures



Eisuke MATSUI, MD. resident of Gifu Research Institute for Environmental Medicine, founding member of ACSIR (Association for Citizens and Scientists Concerned about Internal Radiation Exposures).

(Editor's note: In annex to Dr Matsui's oral presentation we have added an extract of the text he prepared before the Forum describing the creation of ACSIR and its founding members (see page 25). This text sets in their historical context the scientific and citizen concerns regarding the effects of atomic radiation in Japan, the only country in the world to have been victim of the atomic bomb.)

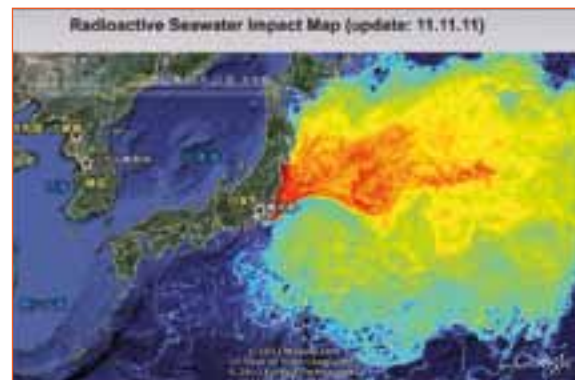
It is a great pleasure for me to be here today and to address this Forum organised by Independent-WHO. First of all I would like to refer briefly to the situation in Japan following the beginning of the TEPCO catastrophe which led to the creation of the Association for Citizens and Scientists Concerned about Internal Radiation Exposures, ACSIR.

Since the 11 March 2011 accident we have noted the following points:

- Massive leakage of radioactive materials from TEPCO sites
- Careless decontamination (clean-up) operations
- Contamination of natural resources all over Japan by disposal of radioactive debris at local governments' incineration plants

- The Japanese government's overtly optimistic standard for permissible radiation doses for contaminated foods

It is also well known that TEPCO dumps radioactive effluents into the sea, as is shown in this Radioactive Seawater Impact Map (update: 11.11.11). As of 6 Dec. 2011, 26 billion Bq of Sr90 and other components had been dumped into the ocean. In March 2012 TEPCCO decided to abandon dumping radioactive effluents into the sea.

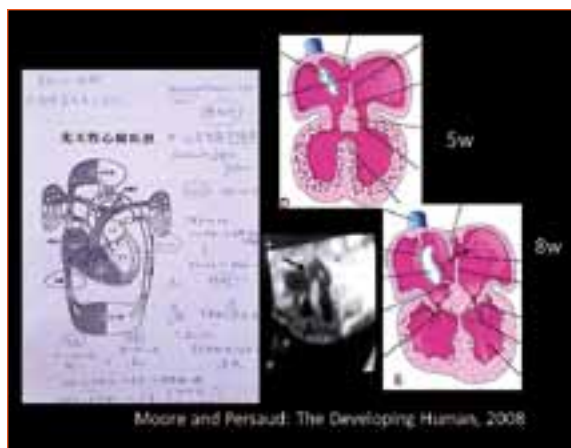


In the light of these facts, priority must be given to saving the lives of present and future generations, especially children. We must take into account:

- the risk of internal radiation exposure for fetuses and infants;
- the real facts of health disorders already observed in the contaminated areas.

We have reached the conclusion that there is an urgent need to evacuate the population from the contaminated areas, specially the children at risk.

As an example I would like to present the case of a baby in the city of Koriyama: the foetus was irradiated by particles disseminated by the Fukushima Dai-Ichi nuclear plant on 11 March 2011. It showed ventricular anomalies and an inter-auricular communication. The septas opened at 5 weeks and closed normally at 8 weeks. The baby, a boy, was born premature in the ninth month. After birth he was diagnosed by a cardiologist specialized in new-born babies and found to still have ventricular anomalies and an inter-auricular communication but a surgical operation was not necessary because the septal defects had become very slight. The accompanying slide shows a similar case although the causes were not the same (Fig.: Moore et Persaud:.. The Developing Human, 2008).



Another example is the death due to acute cardiac insufficiency of two high school students last summer.

Yet another concerns ultrasonography of thyroid gland cysts conducted by the famous Dr. Shunichi YAMASHITA. He found cysts in 35 per cent of the children examined in Fukushima (see table); earlier, in the year 2000, he examined children in Nagasaki and found only 0.8 per cent. Now he says : 35 per cent, no problem !

Ultrasonography of Thyroid Gland Cysts of the Children
(Dr. Yamashita Shunichi)

	Cysts		Total
	+	-	
Fukushima (0-18yo, 2011.10-2012.3.31)	13,380 (35.11%)	24,734 (64.89%)	38,114 (100%)
Nagasaki (7-14yo, Beginning of 2000)	2 (0.8%)	248 (99.2%)	250 (100%)

An example in Japanese history of the late effects of internal radiation:

A year before Fukushima disaster, I began writing a book on internal exposure to radiation. The book entitled *The Invisible Terror, Internal Radiation Exposure* was published soon after the Fukushima accident (the original Japanese title is *Mienai Kyofu: Hoshasen Naibu Hibaku*, published by Junposha). In the book, I introduced a typical example of the late effects of internal radiation exposure. This is the case of the crewmen of the *Lucky Dragon No.5*, a tuna fishing boat which was heavily contaminated by the US hydrogen bomb test in Bikini

atolls in the Marshall Islands in 1954 (see further details in the Annex). The following table, taken from my book, shows the incidence of cancer and deaths among the crew-members:

- Death : 13/23 crew-members (56.5%)
- Average age : 52.2 years old
- Cancer deaths: 7/13 (53.4%)
- Survivors with cancer: 3
- Cancer patients 16/23 (69.6%) (July 2004)

The crew-members of the *Lucky Dragon No.5* are among the 20,000 fishermen in nearly 1000 ships whose radiation exposure was covered up, erased from the history. The Japanese government exchanged the dignity of the fishermen for a tiny compensation payment to the 23 *Lucky Dragon No.5* crew-members.

High school students in Kochi prefecture heard from the fishermen the facts of the radiation exposures. In 1988 they published a book entitled *Bikini no umi wa wasurenai* (Bikini sea will never forget). And in 2005 Maeda Tetsuo published a book entitled *Kakusareta Hibakusha* (The Hidden Hibakusha in the Bikini islands).

Citizen activities since 11.03.11

A **National Network of Parents Saving Children from Radiation** was launched in several cities on 12 July 2011 and since that date numerous networks have spread throughout the whole country (see <http://kodomozenkoku.com/index.html>)

Citizen's Radioactivity Measuring Stations (CRMS) are working all over Japan (see en.crms-jpn.com/index.html). Information on this project will be provided by Ms Aya MARUMORI and Wataru IWATA later in today's programme. The project is illustrated below:





Citizen's Radioactivity Measuring Station

NPO Yukinosato Towamachi, mountain area of Nihonmatsu-city

Evacuation of children from contaminated areas

In September 1911, Professors Chris Busby, Shoji Sawada, Katsuma Yagasaki and myself presented professional opinions in the Fukushima Collective Evacuation Trial, a lawsuit filed by the parents of 14 children of Koriyama city in Fukushima prefecture. The plaintiffs insist that the children be evacuated in a group with the government's support. The point of our arguments was the danger of low dose internal exposure to radiation. The case was dismissed in the first instance, and we are waiting for the result of the last resort appeal.

Other activities

Among other activities was an **International Conference of Citizens and Scientists** (12 Oct. 2011) in Tokyo.

Extracts of the conference proceedings can be found on the web links below:

- Broadcast: Morning and Afternoon Conferences: <http://bit.ly/f6HUWg>
- Prof. Sebastian Pflugbeil and Eugen Eichhorn et al. gave lectures <http://www.ustream.tv/recorded/17951948>

Round-table conference: <http://bit.ly/f6HUWg> and <http://bit.ly/fserD8>

- Citizens should have scientific knowledge
- Scientists should be citizens, not "specialists"
- New citizen's revolution

The next Conference was to be held end June 2012



Whole Body Counter measures only y-ray



Measuring rice, pea, garlic, dry milk etc.

One day, while checking dried milk for babies produced by the Meiji dairy company, they discovered radioactivity at the level of 50 mSv. Meiji was obliged to withdraw the product from the market.



International Conference of Citizens and Scientists
Prof. Sebastian Pflugbeil, Prof. Eugen Eichhorn, & Herr Masao Furumoto aus Berlin
12 Oct. 2011 in Tokyo

Another event:



I can also mention that Dr Yuri Bandazhevsky gave a series of lectures and we are now organising meetings between Dr Michel Fernex and Japanese doctors.

Appeals launched by our Association for Citizens and Scientists Concerned about Internal Radiation Exposures (ACSIR)

What is needed now in Japan is the promotion of truly scientific studies about the effects of radiation on the human body that are based on facts and actual radiation exposures, and not on policies that promote nuclear weapons and nuclear power. The effects of the Fukushima accident must be dealt with scientifically and democratically from the viewpoint of citizens.

We have therefore **appealed to all concerned** to join and participate in the activities of ACSIR and to insist that the competent authorities recognize that the major effects of radiation from the accident are caused by internal exposure by inhaling or ingesting food and drink.



The norms applied by the Japanese authorities must be revised to include internal exposure to small doses: In measuring the doses of exposure to radiation, the Japanese government and its professional advisors have relied mainly on gamma rays which are easy to detect. In terms of internal radiation exposure, beta and alpha rays have a far more serious effect than gamma rays. The Japanese government and TEPCO hardly measure such isotopes as beta emitting strontium-90 or alpha emitting plutonium-239. They have been deliberately ignoring the characteristics of internal exposure and its effects on the health.

To illustrate our arguments we have used a table that reveals comparative data of Ukraine, Belarus and Japan on intolerance dose limits of radioactive materials in foods and drinks (Bq/kg). For example, dose limits of radioactive materials of water : the government of Ukraine and Belarus decided the dose limits of Strontium 90, as 2 and 0.37 respectively. The Japanese government, however, decided no dose limits of strontium 90 in food and drinks. And the dose limits of Cesium 137 in food and drinks in Japan are far higher compared with those of Ukraine and Belarus.

Dr. Yamashita has been saying to the public in Fukushima, "below 100mSv is safe!" The Japanese government has been saying "By decontamination, below 20 mSv, you can come back to the contaminated area and live there."

This propaganda by the public the authorities should be considered as "Slow Murder".

Recently, a very important paper was published by The Radiation Effects Research Foundation (RERF): Studies of the Mortality of Atomic Bomb Survivors, Report 14, 1950–2003:

An Overview of Cancer and Noncancer Diseases, Kotaro Ozasa et al. RADIATION RESEARCH 177, 229–243 (2012). The estimated lowest dose range with a significant ERR (Excess Relative Risk) for all solid cancer was 0 to 0.20 Gy, and a formal dose-threshold analysis indicated no threshold; i.e., zero dose was the best estimate of the threshold.

Conclusions

We must insist on the responsibility of TEPCO and the Japanese government who made the nuclear disaster and convince them that:

- Human beings cannot live with nuclear power
- We cannot live in the contaminated area
- We should decide not to cultivate or fish in the area

- We should made strategies to live in the less contaminated area
- We must create centenary plans

TEPCO and Japanese government must therefore take the following steps:

- Ensure indemnification for the evacuation
- “Keine Medizin ohne Lebensmittels” (No medicine without food)
- 100% self-sustaining safe food
- Well designed checkup and medicine capable of saving life
- Abolition of the clearance system

The Japanese government must force local governments to dispose of low-dose nuclear waste. ▶

Annex

Immediately after the accident of TEPCO's (Tokyo Electric Power Company) Fukushima Daiichi Nuclear Power Plants, major TV stations adopted opinions of those academics who kept saying low dose radiation exposure is not harmful. In measuring the doses of exposure to radiation, the Japanese government and its professional advisors have relied mainly on gamma rays which are easy to detect. The government and TEPCO hardly measure such isotopes as beta emitting strontium-90 or alpha emitting plutonium-239. They have been deliberately ignoring the characteristics of internal exposure.

Alarmed by this deception and misinformation by the government and their professional advisors, a number of scientists and citizens decided to form the Association for Citizens and Scientists Concerned about Internal Radiation Exposure, in short ACSIR. Within the two months following the formation of ACSIR in mid-January 2012, the membership reached 350. This rapid growth of membership itself shows how concerned citizens, scientists, and medical doctors are about the invisible danger of internal radiation exposures.

Our main members include those scientists who have been researching on the effects of low dose exposures among Hiroshima and Nagasaki *hibakusha*. An introduction to some of their works will give you a brief overview of the history of research and activities on low dose internal radiation exposures in Japan.

Shoji SAWADA, professor emeritus of physics, Nagoya University, is now the main representative of ACSIR, and one of the pioneers in the field of internal radiation research in Japan. Professor Sawada himself is a *hibakusha*, victim of the Hiroshima atomic bomb. His research on the effects of radiation began in the late 1990s to measure residual nuclear radiation from Hiroshima and Nagasaki. His analysis found that the DS86 (Dosimetric System 1986) that was established by the US-Japan research organization Radiation Effects Research Foundation underestimates the radiation effects on *hibakusha* who had been beyond 1.2 km from the hypocenter of the Hiroshima bomb. The average effects of radiation exposure from the fallout increases with distances from the hypocenter, reaches a peak at around 1.5km, and then decreases gradually for farther distances but remains even at 6km. The peak values of

estimated health effects from fallout are comparable with that of acute external exposure of gamma ray doses around 1 Gy. This suggests that the main effects resulting from residual nuclear radiation were caused through **internal** exposure, especially intake of radioactive small particles by ingestion and inhalation.

Professor Sawada's findings were presented as professional opinions in a number of lawsuits filed by *hibakusha* for official recognition of bomb-related illness and for medical allowances, beginning in 1997. It is estimated that in 2001 there were over 290,000 A-bomb survivors in Japan, but the government recognized only 2,200 of them (less than 0.77%) for A-bomb related illness. From 2003 those *hibakusha* whose applications were dismissed by the government began to file group lawsuits, and Professor Sawada continued to present professional opinions for these lawsuits. Between 2003 and 2011, there were 17 group lawsuits by 306 *hibakusha*, and most of them were victorious as the judges recognized the effects of internal exposures. However the government has not changed its attitude to recognize radiation related diseases. Professor Sawada's article is available in English in "Estimation of Residual Nuclear Radiation Effects on Survivors of Hiroshima Atomic Bombing, from Incidence of the Acute Radiation Disease", *Bulletin of Social Medicine*, vol.29 (1) 2011, (pp.47-62).

Among our citizen members, Matashichi OISHI is another nuclear victim. He is one of the 23 crew-members of the *Lucky Dragon No.5*, a tuna fishing boat which was heavily contaminated by the US hydrogen bomb test in Bikini atolls in the Marshall Islands in 1954. Mr Oishi was 20 years old at the time. In his book, *The Day the Sun Rose in the West: Bikini, the Lucky Dragon, and I* (OISHI Matashichi, Richard Minear (tr.), University of Hawaii Press, 2011), Mr Oishi describes how the boat and its crew-members were covered with the "death ash" from the nuclear test and how his colleagues died of radiation one after another. He exposes the Japanese government cover-up of the harm of radiation to the more than 20,000 crew-members of a thousand fishing ships which had been contaminated in the test vicinity, how the authorities stopped checking radiation of the contaminated tuna, how the "U.S. government never accepted legal responsibility," and how the Japanese government was at fault not only for having failed to demand compensation for damages, but also for expressing "its respects once again" to the U.S., the

very country that had caused enormous suffering, for the meager consolation payment (p.57).

Mr Oishi's first baby was stillborn and deformed, but he could not tell his wife the truth. It was only after 40 years had passed that he finally could tell his family about that. Mr Oishi is now very active talking to school children and citizens about the danger of radiation, nuclear weapons tests, and nuclear power plants.

Another founding member of ACIR is Katsuma YAGASAKI, professor emeritus of Condensed Matter Physics, Ryukyu University. In his paper, "Depleted Uranium Shells, the Radioactive Weapons: Perpetuation of War Damage by Radiation", Professor Yagasaki explains about the mechanism of depleted uranium shells and the damage caused by internal radiation exposure and heavy metal poisoning. The paper (http://www.uraniumweaponsconference.de/speakers/yagasaki_dushells.pdf), was presented at the World Uranium Weapons Conference 2003, "Depleted Uranium and other Uranium Weapons: Trojan Horse of a Nuclear War, An International Educational/Organizing Conference" (at University of Hamburg, Germany). Professor Yagasaki also

presented a professional opinion entitled "Internal Exposures to Radiation and Atomic-bomb Disease" for a group lawsuit by *hibakusha* in 2004.

I am Eisuke MATSUI, MD, a physician for respiratory diseases and radiologist. I delivered a paper, "A Report of the International Criminal Tribunal for Afghanistan in Japan" at the above mentioned World Uranium Weapons Conference in 2003. I gave a testimony on the issue of health effect of depleted uranium and other internal radiation exposures at the 11th public hearing of the International Criminal Tribunal for Afghanistan in Tokai, Japan, in 2003.

A year before the Fukushima disaster, I began writing a book on internal exposure to radiation, *The Invisible Terror: Internal Exposure to Radiation* (the original title is *Mienai Kyofu: Hoshasen Naibu Hibaku* published by Junposha). The book was published soon after the TEPCO accident. It is a sad coincidence that the book became in demand, as citizens wanted to know the truth about internal radiation while the government and government-sponsored academics kept saying "there is no immediate danger" or "below 100mSv/y is safe". 🍅

DISCUSSION 1

Points raised:

Hibakusha – Three Mile Island – Radiophobia – About scientists – Contamination of Tokyo – Dr. Yamashita – Measuring radioactivity around power stations.

Question

Raymond Zoller, journalist

Are the *Hibakusha* treated any better today by Japanese society?

Reply

Eisuke Matsui, specialist in respiratory pathology related to low doses

Certain *Hibakusha*¹, – the victims of Hiroshima and Nagasaki – do not want to be known as *Hibakusha*. The social situation in Japan today in relation to Fukushima is very similar. This state of affairs must be addressed.

Comment

Yves Lenoir, President, “*Enfants de Tchernobyl Bélarus*”

I would like to say something about Three Mile Island, which has been forgotten. After the accident, 260 families in which children with Trisomy 21 had been born, took a case to court. Metropolitan Edison paid out US\$ 12 million in compensation. So Trisomy 21 was recognized after Three Mile Island. Radiophobia was invented by the psychiatrist Mark Sheaffer² in 1985, in order to explain the decrease in immune function in people affected by fallout from Three Mile Island. These people were worried about their health because they were ill and could not get better. It was concluded that because they feared radiation, their immune function was weakened.

Question

Nicole Roelens, “*Stop Fessenheim*”

The last speaker said that citizens and scientists must work together. But how can we – citizens – tell if we are dealing with a scientist who is doing real work and one who is just pulling the wool over our eyes? It is hard to know.

Comment

Robert James Parsons, journalist

The English researcher Dai Williams used the internet site of the “*National Atmospheric and Oceanographic Administration*” in the USA to track winds across the planet. He was able to introduce his own data. On wind blowing from Fukushima, he introduced dust and in the days that followed, he followed this dust which turned clockwise towards the ocean and then returned straight to Tokyo. The conclusion was that in the 3, 4, 5 days which followed, about 90 % of the radionuclides which went from Fukushima to the sea, came straight back to Tokyo. There are samples provided by people which confirm that the level of radiation in the city is terrifying. Neither the government nor TEPCO nor anyone else has mentioned this.

1 See the book by Kenzaburô Ôe : http://madamedub.com/WordPresse3/?ha_exhibit=notes-de-hiroshima-kenzaburo-oe

2 See : <http://www.tmia.com/node/1318> et <http://www.nirs.org/reactorwatch/accidents/tmihealthchronology.pdf>

Comment

Yan Hemmer, *“Children of Chernobyl-Belarus”*, Germany

As we sit here, Dr Yamashita³ – Mr. 100 millisieverts – is accelerating the assassination of Japanese children. In the letter here, he advises Japanese doctors not to scan children, not to do ultrasound examinations. Doctors are advised not to speak about Fukushima.

Comment

Franz Botens

There have been epidemiological studies of children under five years of age with leukemia who live near power stations. Is there a connection with power stations? In Germany, at the Gundremmingen nuclear power plant, it was always thought that the level of radiation was very low. But figures have just been published⁴ showing that when inspections are carried out, the lid of the reactor core must be raised. This is when radionuclides escape and the level of contamination is very high. It is during these two, three days of inspection that children are contaminated. The levels measured have not been published except as averages and so there is no danger. In reality these peak emissions are dangerous but no one reports them so people cannot take measures to protect their children.

3 Dr Shuniti Yamashita stated on 24 March 2011: “Radiation does not affect people who smile but those who are worried.” <http://fukushimavoices-eng.blogspot.ch/2012/05/fukushima-childrens-thyroid-examination.html>

4 <http://www.ipnw-europe.org/fr/nucleaire-et-securite.html?expand=709&cHash=409900ff65>



3. Radioprotection against internal contamination

Moderator: Wladimir Tchertkoff (Italy) journalist and author of *Le crime de Tchernobyl* published by Actes Sud

The state of children's health in Belarus following the Chernobyl accident



Galina Bandazhevskaya (Belarus) paediatrician and cardiologist

Ladies and Gentlemen, Dear Colleagues, Good Morning! When you look at this picture, you will understand that I am going to talk about what is most precious to us at this moment: the state of

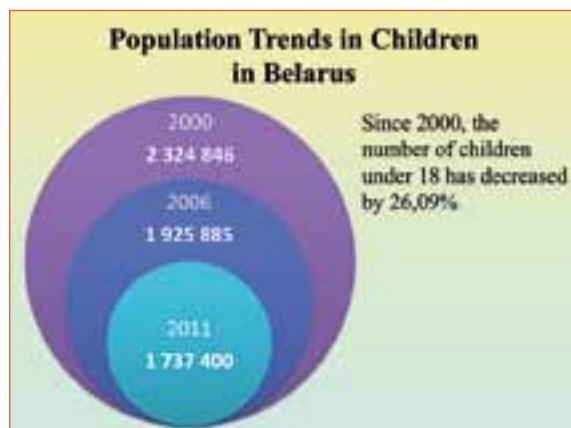
our children's health. The accident at Chernobyl caused many problems in the countries that were most affected: Belarus, Ukraine and the Russian Federation. Twenty-six years after the accident, the most important question - but the one that has been least studied from the scientific point of view - is the health of the people in contaminated territories.



23% of the territory (of Belarus), mainly the regions of Gomel and Moguilev, where nearly 250,000 children live today, was contaminated [1].



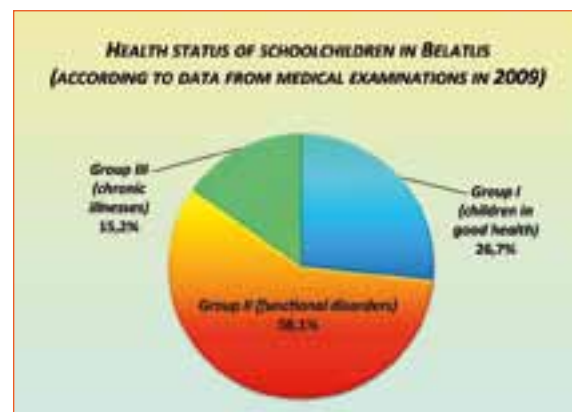
Two radionuclides, short lived iodine-131 and long lived cesium 137, were responsible for most of the radiation to which people were exposed. Particular to this region is the fact that 70% of the total radiation dose received by the population is internal, through the consumption of contaminated food such as milk, potatoes, mushrooms, berries, game, etc. [2]



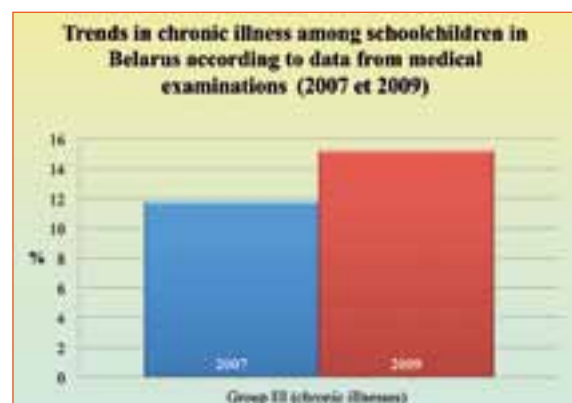
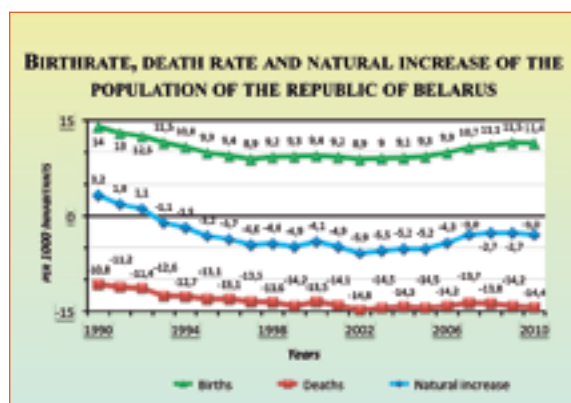
At this moment, Belarus is experiencing a demographic catastrophe. Since 2000 the number of children under 18 has decreased by 26.09%; at the beginning of 2011, they numbered 1,737,000. [3], [4]

Since 2003, as you can see from the next slide, there has been a slight increase in the birth rate. However, the death rate in the Republic has increased from 13.8 per thousand in 2008 to 14.4 per thousand in 2010. [5]

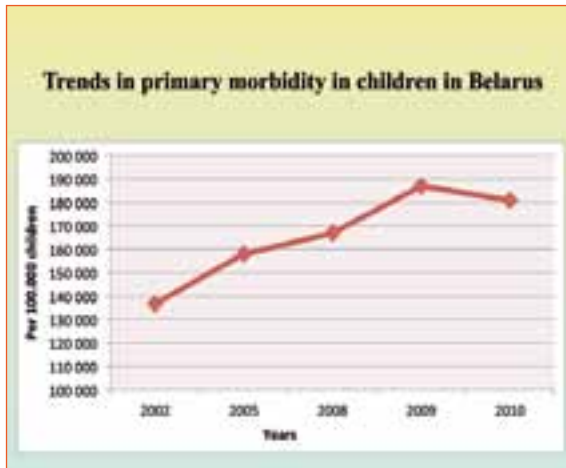
Today, in the course of our clinical examinations, paediatricians like myself are seeing an increase in the number of illnesses and a general deterioration in children's health in Belarus. According to data from medical examinations, out of a total of more than 1 million schoolchildren in Belarus in 2009, 26.7% were considered in good health, 58.1% had functional deficiencies and were at risk of developing chronic illness, and 15.2% suffered chronic illness. [6].



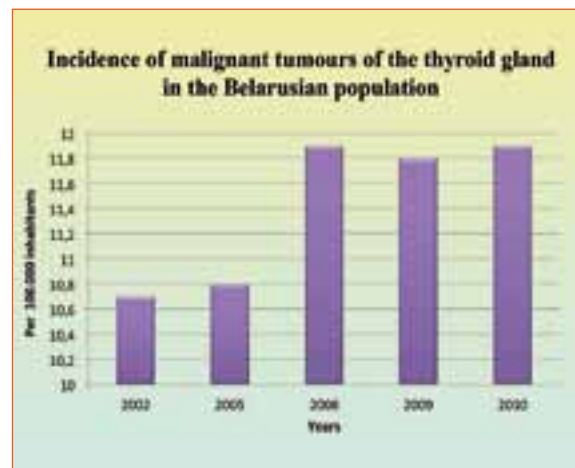
Between 2007 and 2009, the number of schoolchildren suffering from chronic illness had increased and the number of children in good health had decreased (Fig 3). This means that in 2007, there was far less chronic illness than in 2009. These are official figures from the Ministry of Health. General practitioners are seeing a constant decrease in the number of children in good health.



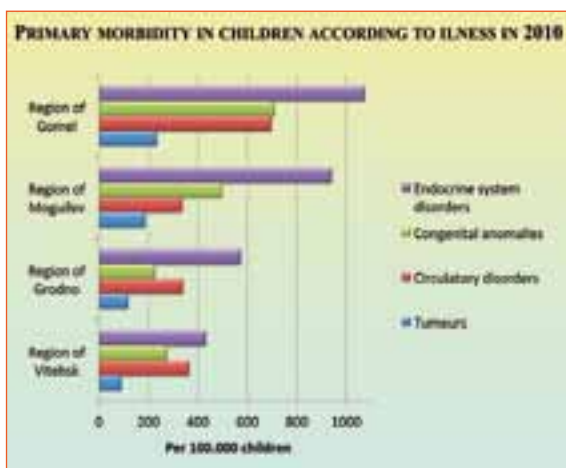
The next graph – and these are also official data from our Ministry of Health – shows the trend in primary morbidity in children in Belarus between 2002 and 2010. You can see the upward trend until 2009 as shown by the continuous line. [7; p125].



only condition that is recognised as caused by radioactive contamination. On this slide, you can see all the cases of thyroid cancer among the population of Belarus. You can see that the incidence of this illness remains high year after year. [7 p.24]

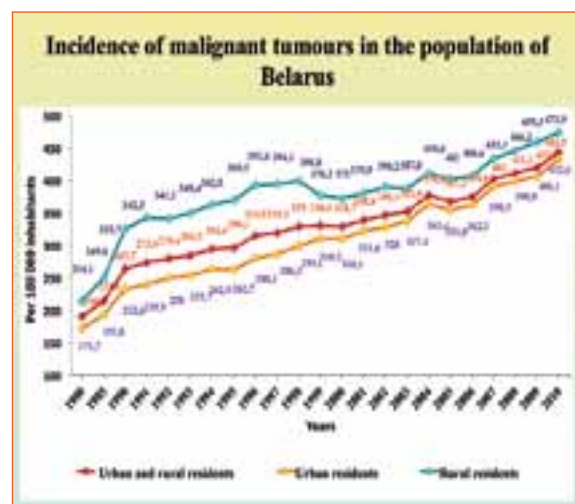


We compared illnesses in children in 2010 according to particular nosological categories between two 'contaminated' regions (Gomel and Moguilev) and two 'clean' regions (Grodno and Vitebsk). You can see the pattern that results and the extent to which disorders of the endocrine system, cancers, cardiovascular illnesses and congenital malformations are more frequent in the contaminated territories than in the clean territories. [7; pp129-133, 139,140].

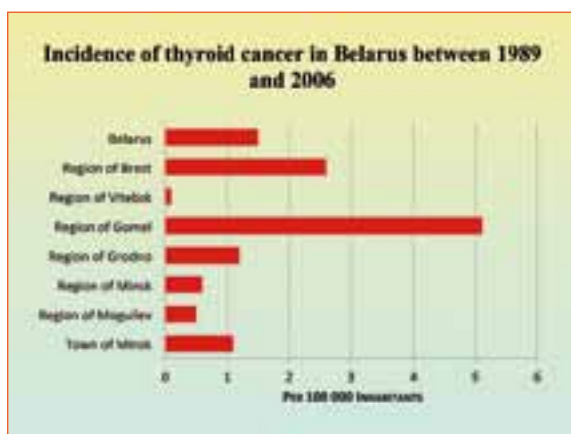


The year 1993 is the year in which the World Health Organization officially recognized thyroid cancer as an illness attributable to radioactive contamination. Today, it is still the

The next graph shows the trend in incidence of malignant tumours in the population of the Republic of Belarus. The whole population is shown, rural and urban. Note the general increase in malignant tumours after the Chernobyl catastrophe [10]. Primary morbidity from cancer more than doubled in the country over the last eight years. [11].



A study on the incidence of thyroid cancer in Belarus shows that Gomel is the worst affected. During the period 1989 - 2006, among 778 children with thyroid cancer, 342 lived in the Gomel region [9].



We looked at the ranking of Belarus among the Newly Independent States (NIS, the countries of the former Soviet Union) in terms of cancer incidence. And again the highest incidence is here in our country, in Belarus, followed by Ukraine and Russia. Then, the number of illnesses decreases in the other countries of the former Soviet Union. [7; p242]



While the radiological cause of thyroid cancer has been recognised by the World Health Organization, more than 25 years later, the correlation between the increase in incidence of congenital malformation, cancer and cardiovascular disease and the accident at the Chernobyl power plant, continues to be denied. Increases in the number of children who are ill and are victims of the accident is explained in terms of the quality of routine, preventive medical examinations.

The fact is that medical science does not study the effects of radiation on health from which our children have suffered since 1986. We can diagnose cardiac pathologies in children; every

paediatric clinic has a Holter machine to monitor heart rhythm; in maternity units, we immediately do an electrocardiogram on newborns and a Doppler examination of the heart. We have competent paediatric cardiologists and we know how to diagnose conditions correctly. But there you are, sometimes we cannot explain the cause of these problems. If the etiology of a certain illness is unknown, I cannot prescribe the correct preventive medicine nor follow up with the proper treatment. The risk factors for development of cardiovascular conditions in children are cited in official scientific sources: arterial hypertension, overweight, obesity, tobacco, family history. Of course these risk factors play an important role in the development of the illness, but radioactive contamination is completely ignored, yet it is one of the most important contributing factors in children living in contaminated territories of Chernobyl [12].

The study below takes no account of radioactive contamination as a factor either.

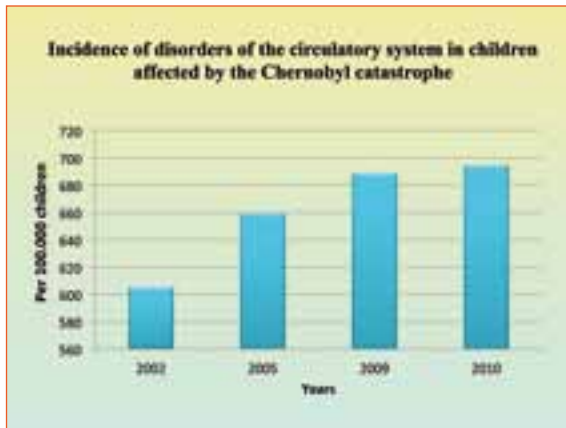
Incidence of main factors for cardiovascular disease among schoolchildren of Minsk in 2007-2008 (according to data from medical examinations and anonymous survey)

Risk Factors	Frequency of occurrence
1. Arterial hypertension over 90 centiles	7,67%
2. Overweight	12,96%
3. Obesity	5,2%
4. Tobacco use	28,6%
5. Low physical activity:	
- Non respect of daily diet	88,0%
- No morning physical exercise	87,9%
- No sport	64,8%
- Less than 1 hour spent outside	16,5%
- More than 4 hours of TV/computer	47,6%
6. Family history of cardiovascular disease	27,5%
7. Dyslipidemia in the risk groups above	47,6%

As far as development of cardiovascular and other conditions are concerned, no account is taken of radionuclides and in particular, cesium 137 to which our children have been exposed for more than 26 years. [2]. In prevention programmes, the health authorities see no need to include measures of radioactive load in children's bodies, in their protocols for the medical examination during check-ups of children affected by the Chernobyl accident. Urban clinics and hospitals have no human radiation spectrometers (HRS) which would allow them to determine the average specific activity of cesium 137 in the child's body.

In the first years following the catastrophe we started to observe the increase in cardiovascular conditions in children in the contaminated regions

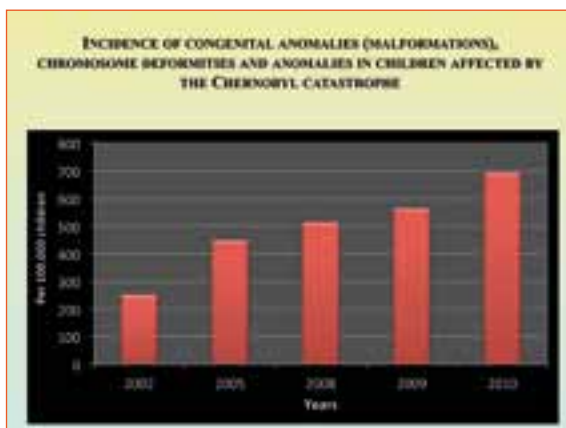
of the Republic. Today, the upward trend in morbidity persists. [8], [7; p150].



The next slide shows congenital malformations [8].

The incidence of congenital malformation of the heart is quite high. Estimates of the incidence vary according to author but on average, it is between 0.8 and 1.2% of all newborns. Congenital heart malformations represent up to 30% of all observed malformations. Congenital heart malformations constitute a very large and heterogeneous group of illnesses, ranging from mild to life threatening forms. Every year, around 90,000 children are born in Belarus, of whom 800 have a congenital heart condition. Every year, almost 1000 children, of whom 100 are newborns, undergo operations in the Centre for Paediatric Heart Surgery in Minsk (РНПЦ “Кардиология”).

Paediatric cardiologists accord great importance to disorders of heart rhythm and conductivity, which are on the increase. The gravity of these arrhythmias depends on their frequency, and the likelihood that they will become chronic, with the

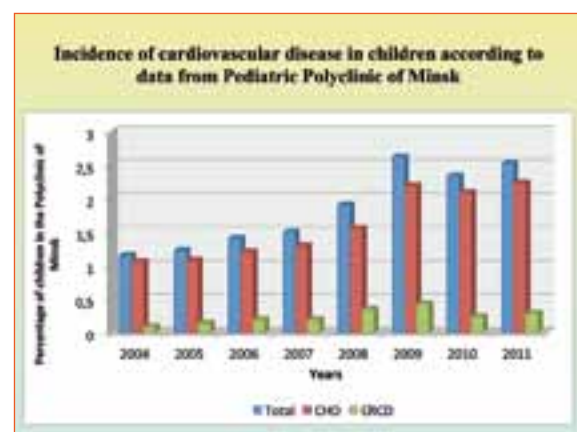


risk of sudden death. Some rhythm or conductivity disorders are also seen in children who are in “good health” [13]. Since 2008, in the course of our work as paediatric cardiologists during medical examination of children and adolescents, the cardiac rhythm disorders that we encounter most frequently are: migration of the rhythm stimulator, sinus brachycardia, shortened PQ phenomenon, auricular rhythm and extrasystoles.

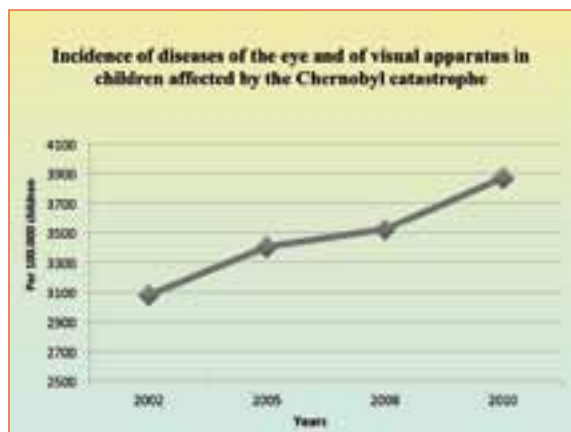
When we were in Gomel in 1995-1996, doing check-ups on children who were in good health, in crèches and schools, we began to see rhythm disorders on electrocardiograms. We were seeing partial right bundle branch block of the Bundle of His, sinus bradycardia, extrasystole and other conditions.

Currently, we are having to deal with the increasing incidence of complex problems of rhythm and conductivity, problems which previously we saw in adults. These problems require corrective medical treatment including sometimes the insertion of a pace maker.

According to statistical medical data from the Paediatric Clinic in Minsk, the number of children with heart problems has increased significantly – more than doubled - between 2004 and 2011. In first place are congenital heart malformations, cardiac rhythm disorders and disorders of the circulatory system such as myocardiodystrophy. [14]



Here is another illness to which I must draw your attention: eye problems in children. Doctors working in the contaminated zones report increases in the frequency of cataract in children. This is a condition rarely seen in children. This slide shows all the various disorders of the eye and related organs in children who are victims of the Chernobyl accident. [7; p150] [8].



Conclusions

On the basis of this presentation, three major conclusions can be drawn.

It is clear that children's health continues to deteriorate in the post-Chernobyl period in Belarus.

The major concern is the increase in primary morbidity, notably disorders of the circulatory

system, cancers, congenital anomalies and malformations, and eye disease in children affected by the Chernobyl accident.

Given the dreadful situation that has arisen in terms of children's health in Belarus it is imperative that concrete action be taken by the Ministry of Health of Belarus, regional public health authorities, radioprotection experts and scientists, with a view to developing and introducing preventive measures and treatments for children who are ill and who live in such an unfavourable ecological environment.

In conclusion, I would like to end my presentation with this prayer from a paediatrician:

I approach the word without illusions.
I do not see life through rose-coloured spectacles,
But for the hundredth time, I beg you:
"Letting kids die is not the best thing to do!"

Thank you for your attention. ▶



References

Note. The data presented in this article are official medical statistics of Belarus.

- [1] Nesterenko V.B. from Information Bulletin N.24 – M.2003. Document presented at the 7th International Scientific and Practical Conference – Grodno, 26-28 octobre 2011.
- [2] Korzun V.N. Prevention measures in relation to internal radiation of the body from chronic ingestion of radionuclides of cesium and strontium. Discussion of doctoral thesis.– Kiev 1996, p. 293.
- [3] Zharko V.I. A summary of the work undertaken by public health institutions in 2009 and major action programmes in 2010 Du bilan des travaux des organes et des institutions de santé publique en 2009 et des principaux programmes d'action en 2010 / V.I. Zharko/ Problems of organization and computerization d'organization et d'informatisation – 2010, N°1, p. 4-19.
- [4] National statistical committee of the Republic of Belarus, Children and youth in the R.B, Statistical book, Minsk 2012, p.29
- [5] National statistical committee of the Republic of Belarus, Minsk 2011, General indicators of population reproduction, p.123.
- [6] Report of the Vice Minister of Health R. Tchesnoït. Analysis of the state of children's health in Belarus in 2009.
- [7] National statistical Committee of the Republic of Belarus. Population health in the RB. Statistical book - M.2011.
- [8] Strategic programme for public health progress in Belarus, 2011-2015. Approved by the Minister of Health of the Republic of Belarus. 14.10.10.– Minsk 2010, p. 213. – p.18
- [9] Malignant neoplasms in children in the Republic of Belarus: Morbidity, survival, mortality and palliative care. N.N.Savva, A.A.Sborovskaya, O.V.Aleinikova. – Minsk: ГУ РНМББ 2008. – p. 184
- [10] Ministry of Health of the Republic of Belarus, Population morbidity: Incidence of malignant neoplasms in the population of regions of the Republic of Belarus – 9.12.2010
- [11] Population health status and organization of health care in the Republic of Belarus. Statistics of the Ministry of Health of Belarus – 1 December 2009. <http://stat.med/by>
- [12] Rozhko A.V. The Chernobyl catastrophe: medical and biological models, development and prediction of thyroid problems in the population. Discussion of doctoral thesis – 2011, Moscou, p. 326.
- [13] M.N.Chkolnikova Lethal arrhythmias in children. Minsk, p.231
- [14] G.S.Bandazhevskaya. Incidence of cardiovascular disease in children: data from the Paediatric Polyclinic of Minsk.

Implementation of radioprotection for local populations. The radio-ecological atlas; human beings and ionising radiation



Alexei Nesterenko (Belarus), Director, Belrad Institute

Dear colleagues and friends, it is an honour to present to you today the modest contribution that our institute makes to help a small number of children in Belarus. They are continuously exposed to radioactivity, and the consequences of this exposure which have been described to you by Dr Galina Bandazhevskaya.

I would like to thank the organizers of the Forum and express our admiration for their tenacity in holding the Hippocratic Vigil, just 200 metres from here, in front of the WHO, the organization with ultimate responsibility for health worldwide.

And I would like to express my deep gratitude to the organization that has supported us for so many years, the Franco-Belarusian association, Children of Chernobyl Belarus (*Enfants de Tchernobyl Bélarus*).

We have been working in the area of radioprotection of local populations for more than twenty years and are in a position to generalize from that experience and present a summary of what we have learnt. As long as children live in contaminated areas and eat food that is produced locally and contains high levels of radionuclides, they need constant radioprotection.

Much has already been said today about the consequences of the Chernobyl catastrophe in Europe and in Belarus and data has been presented on the levels of radionuclides in our country. Suffice

to say that out of ten million inhabitants living in our country, Belarus, two million live in areas that are contaminated by radionuclides from Chernobyl, the most significant of which is cesium 137. Below is a map of the radiocontamination of Belarus.



I would like to draw your attention to something on the map that tells us quite a lot about the situation in our country. You can see that a large part of the territory is shown against a white background. This does not mean that there are no radionuclides. Simply, the point of departure adopted by Belarus to illustrate the scale of contamination is 1 curie per square kilometer. Thus, any measurement between zero and one is shown as white.

The beginnings

Our institute was set up by my father, Professor Vassili Nesterenko, who prior to 1986, worked in a very different field.





He was a very well known physicist working in the nuclear industry. He even invented the first mobile nuclear reactor in the world. But, as he explains himself, he had a crisis of conscience in 1986 - in particular when he witnessed the evacuation of children from Braguine at the end of May 1986. It brought back powerful memories from his wartime childhood. He often said that humanity was not ready for the use of nuclear power, whether peaceful or military. Following these events he devoted his life and work to the protection of children from the threat of nuclear contamination/protecting children from the nuclear threat.

What is the work of the Institute? When the Institute was first set up, the main problem was the complete lack of credibility of the information emanating from the government. Exactly the same thing is happening in Japan today.

Our main task therefore, was to provide people with the means to control their own environment.



With this in mind, we developed a simple measuring instrument which became known as the “people’s dosimeter”. This was to allow them to see for themselves what was happening in their vegetable gardens or in the forest nearby so that they would have some basic information on the problem.

Development and production of dosimeters and radiometers



The next step was to make more sophisticated instruments that could measure food products. You can see in the slide on the right hand side, the instrument for measuring food and other materials,



and the “people’s dosimeter” on the left. After that, we needed to educate and train people. They needed a place where they could come for advice and information.



Setting up and running local centres for radiological control

With this in mind, a network of 370 public laboratories was set up in 1993 for the radiological control of food products in all contaminated districts of the Republic. They were mainly set up in schools. Children actively participated in the work of the laboratories, they collected samples themselves, gained knowledge and even instructed their parents with some success.

It should be noted that until 1994, all 370 centres were supported by the State, which, for that time, represented a significant victory for Belarus. But from 1994, government support ceased, for all the reasons we know. At the moment, there are only

eight centres, all supported through sponsored projects. More than 800 local people have been trained over the years to operate this equipment, and this is just for work with the local population. The equipment is also used by agricultural and industrial enterprises.



Radiological monitoring of children: HRS laboratory and pectin

The next step in our work was to monitor the radioactive load in people's bodies. The photos below show how this is done. We have eight of these instruments for human radiological spectrometry (HRS). These are called whole body counters (WBC) in English.



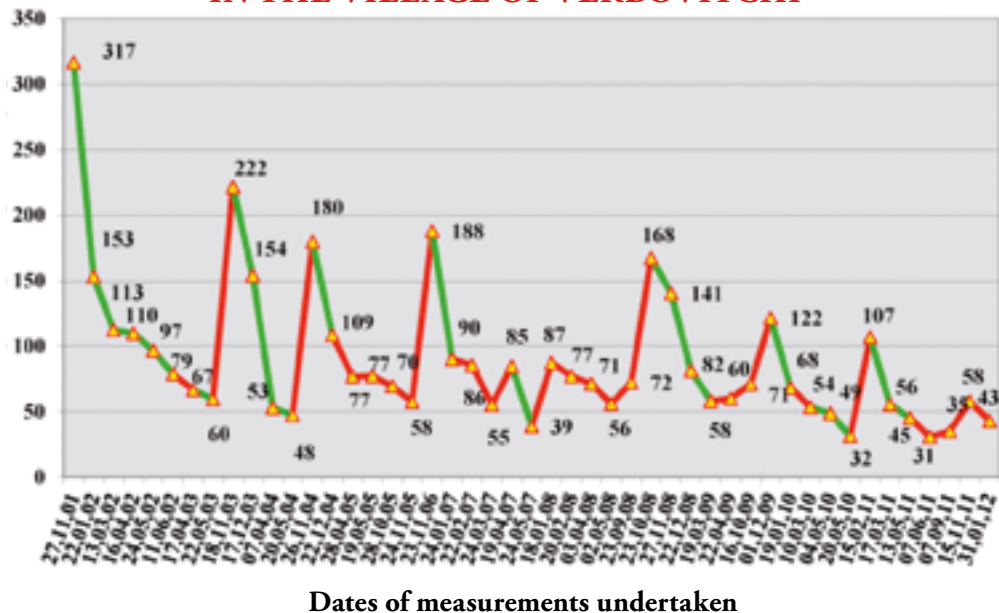
The next step was obvious: we knew that food was contaminated. We could not evacuate the children nor give them money so that their parents could buy them clean food. We knew that children's bodies contained radionuclides. How could we help them? We undertook a long research project to identify enteroadsorbents - substances that are able to fix and then eliminate radionuclides from the body. We worked with different producers. In the end, we developed our own preparation based on apple pectin which we have used for many years and which we distribute among children in our country and in the Ukraine.



These products come in different forms, either in a powder or in a pill. The following graph demonstrates their effectiveness.



CHANGES IN AVERAGE SPECIFIC ACTIVITY OF CESIUM 137 IN CHILDREN'S BODIES IN THE VILLAGE OF VERBOVITCHI

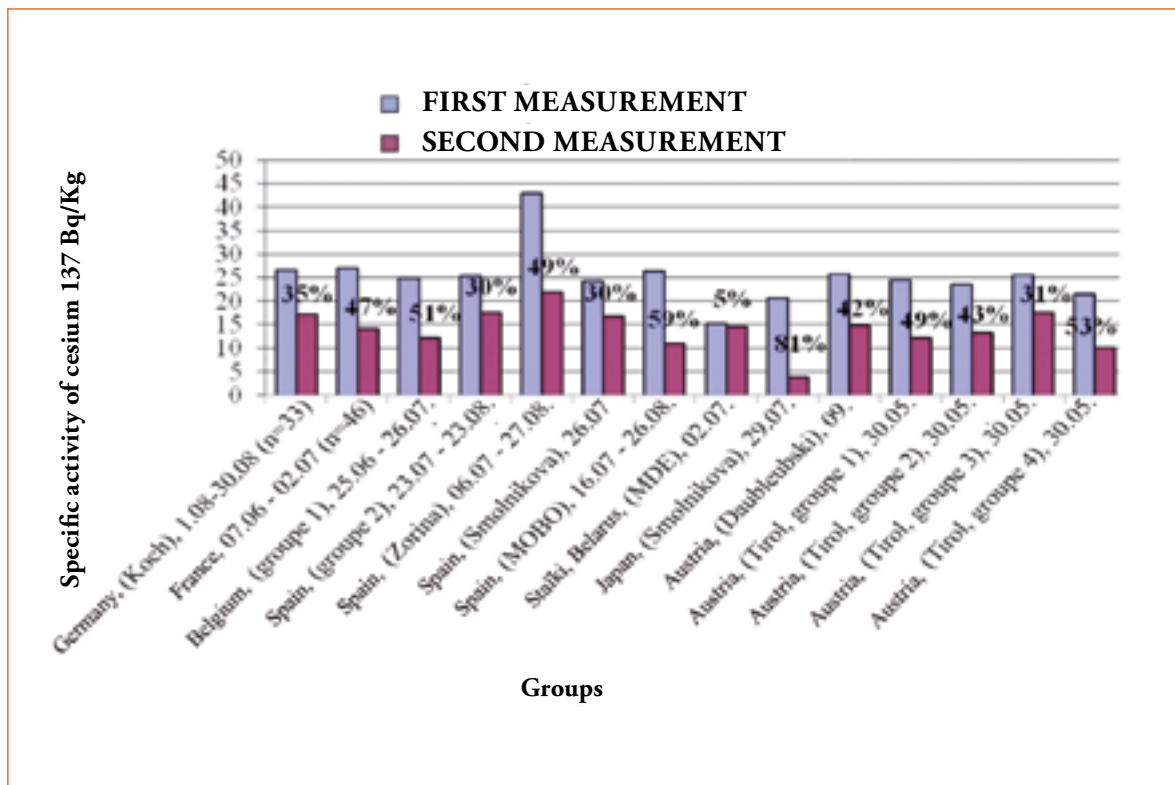


We worked for many years in the village of Verbovitchi in the district of Narovlia in the region of Gomel. The green segments in the graph indicate the periods when the pectin product was taken and the red segments correspond to seasonal peaks in consumption of mushrooms and breaks in pectin treatment for lack of funds. You can see that through this procedure, it is possible to significantly reduce radioactive load in children's bodies through elimination of radionuclides even if they



live in a contaminated area. In addition, with the support of humanitarian associations, our Institute organizes convalescent periods for children outside the country and in Belarus, mainly in summer and this also achieves results.

If a child consumes clean food, and takes vitamins and the pectin product over a period of one month, it is possible to eliminate up to 60%, sometimes even 80%, of radionuclides from her/his body.



Methodology

Let us look at a practical example of radioprotection of the population at local level: the work of the Institute in the district of Narovlia in the Gomel region. From 2001 to 2003, we implemented a radioprotection programme for 1400 children in three schools of Narovlia and in eight village school in the district, with the support of the French association “Enfants de Tchernobyl Bélarus” (Solange and Michel Fernex) and the Belgian association “Enfants de Tchernobyl” (Charles Deleuse).

Initially, in 2001, the children in Narovlia had concentrations of cesium-137 below 1653 Bq/kg in their bodies; in Golovchitsy – below 1308 Bq/kg; and in Kirov – below 1993 Bq/kg. The children then received 4 to 5 cycles of radioprotection treatment consisting of 4-5 pectin cures and 8-10 WBC measurements (Whole Body Count measured with a radiospectrometer before and after taking the pectin preparation). After each measurement, staff from the Belrad Institute for Radiation Safety held meetings with parents and teachers to examine the results. There were a large number of families who were drinking milk from their own cows, in which the children had levels of between 600 and 800 Bq/l.

For these families, Charles Deleuse obtained 25 household milk separators in Minsk, and these are able to reduce levels of radioactivity 6-8 fold. WBC measurements showed that levels of cesium-137 were subsequently 3-4 times lower in these children.

Training seminars were held and all parents and children received the booklet “How to Protect Yourself and Your Child from Radiation” which contains practical advice, including how to reduce the levels of radionuclides in wild fowl, mushrooms and fish, before they are cooked, such as by soaking these foodstuffs for two periods of 3-4 hours each in salted water (two tablespoons of salt and one tablespoon of vinegar dissolved in 1 litre of water). Other measures, such as having two visits from the mobile WHC laboratory each quarter, establishing local centres to monitor radiation in food, and quarterly educational seminars in schools, have led to a reduction of the average specific radiation burden in children from eight villages and two schools in Narovlia.

Thanks to the continuing financial support of the Association “Children of Chernobyl Belarus” (France), we are able to continue administration of pectin cures twice yearly, and have seen the radiation burden decrease by up to 30 Bq/kg.

The results from the programme have shown that it is more effective to administer a quarterly cycle, in which pectin is taken for a month, followed by a two month break, and so on, four times a year. Quarterly public discussions of the results of WBC measurement, identifying the critical group of children with high Caesium-137 levels in their bodies, and then working with the parents, contribute to more effective radioprotection for the children.

The WBC measurement of children during each cycle of the intake of pectins is an effective way to determine the most irradiated children, and draw the parents' and teachers' attention to them. Such children should be sent for recuperation in uncontaminated regions as often as twice a year, and the entire programme of radiological protection should be made available to them.

It should be noted that the highest levels of radioactive load are found in children of the most socially vulnerable groups. For example, in families where there is alcohol abuse, in single parent families, etc., when children are left to themselves, or if they spend a lot of time in the forest, if they gather and consume more berries or mushrooms. The result is that sometimes their levels can be up to ten times higher - even one hundred times higher - than other children in the same school or village.

Informing the population

People must be informed about what they are eating, about their local environment and about what is happening in terms of their radioactive load. And they must be able to understand all of this information and draw precise conclusions.

Unfortunately, the trend at the moment is to forget about the problem of Chernobyl. Twenty-five years have passed. Our government declares that radionuclides, thanks to their political wisdom, are now disintegrating more rapidly. However, just this year, in one of the districts of the Republic of Belarus, radioactivity of 268,000 Bq/Kg was reported.¹ According to various norms, this is comparable to and even exceeds many kinds of nuclear waste. These are not food products, these are poisons.

Our Institute works actively to inform the population. We have developed a large quantity of information brochures, films, and in a moment, my colleague will present the book we have developed for the general public "*How to protect yourself and your children from the effects of radioactivity*" that has already been published in Japanese and is now available in French. We hope that our sad experience will be of interest to the French speaking population but that, in your lifetime, you will not need it.

Radio-ecological atlas: human beings and ionising radiation

Another interesting part of our work that I would like to describe to conclude this presentation, is the Atlas of Radioactive Contamination of the Population. These maps do not show the contamination of soil but of the bodies of children in Belarus. Hundreds of measurements and analyses have been collected. They constitute the sum of our work and unfortunately, what they reveal is that if nothing is done to protect the population from radioactive contamination, if we do not help them, if we do not work with the local people, we cannot speak in terms of *improvements* in the situation, even in the radioactive load in people's bodies.

"The Radio-Ecological Atlas: Human Beings and Radiation" is based on the "ATLAS" project and is a systematized analysis of whole body count measurements of cesium-137 radionuclides, which were performed on children in villages in the following nineteen districts of the Chernobyl region of Belarus between 2001 and 2007.

The ATLAS presents an analysis of the results of measurements performed in settlements of the following nineteen districts of the Chernobyl region:

1. Gomel region: Bragin, Buda-Koshelevo, Vetka, Dobrush, Yelsk, Zhitkovichi, Kalinkovichi, Korma, Lelchitsy, Loyev, Narovlya, Rechitsa, Rogachyov, Svetlogorsk, Khoyniki and Chechersk districts.
2. Brest region: Luninets and Stolin districts.
3. Mogilyov region: Krasnopolye district.

1. Data from measures undertaken in 2012 by the Belrad Institute, Minsk. On 23 September 2009, Pravda dei Komsomol of the Region of Smolensk (on the page devoted to Belarus) had already announced: *150 kilos of mushrooms gathered in the forests in Gomel region are dangerous for health*. "Veterinary service staff have withdrawn the dangerous mushrooms from sale. In line with regulations, these chanterelles must not just be disposed of in ordinary rubbish bins but must be buried in special containers as dangerous waste. Oléssia TOMACHOVA".

As the Institute continues the monitoring of radiocontamination in children, the atlas is regularly updated to include the new data. First, the results of **154,459 measurements** for the period 2001 to 2007 were collated and analysed. Later on, the atlas was extended to incorporate the results of measurements performed between 2008 and 2011, which included the results from the Cherikov and Slavgorod districts.

The analysis of results for each village is based on: data on the village taken from the Dose Catalogue of the Ministry for Public Health Services of the Republic of Belarus 2004; an average of specific activity of incorporated Caesium-137 in the whole and critical group (group consisting of 30 children in city schools and 15 children in rural schools having maximal values of Cs-137 specific activity according to the results of measurements); a median value in the whole and critical groups; an interval distribution diagram of the accumulation and maximal values of cesium-137 specific activity.

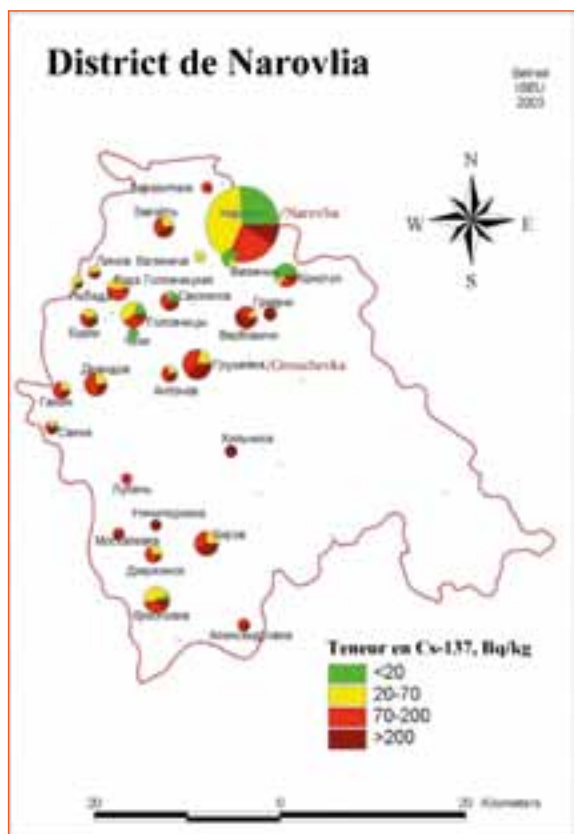
In many settlements the measurements were taken regularly over several years. On completion of the analysis of measurements, a graph showing the trends in average Cs-137 specific activity was produced for the period in question. The analysis of all the data received permits the identification

of trends over time and the variation according to time of year, different age groups and so on.

By processing the results, maps showing the levels of Cs-137 radionuclide contamination of children in fifteen districts were created. The areas where the work had been carried out are represented by different colours: green shows a Cs-137 concentration of 0 to 20 Bq/kg; yellow, 20-100 Bq/kg; orange – 100-400 Bq/kg; and red – over 400 Bq/kg. The size of each coloured area depends on the number of measurements that were taken: less than 20 measurements, 20-50, 50-100, 100-500 and more than 500. The diagrams are based upon the results of the last measurement carried out in the village. If there is more than one educational establishment in one village the results for the given period are added together and that is the figure used for the diagram.

The projects “ATLAS-2” and “Prompt Radiological Assistance for the Children of the Chernobyl Zone of Belarus” were a logical continuation of the original ATLAS project. The purpose was to update the Radio-Ecological atlas with the new data, and provide comprehensive and prompt assistance in those settlements where an adverse radiological situation was discovered in the course of radiation monitoring. It should also be mentioned that the ATLAS was subsequently extended by including the data received as a result of activities carried out as part of other projects and work carried out by the Belrad Institute. Today the ATLAS presents the systematic analysis of the results of more than **300,000** measurements.

On the basis of the measurements taken between 1997 and 2011 in the settlements where the Belrad Institute was working, we can identify three distinct groups of areas where the outcome has been completely different. The first group comprises those villages in which the situation has improved significantly i.e. the levels of radionuclides have been reduced, with the consequence that radiation doses have similarly been reduced. These improvements were brought about by the radioprotection measures taken by the State and the work of the Belrad Institute. The second group is made up of the villages where the radiological situation has remained the same. The third group consists of the villages in which the situation has got worse. It should be pointed out that, in these cases, the deterioration happened as a direct result of particular local conditions, as a consequence of, for example, an abundant crop of (contaminated)



mushrooms. And those successes that we have had give us confidence that we are moving in the right direction and will achieve even better results.

The Belrad Institute has never considered its methods of radiological protection of the population to be the only solution or to be a panacea for all disasters. On the contrary, we are well aware that our work is just a small part of what needs to be done. Positive results can only be achieved by using a whole series of protective measures, such as:

monitoring of radiation in the environment, food and populations; medical examinations; administrative measures; rehabilitation of contaminated areas; the application of modern methods in agriculture and forestry; education; use of radioprotectors for the quick elimination of radionuclides from the bodies of people and dairy and beef cattle and so on. In this context, the experience and the scope of activities performed by the Belrad Institute could be extremely useful.

Thank you for your attention. ▶

From Chernobyl to Fukushima – A Practical Guide to Radioprotection



Vladimir Babenko (Belarus), Vice-Director of the Belrad Institute

Ladies and Gentlemen, Dear Friends! As Alexei said, it is a great honour to participate in this Forum.

In 2009, colleagues in Germany told me that interest in Chernobyl was waning and that it was becoming more and more difficult to make analogies between Chernobyl and the future of nuclear power in Germany, France and other countries. But in 2011, Fukushima dramatically re-awakened memories of Chernobyl. Twenty five years have passed and today, it is Chernobyl and Fukushima together that put in question the future of nuclear reactors on the planet.

Twenty-five years is a period that allows us to analyze, to ask ourselves what we have achieved, what have we done to mitigate the consequences, and what lessons we have learned. Fukushima showed that the conclusions are scarcely encouraging. Humanity has learned nothing from the Chernobyl catastrophe. I used to think that the reason why the consequences of Chernobyl were so serious was the political regime in the USSR at the time. But Japan has a completely different regime and system, a different economy, a different geographical position, other traditions. Everything is different but the mistakes are the same as 25 years ago. The main mistakes lie in the attempts to hide information about the real dimensions of nuclear catastrophe, the attempts to minimize the extent and to hide the truth and the facts. The behaviour of the authorities in both cases led to a total lack of

public confidence in official information. When a population does not believe official information, it encourages conjecture and rumour and this leads to serious psychological consequences. In Belarus, we only learned about the real dimensions of the Chernobyl catastrophe in 1992, six years after the event. Even now, certain aspects remain hidden such as the material used and certain details relating to the construction of the reactor.

Because of the attempt to hide and falsify information, much time was lost. For example, if stable iodine as prophylaxis had been distributed, perhaps the question of thyroid cancer would have been less critical. Also, it was perhaps a mistake to invest so much money in construction. We built houses and apartments for evacuated people in places where they should never have been allowed to live, places from which the inhabitants themselves should have been evacuated. One example is the village of Grouchevka in the district of Gomel, where an entire street was built for immigrants. No one can live there. Contamination with cesium 137 reaches 10 and 15 Ci / km². The inhabitants should be evacuated. In 1999, we took measurements in children. The accumulation of incorporated radionuclides of cesium 137 in the body exceeds 1000 Bq/Kg: 1003, 944, 839, 808 etc.

In Japan, I met people whose opinion on the problem of Fukushima is completely different. I met people who behave as if nothing happened, as if there was no Fukushima. "We will live as we have always lived". They are far more upset about the consequences of the natural catastrophe. I have even met people who believe that Fukushima was destiny – a disaster sent to test them. They must confront this difficulty with willpower, force of character, perseverance. However, most of the people I met in Japan were very worried about what has happened. They believe that Fukushima is a huge problem that must be resolved, that it is essential to minimize the negative impact of ionising radiation on human beings. They want to raise their children in good health, a perfectly natural desire, it seems to me. Fortunately, this is the majority. This means that action will be taken and there will be positive results.

After the Fukushima accident, the Japanese population did not have adequate knowledge about ionising radiation, nor instructions on what to do in case of a nuclear accident, no books, no information material allowing them to understand the situation nor to take the most elementary radioprotection

measures. This is the reason for the enormous interest that the Japanese have shown in the experience of Belarus in mitigating the consequences of the Chernobyl catastrophe. This is the reason for the interest in the book *"After a nuclear accident: A practical guide to Effective Radioprotection"* translated and published in Japanese and French (*it is currently being translated into English, German and Norwegian*).

This little book was written and published in Belarus in 2003. At Belrad we are convinced that education and information programmes are just as important as radiological follow-up of people, food, all components of the biosphere and other measures of radioprotection.

The book is not didactic material. It was designed for people living in villages contaminated by radioactive substances, for school children and for students as a manual to complement courses taught in school about non-dangerous activities. It can also be used in optional courses, in radioprotection groups, or for self instruction. The most difficult thing was to present the subject in a way that would be understood by the majority of villagers. One day, someone told me "But this book is for housewives", I understood that we had achieved our objective. If housewives understand what is written, then we have accomplished the necessary.



[Laughter and protest from the audience].

The book is made up of several sections. The first section provides basic information about atoms, the nucleus and radioactivity. The concepts of natural and artificial radioactivity and ionizing radiation are presented. A short analysis follows of the contamination from the Chernobyl accident but the most important thing was to explain to people why and how they should measure radioactivity in the human body. Because when we started our work, many people asked us if it was dangerous. They feared that that we were irradiating them when we measured them with the spectrometer. All that had to be explained. In addition, we had to teach them how to cultivate their vegetable garden under conditions of radioactive contamination, give them advice on how to eliminate radionuclides when preparing and cooking food. In short, in 2003, we were convinced that people were terribly lacking in information.

In Belarus many houses are still heated with wood stoves. The burning of wood from contaminated zones results in radioactive substances being concentrated. Let us suppose that one cubic metre of wood produces a handful of ash. This ash is thrown onto the vegetable garden as fertilizer. We had to

teach them these elementary things. In 2003, we had acquired some experience; we knew what people were interested in. Working there several years, we were convinced that the people trusted us and that is why the book came out in 2003.

The problem of the Chernobyl catastrophe is here in our country and it will be here for a long time. Much of what is presented in the book is based on the practical work of our Institute. We go regularly into the Chernobyl zone, we work with the people, we measure the food products and the people themselves, we organize seminars, conferences and meetings. We have never thought that the work of our institute is the only approach or the universal panacea. We are well aware that in order to obtain positive results a number of problems need to be resolved. In relation to radioprotection, I would say that there has to be continuous monitoring of food products and people, that medical controls are necessary, ie everyone's work is necessary, for example the government, should for example forbid the gathering of mushrooms in contaminated areas and guarantee supplies of clean food through commercial networks. There is also the important question of standard of living. Because as Alexei Nesterenko has said, in general, the lower the standard of living, the higher the contamination.

The level of accumulation of radionuclides in people's bodies and the radiation dose received represent the basic criteria for evaluating efforts to mitigate the consequences of the catastrophe, although I agree completely with Professor Yablokov when he says that dose is a value which does not objectively represented the real state of affairs. It is a calculated value. Apply one method of calculation and you get one result, apply another and the results will be different. It is a calculated value which depends on the subjectivity of those who calculate whereas the actual load of radionuclides in the body is a measured value. However the starting point for radioprotection measures is represented by radiological follow-up of the population and by the annual limit of 0.1mSv/year.

Point 12 of the executive conclusions of the 2003 Recommendations of the European Committee on Radiation Risk states: **"...The total maximum permissible dose to members of the public arising from all human practices should not be more than 0.1 mSv with a value of 5 mSv for workers"**. This publication is presented by the European Committee on Radiation Risk as a "recommendation". Common sense tells us

that we should take seriously the advice provided in this publication by scientists from Canada, Norway, Great Britain, Germany, France, India, Belarus, Finland and Russia. Thank you for your attention. ▀

DISCUSSION 2

Points raised

Exposure to radionuclides through inhalation – Thyroid and heart disorders – Latency period of illnesses – Heart disorders in children and radioprotection in Belarus – Respiratory illness and evacuation of children in Japan – Pectin – Hidden data – Training health professionals in France – Distribution of iodine in Poland and Belarus

Comment

Chris Busby, chemist and physicist

I would just like to make a comment on internal exposure to radionuclides through inhalation. In Japan, we measured the concentration of cesium in more than 20 air filters from cars, from South of Tokyo to quite near Fukushima. We observed extremely high levels of particles containing cesium and other radionuclides, and it was a long time after the accident. We know from work we have done in Iraq and other places that once these particles have been deposited in an area they will turn up again in suspension in air filters over very long periods of time. More than a year after, in Kosovo, we found radionuclides suspended in air filters. This is one of the most important things to understand particularly because you get a much higher dose through inhalation than through ingestion because the radionuclides go directly into the bloodstream through the lungs. It is essential that people understand that they must take the surface layer of soil and bury it; triple ploughing is required. You take up the surface of the soil, then you put this contaminated layer upside down underneath and then you put the clean layer on top.

Question

I come from a region that we call the Great Eastern part of France where we have been exposed to fallout from the Chernobyl cloud, and are still exposed to fallout from the ANDRA cloud. Everyone knows this national authority that tries to manage nuclear waste. The question is the following: Are there around Chernobyl – as I have noticed in our region – what I would call double victims, who have thyroid problems and cardiac arrhythmias simultaneously?

Reply

Galina Bandazhevskaya, pediatrician and cardiologist

From 1986, 778 cases of thyroid cancer were reported in Belarus, of which 342 were in Gomel, a region close to Chernobyl, 100 kms from the power plant. With regard to cardiac rhythm disorders, this information is available from the Ministry of Health. It is forbidden information. Nowhere will you find a statistic, a paragraph, indicating the existence of rhythm disorders in children, nor the number of cases. Only an overall figure is provided: “*cardiovascular disorders in children*”. Everything is included in this, heart defects as well as myocardial dystrophies. As far as rhythm disorders are concerned, I can only speak from my personal experience. At the moment, I work in a polyclinic as a cardiologist and I do checkups of children with heart problems. Among the 16,000 children attending this clinic, I have nearly 1000 children registered as having cardiovascular disorders and being followed up at the clinic. Nearly 1000 children! 60% of them have cardiac malformations, half of these being rhythm disorders.

I already mentioned in my presentation that at the beginning of our work in Gomel, we observed quite simple rhythm disorders in children otherwise in good health. So we started our first scientific work, and we noted that at some time in the future we would be dealing with more complex problems which would be difficult to solve. This is what we are seeing. Currently, these children - and there are a lot of them - need pacemakers. We have to give them invalid status. And invalidity is increasing. I

am not just talking about the polyclinic in Minsk, a town which is not considered part of the contaminated region of Belarus.

Question

I would like to ask Galina a question about her data because they start in the year 2000. Could you tell us what the base level was before Chernobyl and also, based on your data, can you calculate the latency period for each illness, for each disorder? I have a second question for the other speakers: would it be possible to display the information on radioprotection measures and reduction of radioactivity, so that we can see them? Because that seems to be very important.

Reply

Galina Bandazhevskaya

How to determine the latency period? In Belarus, we still have – since the Soviet era, a public health system that is reliable and competent. Once a year we do medical checkups on children, for prevention purposes. This includes examinations by medical specialists, neurologists, cardiologists, eye specialists, stomatologists etc. But to date, no doctor has managed to get measurement of radioactive cesium included in these preventive examinations. The latency period begins from the moment you have discovered cesium in the child's body. This is the moment to do a cardiogram – I speak as a cardiologist – and to undertake a thorough examination of the cardiovascular system.

The problem is that everything is hidden: we don't have illness induced by radioactivity, in particular in cardiology. Different risk factors are invoked, even saying that our children smoke too much - 28% in the table I showed you – that our children don't do enough sport. Undoubtedly these factors play a role in the development of cardiovascular disorders but we must not forget that our children have been exposed to cesium 137 for 26 years. This is the first risk factor that should be noted. That is to say, each child should be measured for radioactive load of each substance. Prevention should start with elimination of these radionuclides from the body.

Question

Wladimir Tchertkoff

Are there any spectrometers in hospitals?

Reply

Galina Bandazhevskaya

In no health centre, polyclinic, district or regional hospital is there a spectrometer to measure the load of cesium in the body, ie human spectrometers to measure radiation in the body. There are no RUG¹ to measure food products that our children eat in these same health centres, clinics or schools.

Reply

Alexei Nesterenko, Director, Belrad Institute

I am responding to the question about the possibility of getting information on radioprotection and the extent to which this information is disseminated. With regard to Russian language editions that we have produced, they are all freely available on our site². With regard to translations, for reasons of cost, we cannot do this ourselves. It is fortunate that this little book by Babenko³ has been published in French and Japanese. Some of our publications are in French, English and German on our web site

1 RUG: Gamma Radiometer designed to measure the activity of samples contaminated with cesium 137 and 134
http://belrad-institute.org/FR/doku.php?id=appareils_de_radiometrie

2 <http://www.belrad-institute.org/>

3 <http://enfants-tchernobyl-belarus.org/doku.php?id=contactez-nous>

and on the website of our Franco-Belarusian association “*Enfants de Tchernobyl Bélarus*”⁴. Please help yourselves, this is not a way of earning money, on the contrary, we want our experience to be shared as widely as possible.

Question

Eisuke Matsui, specialist in low dose respiratory pathology

I am Dr Matsui from Japan, a radiologist. I take care of patients suffering respiratory illness and lung cancer. I would like to know how medical experts – pediatricians, gynaecologists, cardiologists dentists, have worked together over these 26 years to protect children’s health. In Japan, about 30 doctors in the country, are in contact with each other in order to do this and your experience and your advice would be useful. It is vital that children be evacuated as a group to a region that is less contaminated, and for a long period of time. I would like to know how you planned and implemented such a project in your country.

Reply

Galina Bandazhevskaya

I will start with the question of the collective convalescence of children. 250,000 children still live in contaminated areas of Belarus. These children enjoy certain privileges. Twice a year they get rehabilitation for one month in prevention centres, in sanatoriums or abroad. These children get free food in schools or crèches. More in depth and detailed medical examinations are undertaken depending on the cohort of children. Children living in contaminated areas get a full check up. They are identified by a hidden code as *child victims of the catastrophe at the Chernobyl nuclear power plant*. They get an annual examination by specialists including a stomatologist, neurologist, eye specialist, pediatrician and cardiologist, and an electrocardiogram is obligatory. Obviously there is close collaboration between doctors. If an anomaly is detected somewhere, it is examined in more depth either at the hospital or at outpatient services of the polyclinic.

I cannot answer you on the question of the frequency of pulmonary illness at the moment because my speciality is cardiology and that is the organ system that I study in depth and detail. While preparing my presentation I saw that we do not have information or statistical data on pulmonary illness. We have only this: “*primary morbidity in children*”, which includes viral infections, bronchitis, acute bronchitis, pneumonia etc.

Question

This is the moment to address our thanks to the Ecumenical Council of Churches which has welcomed us. And I would like to pay homage to the extraordinary courage of both Bandachevezkys, Madame Bandazhevskaya and your husband. I pay tribute to your constant courage. In the Babenko book, you mention a medicine called Vitapect. What is this, what is it made of, who produces it, so that we can give this information to the Japanese? And in conclusion, I was interested and I studied the Polish and Soviet civil protection systems. I know that in the Swiss army, there were recommendations in the case of nuclear war; these were not made public, they were secret. What could be done through the intermediary of the Russian, Ukrainian or Japanese civil protection to help the population and to offer better education in schools? These may be naïve questions but thank you for considering them.

4 http://enfants-tchernobyl-belarus.org/doku.php?id=notre_association

Reply

Galina Bandazhevskaya

I do not know if these secret data exist in the Security Committee of the State. But I do know the extent to which statistical and medical data are falsified. I can give you an example. The regional public health committee secretly sent this message. *“To date you have filled your quota of invalids, so from now on, you cannot not accord invalidity status to any more children.”* So, this means that we have plans for a certain number of one year olds that we have the right to register. And if we exceed that number in the framework of these plans, they will not be taken into account in statistical reports. Let us look a little further. I am a cardiologist. I have 1000 children registered at the health centre. It is physically impossible for one person to do a complete health evaluation of this number of children. This is why, at the centre, we only register the most complex cases of children with problems. All the others, who have the same cardiovascular problems, are left out. And those cases are not counted in the statistics either. Thus, you can only half believe these statistics. But despite the fact that the data is falsified, they convey part of the truth. You cannot hide everything. One day, it will come out. And we, doctors, we want people to know, so that they believe us and not the Minister of Health who says: *“You can live in areas that are contaminated with radionuclides. There is nothing terrible here. We live here, we have children and we will grow wheat”.*

For the question on pectin, Alexei Nesterenko will reply.

Reply

Alexei Nesterenko

The preparation⁵ is currently going through certification procedures in Japan. Afterwards, you can buy it yourself, as an individual, or through internet directly in Japan, this will be possible from the month of September.

Question

I am a simple French citizen. In relation to the book by Babenko *“Practical Guide for Effective Radioprotection”* I find that the question is well posed but there remains a question mark. I saw on the third page that life after a nuclear catastrophe is no longer really a good life. And I think that at this point in the discussion, in fact in relation to everything we have heard, it might be time for someone to say and I am giving myself that right, what is this nuclear energy, which creates so many problems, so much work to people trying of cure these children, trying to get them out of their situation in Belarus, a situation which is catastrophic. There is Chernobyl, there is Fukushima and then there is the EPR under construction in France. Now, probably we are next on the list, in the next book France will also feature. And I say to myself: the only effective practical guide on radioprotection will say that nuclear power must be rejected, we should leave the atom where it was, because, as everyone recognizes, it is simply diabolical.

Question

Véronique Ratel

I am a French citizen, a physical education teacher and sportswoman. I can no longer teach in my area of expertise. In 2007, I tried to set up a radioprotection project of a class in radioprotection, because my school was 35 kms from the nuclear power plant of Nogent-sur-Seine: I was blocked at the level of national education authority. This is really serious. Now, I try to inform health professionals, as best I can, And it is very difficult. The information does not pass. Health professionals in France are trained in a very narrow way in the field of radioactivity: roughly two hours of courses. In France, there is a huge problem of denial. The Chernobyl cloud's passage over France was denied. In

5 <http://www.vitapect.eu/>

France, there has been an explosion of thyroid problems: Levothyrox is the second most prescribed medicine, after paracetamol. If French health professionals are present in the room I would ask them to say a few words, to ask Galina and Yuri Bandazhevsky and the Japanese some questions, so that they can share this information with colleagues and in their scientific French journals.

Question

I am a health professional and I would like to ask a question about iodine tablets. Apparently in Poland after Chernobyl, iodine was widely distributed to several million people. Is that true and what were the results? Because I believe it was the only country in the world where there was protection with iodine tablets.

Reply

Michel Fernex, Emeritus Professor, Faculty of Medicine of Basel.

When Chernobyl happened, Professor Vassili Nesterenko requested that certain measures be implemented. One of the measures was evacuation in a 100 km radius and the other was the distribution of iodine. The request passed through the authorities in Moscow of course. Both measures were refused. The Polish authorities who knew Nesterenko, phoned him and asked him what they should do. Nesterenko's reply was distribution of iodine to children immediately, perhaps to women in certain circumstances but the children immediately. And the Polish took the initiative extraordinarily fast mobilizing everyone, postal workers, school teachers, the police, the army, everyone and they distributed stable iodine – so iodine potassium in different forms, in doses of about 100 mg of potassium salt – to 10 million children. It's fantastic. It was done in record time. And they distributed that also to nearly one million adults, women. Professor Baverstock, - who at the time was at the WHO before he was moved aside – did a study on tolerance after this iodine distribution⁶. There were no secondary effects worthy of the name. There you are. What is much more difficult is the epidemiological result because in that case, you can only speculate and Baverstock estimates that 2000 thyroid cancers were avoided but these are not scientific data while the data on tolerance is scientific. And it's important for us. Which does not prevent me from asking Japan, why, at the time of the accident – and it was the right moment – why stable iodine was not distributed at the very least to all children in a wide radius?

Reply

Galina Bandazhevskaya

At Chernobyl, no one took the tablets for a week. On 26 April there was the accident and the people went to the May Day celebrations. With the children with flags, they celebrated and they demonstrated their devotion to work. As far as iodine tablets are concerned, we didn't know you were supposed to take them. Firstly because information about what would happen in the case of an accident was hidden and secondly because the government told us that there is nothing to worry about in relation to any radioactive emissions. People who didn't want to go on the demonstration were forced to go. After ten days or so, doctors themselves began to take medicines and give it to their children.

Comment

Yuri Bandazhevsky, Anatomopathologist

Just a word about iodine. I make this comment as someone who has total responsibility for people's health protection in contaminated areas. In 1986, official authorities undertook neither protection measures nor prophylaxis with iodine. For a long time, Gorbachev and his government hid information through every possible means. This is why no one, no doctor, no scientist, spoke about any kind of prophylaxis with iodine in 1986-87. It just didn't happen. That is the truth. I don't know what

6 http://www.who.int/ionizing_radiation/pub_meet/Iodine_Prophylaxis_guide.pdf

Baverstock or other scientists wrote. I know what I know. I'm a witness because I worked in these areas with my colleagues.

I would not like it if with time history and real facts got distorted. That is why we published a series of books in Japanese, French, Italian and Russian where we tried to present objective scientific information about what is happening and what happened in the contaminated area. I would ask you to be very careful, because after a certain time false information no longer allows us to set up a real protection programme for the health of the people in the case of new radioactive calamities.



4. Management of the catastrophe by the authorities and its effects on society

Moderator: Eric Peytremann (Switzerland) committee member, ContrAtom

The health impact on Corsica of the accident at Chernobyl: an independent epidemiological study finally set up



Dr Sophie Fauconnier, (France) physician author of studies on the health impact of the Chernobyl accident in Corsica.

A) The arguments against the health impact of Chernobyl on cancers of the thyroid

The number of cases of thyroid cancer in France has risen sharply, in fact exponentially, since the end of the 1970s: [1] The figures rose from 1.5/100,000/year in 1975 to 2.5/100,000/year in 1985, then 4.5/100,000/year in 1995, and finally 8.15/100,000/year in the period 2002-2006. The incidence in Corsica was 9.8/100,000/year in the period 1998-2001.

In the scientific literature, as well as in the press, experts regularly put forward their arguments dismissing the impact of Chernobyl on diseases of the thyroid. They are careful not to mention the occurrence of other supposedly benign thyroid diseases: thyroiditis, goiters (GMHN), nodules, malfunctions... We shall examine their arguments one by one:

It is claimed that: "the increase had begun prior to 1986"

Yes, but... With regard to the slight increase that happened before 1986, around the end of the 1970s,

it should be remembered that thyroid ultrasound had just been introduced at that time and it is not unusual for a new screening technology to create an increase in reported cases, at least temporarily.

Logic would dictate that after such a rise in incidence, there would follow a levelling off in the number of new cases, rather than an increase in the rise.

It is claimed that: "some less contaminated regions have had a greater increase in cases of thyroid cancer than eastern France has had". In the department of Calvados, which was less contaminated, or in the Tam, there were greater increases than in Eastern France and Alsace.

Several points need to be emphasised: The department of Isere, which keeps a register of previous cases of cancer, saw the greatest increase in the incidence of thyroid cancer, with an 800% increase over 20 years, bringing it up to the same high level as Corsica for the period 2003/2006.

Calvados, regularly put forward as an example, is part of Lower Normandy which is home to an extensive dairy industry. It should be remembered that Lower Normandy is surrounded by nuclear power plants. *Milk and dairy products are the principal carriers of radionuclides after a nuclear accident.*

At the beginning of May 1986, the west and south of France were enjoying relatively mild weather. In Eastern Europe and in the east of France, the herds of livestock were still being kept in their sheds, being fed on hay, silage and other feed gathered the year before.

In areas where the climate is milder, animals are put out to pasture. In Corsica, the animals - cows, sheep and goats - always graze freely, they are almost never fed in the stables, and therefore exposed to greater amounts of iodine contamination. With spring coming early, the gardens were starting to produce radishes, leeks, dandelions, asparagus, but especially broadleaf vegetables, such as lettuce and chard, which absorb large amounts of radioactive particles, especially when they are dispersed in dry weather, by drizzle or mist.

It is important to distinguish between different ways in which radionuclides are deposited, depending on climatic conditions.

Rain or heavy showers during the passage of a radioactive cloud lead to high levels of radionuclides **in the soil** and subsequent testing found a large amount of Caesium-137.

In the case of dry weather or fog or drizzle, it is mainly the **exposed parts of plants** and pastures that are contaminated with a cocktail of radionuclides, resulting in rapid contamination of animals, dairy products and vegetables.

Any farmer intending to spray with insecticides or herbicides takes account of the weather: rain will "wash" the plants and make the treatment less effective. The same is true for the radionuclides from Chernobyl. The contamination capacity of mist and fog is greater than that of rainfall as far as plants are concerned.

So, as far as diseases of the thyroid are concerned, there is no point in trying to find a link between the occurrence of these diseases and the concentration of caesium found in the soil. Instead, thyroid diseases should rather be linked with diet and lifestyle issues (rural life, raising livestock, growing one's own food...) as well as the local weather conditions at the time of the passage of the cloud from Chernobyl.

It is claimed that: "radioactive iodine does not produce an increase in thyroid cancers in adults"

False: In Belarus, based on a register of cancer cases, Professor Demitchik [2], [3] showed that there had been a 500% increase in thyroid cancers in adults between 1986 and 2000.

It is claimed that: "the increased vigilance of doctors and more sophisticated screening techniques mean that it is possible to detect a greater number of cancers, especially microcancers, i.e. tumours less than 1 cm in diameter"

False: I studied 201 cases of thyroid cancer that occurred in Corsica between 1985 and 2006, considering in particular: how they came to be diagnosed; the cell type, size, and degree of invasiveness; the age and sex of patients and where they had been living in 1986.

I concluded that: 1/3 of all cancers were discovered by chance; half of the cancers discovered by chance had gone beyond the microcancer stage; but above all, that microcancers that were discovered by chance, and were asymptomatic and without complications, represented no more than 8% of all cases.

In other words, the remaining 92% were either cancers that had been detected because of their size, because of noticeable symptoms, or because

of associated functional problems: either aggressive microcancers with invasion of the thyroid capsule or invasion of the lymph node or metastasis.

At the time of diagnosis, 11% of microcancers exhibited complications, such as lymph node invasion or metastasis.

Could this be evidence of a particularly aggressive form of thyroid cancer in Corsica, which was the worst-affected region because of the scale of the fallout and the eating habits of the people?

B) The evidence for the health impact of Chernobyl on France, using the example of Corsica

Corsica is located about 2 000 km from Chernobyl and yet it was significantly affected by radioactive fallout. This was a result of the radioactive cloud passing directly overhead, combined with adverse weather conditions at the worst time of year and because of the particular eating habits of the local people.

In 1986 Corsica recorded deposits of caesium-137 of 4000 – 40,000 Bq/m² depending on the region, 20 000 – 400 000 Bq/m² of iodine-131 and 3 times more iodine-132. At the beginning of May 1986, the milk from goats and sheep contained levels of iodine-131 that were often higher than 10,000 Bq/litre and up to 100,000 Bq/litre according to IPSN/CEA [4]. (During investigations preceding a court case initiated by CRIIRAD and the French Association of Thyroid Patients, damning evidence was found concerning these contaminations: they were advised not to talk about these figures, which were far beyond the limits.) Thus radioprotection measures did not respect regulatory limits in force in 1986, and took no account of people's eating habits, or the particular vulnerability of rural populations. [5]

The types of pathologies and the particular organs that were affected make it possible, in hindsight, to clearly identify the impact of nuclear pollution; and all of these indicators are at danger levels in our region.

The peak of neonatal hypothyroidism in the Provence-Alpes-Côte d'Azur (PACA) region and in Corsica

Systematic tests for neonatal hypothyroidism are carried out on all new-born babies in the whole region: we therefore have reliable data. Corsica between 1980 and 1985, six cases of neonatal hypo-

thyroidism were diagnosed in the two departments [6], making an average of one case per year. In 1986, there were five cases, of which four were diagnosed between May 15 and October 15, 1986.

Neonatal hypothyroidism in the PACA region: 75 cases of neonatal hypothyroidism were diagnosed in the eight years between 1978 and 1985 with an average of 9.3 cases per year. In 1986, in the same region, 23 cases were found. So in 1986 there were 14 excess cases. These figures speak for themselves.

The courts of justice have been asked to investigate these cases, paying particular attention to the month in which victims were born (first or second semester), but these requests have not been taken into consideration.

Diseases of the thyroid in Upper Corsica

There has been a sharp increase in thyroid disorders. Expert analysis of the files of Dr. Vellutini, the only endocrinologist in Corsica who was practising before and after 1986, reveals a 117% increase in consultations for thyroid problems compared with other endocrine diseases. In other words, the proportion of patients with thyroid problems more than doubled after 1986.

This can be compared with the sharp increase in sales of the drug Levothyrox, prescribed in France as a substitute for treatment of cases of thyroid dysfunction or after thyroid surgery.

Of all the various diseases of the thyroid, it is Hashimoto's thyroiditis that has seen the greatest increase.

Childhood cancers in the PACA region

There is a national register of childhood cancers. In Provence-Alpes-Côte d'Azur there is a disturbing affair concerning the register kept by Professor Bernard. On 27 March 1996, Annie Sugier, director of the IPSN (*Institut de protection de sûreté nucléaire*), gave a press conference which was reported in the daily *Le Monde* [7] and the weekly *Le Nouvel Observateur*. According to the figures in the register – which exists since 1984 – there were three cases of thyroid cancer in children during the period 1984-1991 and 14 cases in 1992-1993-1994. But these figures were denied and corrected by the Regional Health Directorate on the pretext that there was an error in interpretation of the data. Since 1996 we have no figures coming from this register, contrary

to other regional registers which continued their work. The courts were seized to investigate this affair but we still have no data.

Childhood leukaemia in Corsica

Another element concerns leukaemia in children in Corsica. There are a number of cases of acute lymphoblastic leukaemia (ALL) reported among children born in 1985 and 1986¹, including two cases for Upper Corsica alone of children born in the second semester of 1986. Yet the national average is extremely low, of the order of 3.3 cases for 100,000 children per year, and there are only 2800 births per year in Corsica. So these are very important figures, taking into account that this is not exhaustive data and that there may be others. The registers for PACA and Corsica must contain information which has been kept confidential.

Cases of thyroid cancer in adults

The incidence of thyroid cancer in Corsica over the period 1998-2001 [8] was highest in men², three times higher than the national average and twice as high than in the Doubs (the department with the highest incidence in mainland France).

For women, the figures are a bit different. The incidence of thyroid cancer in Corsica is higher than in the department of Tarn, which registered the highest incidence in 2001 – considering that now Isère has caught up with Corsica and passed the Tarn and Doubs departments.

Overall, the incidence of thyroid cancer in Corsica is the highest among all the French regions that were investigated, taking into account that there is no register of cancers in Corsica and that only 10% of the population – 10 to 15% of the French population – is covered by a register and that other figures are extrapolations. Therefore this incidence is twice as high as the national average.

My doctoral thesis in medicine, “A Study of 201 cases of thyroid cancer in Corsica between

1985 and 2006” published 20th December 2006 [9], suggests that the high incidence in Corsica is real. Only 8% of thyroid cancers are asymptomatic micro-cancers discovered by chance and without complications; therefore it is not an increase in chance findings which explains the overall increase in incidence.

Serious malignant diseases

Excess of cases of malignant diseases in the cohort of young people born in the second half of 1986 or, in other words, those whose mothers were pregnant in May 1986. In our micro-region alone, even without having conducted specific research, it was discovered that among the 80 births in that period, there were 3 cases of serious malignancies (that is a rate of 1 in 26), consisting of one case of lymphoma, one of leukaemia and one of thyroid cancer.

These three cases are by no means exhaustive. The occurrence of three cases in such a small cohort is utterly abnormal, given the very low incidence generally associated with such an age of onset.

The succession of peaks in the various pathologies recognized as radiation induced, should convince the scientific community of the impact of Chernobyl on people’s health in Corsica.

However, the best way to determine the overall health impact of the fallout from Chernobyl would be to compare the health of one group that experienced the full force of the effects of the radionuclides from Chernobyl, particularly iodine, which would mean those people born in 1985 and 1986, with the cohort born in 1988 and 1989 who did not suffer the effects of this iodine.

This would make it possible to quantify the impact of Chernobyl on all diseases, both of the thyroid and others, malignant or benign, within the affected population (thyroid cancer, Hashimoto’s disease, toxic multiheteronodular goiter, Graves’ disease, autoimmune diseases, type 1 diabetes, Hodgkin’s and non-Hodgkin’s lymphomas, leukaemia, etc.).

At last, an epidemiological study in Corsica

The Health division of the Paris Regional Court has not yet reached a conclusion on the majority of these points.

The cases of the most representative plaintiffs have not been processed. The State-run services,

1 Children born in 1985 were very vulnerable because they were between 6 and 17 months old in May 1986; those born in 1986 are between 0 and 12 months old and could have been contaminated as foetuses.

2 INVS Publication 2006 pages 32-38 *Évaluation de l’incidence des cancers de la thyroïde en Corse, période 1988/2001*. (Institute of Health Surveillance – assessment of the impact of thyroid cancer in Corsica, 1988-2001)

set up 1986, responsible for monitoring and issuing warnings, cannot ignore these health problems but keep all the information and scientific data to themselves. That is why the elected members of the Corsican administration have decided, in response to the legitimate concerns of the population, to fund an epidemiological study to measure the impact of Chernobyl and to establish a cancer registry, which people have been demanding from the government for the past 26 years.

The Italian medical team (from the Galliera Hospital in Genoa), consisting of epidemiologists and endocrinologists, won the contract after tenders were invited from the whole of Europe. We should have their initial findings within a year from now.

Conclusion

What one must retain is that the indicators are all on red in Corsica as concerns radiation-related

pathologies. Radioprotection measures have not taken into account the special vulnerability of certain population groups, particularly pregnant women in rural areas consuming local products. No counter-measures were initiated in 1986, although the high degree of contamination was known. And, to come back to the department of Isère, the thyroid has become the most frequent localisation of cancer among young women aged between 15 and 29 since the middle of the first decade of the 21st century. No explanation is given for this increase despite the fact that it would have been unthinkable 20 years ago to find thyroid cancer at the top of statistics.

To conclude, I wish to make clear that I am only the spokesperson for my father, Dr. Denis Fauconnier, who was unable to come here today and who knows this field particularly well, since he has worked on it for the past 26 years. Thank you. ▶

Bibliography

- [1] Colonna M., Grosclaude P., Remonet L., Schvartz C., Mace-Lesech J., Velten M., Guizard AV. et al. Incidence of cancer in adults recorded by French registries (1978-1997) *Eur J Cancer* 2002, 38: 1762-1768
- [2] Demidchik E, Mrochek A, Demidchik Yu, Vorontsova T, Cherstvoy E, Kenigsberg J, Rebeko V, Sugenoia A. Thyroid cancer promoted by radiation in young people of Belarus, in radiation and thyroid cancer: world scientific 1999 51-54
- [3] *Coopération scientifique en endocrinologie/pathologies thyroïdiennes. Pathologies thyroïdiennes en République de Belarus suite à l'accident de Tchernobyl.* Demidchik Y., Lille, March 2000
- [4] CEA-IPSN. *Estimation des conséquences sanitaires en France de l'accident de Tchernobyl à partir des mesures faites par le groupe CEA.* Report of 12/6/1986: 9
- [5] Castanier C., CRIIRAD. *L'impact de Tchernobyl en Corse : analyses et critiques de la CRIIRAD. Journée d'information scientifique sur les conséquences sanitaires de l'accident de Tchernobyl en Corse.* Report of the *Direction de la solidarité et de la santé de Corse et Corse du Sud*, 31 January 2002, p. 20-26
- [6] Fauconnier D. Actes (proceedings) of the symposium "Nucléaire Santé Sécurité" Montauban, 21- 23/01/1988, p. 97-126
- [7] "Tchernobyl serait-il responsable de cancers de la thyroïde en France ?" *Le Monde*, 29 March 1996, Jean-Paul Dufour
- [8] Lasalle JL., Pirard P., Arrighi J. Évaluation de l'incidence des cancers de la thyroïde en Corse, période 1998-2001 (bilan intermédiaire) in *Surveillance sanitaire en France en lien avec l'accident de Tchernobyl*, INVS 2006, p. 32-38
- [9] Faculté de Médecine René Descartes Paris 5, Doctoral thesis by Sophie Fauconnier, 20 December 2006, "Étude de 201 cas de cancers de la thyroïde en Corse entre 1985 et 2006"

Fukushima: “Radiation Management” and Epidemiological Dissidence in the Nuclear Establishment



Paul Jobin (France) Director of CEFC Taipei (Centre for research on contemporary China, Taipei branch), Lecturer – University of Paris Diderot

Introduction: from nuclear plant workers to citizens

To analyze controversies related to industrial hazards, Akrich *et al* (2010: 7-52) have highlighted four possible situations: 1) The victims are not identified, nor the toxic threat; 2) There is a cluster of victims but the toxin in question is not identified; 3) The toxicants are identified, but so far, not the victims; 4) Both the victims and the toxicants are identified, but there is uncertainty on the causal link. So far, as of April 2012, the situation of Japan is characterized by situation #3: we know that there are high spots of radiation, and that it will inherently cause various health problems, but most of the victims are not yet identified – if we exclude some cases of deaths among workers that TEPCO denied to be radiation-related, as well as the 573 citizen deaths that the Japanese government certified as related to the nuclear disaster evacuation. However, there is now a large public distrust in Japan regarding the explanation provided by the government experts, who maintain that there is no need to worry. So we may ask: Whom, and to what extent, does radiation ‘protection’ really ‘protect’?

The term “radiation management” (*hōshasen kanri*), most commonly used in Japan to designate radiation protection, is a telling reminder of the

centrality of economic and management aspects of the problem, not only in crisis situations, but also in normal day-to-day operations of the industry (Thébaud-Mony 2000/2011, Jobin 2011, 2012, Fuse 2012). Alongside this interpretation of radiation protection, epidemiology can be led astray from its original purpose of *protecting* and added to the armory of means for playing down the effects of radiation on human health. Just one year before the Fukushima disaster, in March 2010, the Japanese Radiation Effects Association handed the Ministry of Science an epidemiological study based on an impressive cohort of 212,000 people from a total of 277,000 people who worked in the nuclear industry between 1990 and 1999 (Hōshasen 2010). The study found a significant increase in mortality for one type of leukemia, but considered that for other cancers, there was no difference with the rest of the population. The big problem with this study, like its predecessors (see for example Iwasaki 2003, Guérin 2009), was that it looked only at mortality and ignored morbidity, i.e., people who already had cancer but were still alive at the survey date, or to insist on individual causes like genetics or “life styles” i.e. tobacco and alcohol consumption, etc (Petersen 1990, Murata 2002). Another bias is the tendency to ignore contract workers, though they receive the highest cumulative radioactive doses.

The “definitive” report of the World Health Organization on Chernobyl’s legacy under the sharp control of AIEA (Chernobyl Forum 2005), concluding with a mere 50 victims among the 830,000 liquidators mobilized, is just the most blatant aspect of a long denial of the epidemiological consequences of chronic exposure to low-doses. (Mancuso 1977, Gould and Goldman 1991, ECRR 2003, Greene 2003, Tondel 2006, Yablokov 2009). This denial becomes even more problematic in the Japanese context and the aftermath of the Fukushima catastrophe, since radiological protection was first developed as an ex-post science on the basis of clinical and epidemiological surveys made in Hiroshima and Nagasaki after the atomic bombings.

Signs of dissidence in the Japanese nuclear establishment

On 29 April 2011, Kosako Toshiō, Prime Minister Kan Naoto’s adviser on radiation protection, dramatically resigned his post in a tearful public statement, for failing to persuade the Department

of Education from considering 20 mSv per year as a maximum possible exposure for the children of Fukushima. He was anything but an opponent of nuclear power, but presumably the intrinsic contradiction of radiation protection hit him that day with full force.

After the demission of Kosako, the speech of Kodama Tatsuhiko (who is the head of the Radioisotope Center at the University of Tokyo) at the Parliament, provoked another wave of positive reactions among civil society, but also within the government. Convoked along with other experts, Kodama strongly condemned the government's inaction as regards the decontamination of the evacuated zones and the hot spots outside the evacuated zones. This action finally allowed him to figure among *Nature's* ten scientists of the year 2011.¹ At first glance, his speech seems to crack the culture of allegiance that prevailed within the scientific *establishment* of the nuclear lobby, dubbed the "nuclear village" (*genpatsu mura*).

Borrowing from the famous analytical framework of Albert Hirschman (1970), we could say that Kosako publicly expressed his disagreement by resigning (*voice* and *exit*), while Kodama only *voiced* without needing to *exit*, since he was not a member of a government expert group at that time. Kosako's motion nourished a critical movement in Fukushima prefecture; for example, it motivated a former anti-nuke activist like Nakate Seichi to create an association for the children of Fukushima.²

Conversely, for other specialists in epidemiology or radiation protection, whether their goal was institutional protectionism or proactive criticism, Kosako's public decision was judged severely as a ridiculous act: "I knew him very well for so long. (...) It was odd! Until then, he never expressed such an opinion!" (Nagataki Shigenobu³, and *infra*) Or: "This was just a performance!" (Kimura Shinzō⁴) Furthermore, while critical citizens at first lauded Kodama for his brave speech, his call for a massive decontamination would later be interpreted as another attempt to support the nuclear industry, since former nuclear reactors constructors, like

Tōshiba, have now showed an interest in decontamination as a business opportunity.

These critical gestures need sustained attention so as to determine what will provoke and nourish the dispute or initiate an agreement. Despite the apparently rebellious character of their act, neither Kosako nor Kodama attacked the rules that were established for radiation protection at the international level; their act is rather like a dissenting opinion in international law. Therefore, at this stage, it is important to identify the establishment's consensus, which means paying close attention to the view of those who remain "loyal" (the third and often neglected element of Hirschman's model), and suspend a critical judgment from above.

For that purpose, I will introduce here the arguments of one of them, Nagataki Shigenobu, whom I was able to interview.⁵ Trained as a clinician, a graduate of Tōkyō University and Harvard, honorary professor at the University of Nagasaki (where he also served as university president), and former director of the Atomic Bomb Casualty Commission (ABCC) of Hiroshima, he has also participated in several epidemiological surveys on Chernobyl. Since April 2011, he has been one of the eight members of the Nuclear Expert Group of the Prime Minister,⁶ alongside, among others, Yamashita Shun'ichi, Deputy President of the University of Fukushima, who is the main target of civic protest.⁷ Because of their reassuring speeches, both Nagataki and Yamashita were labeled "patronized scholars" (*goyō gakusha*).⁸

IARC's challenge to ICRP and UNSCEAR's paradigm

For Nagataki, who means to make a difference between science and policy,⁹ there is no reason to

1 *Nature*, 22 December 2011. As mentioned on the advertising cover of the book he published last autumn (Kodama 2011), his speech at the Parliament has been viewed one million times on YouTube.

2 Interview in Fukushima, 1 August 2011.

3 Interview of Nagataki Shigenobu, Tōkyō, 25 July 2011.

4 Kimura Shinzō, brief interview in Iwaki, 19 June 2011.

5 Interview of Nagataki Shigenobu, Tōkyō, 25 July 2011 and 16 January 2012.

6 *Shushō kantei genshiryoku senmonka gurupu*: <http://www.kantei.go.jp/saigai/senmonka.html>

7 Several citizens organizations in Fukushima launched a petition to the governor for the resignation of Yamashita Shun'ichi after his public declaration pretending that under a year exposure of 100 mSv, there would be no consequences for human health, and that parents could let their children play outside without worry.

8 See on YouTube, 4 April 2011, "Nagataki Shigenobu sensei ni yoru kibishii kijun".

9 See his fourth note for the experts group, dated 29 September 2011.

doubt the scientific results from the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR 2011). These have been established from the cohorts studies of Hiroshima and Nagasaki, that a cumulated dose below 100 mSv per year had no consequence, and that above, the risk of cancer grows but with no crescendo: at 100 mSv, the number of cancers would affect 1% of the population, 2% at 200 mSv, 5% at 500 mSv... Concerning ICRP (2007) recommendations of 20 mSv for the workers and 1 mSv for the average population, for Nagasaki, these norms only reflect the need for *policy*, which imply precautionary measures and social compromises, but they do not have any epidemiological foundation.

Concerning Chernobyl, Nagasaki fully trusts the conclusions made by WHO under the cautious control of AIEA (Chernobyl Forum 2005). Nagasaki also refutes any scientific validity to the report published by the New York Academy of Sciences (Yablokov 2009). According to Nagasaki, those like Koide Hiroaki (2011) or Chris Busby (2011) who call for the evacuation of all children from Fukushima prefecture, lack appropriate measurements and scientific evidence to do so. These answers were congruent with Nagasaki's background, his recent public declarations and publication (2012). More surprising was his severe judgment of his colleague Kosako (*supra*). Also, when I mentioned to him the epidemiological surveys on nuclear plants workers conducted for years in fifteen countries (including Japan), under the coordination of WHO's International Agency for the Research on Cancer (IARC) and the direction of Elizabeth Cardis (2005, 2007), Nagasaki disputed the scientific validity of the results. He does admit the solid scientific background of Cardis, and the merit of her participation in the first studies on Chernobyl at the beginning of the 1990s, but according to him, she committed a deontological fault that was denounced by the Canadian team. Nagasaki also challenges the competency of some of the co-authors to deal with the specific question of nuclear plant workers.

As was pointed out by Annie Thébaud-Mony (2012: 33-34), Cardis' surveys have shown a relationship between low doses of radiation and cancer mortality, with a relative risk for all sorts of cancers (except leukemia) two or three times higher compared to the linear non-threshold model based on the cohorts from Hiroshima and Nagasaki. Yet these surveys concerned only regular employees

and not the contract workers who receive the major part of the radioactivity during maintenance operations. Besides, as these surveys were conducted with the financial support of the nuclear industry, and its logistical cooperation for the collection of data, the authors were cautious enough to mention that the excess of deaths was statistically congruent with ICRP's model.

A recent investigation made by NHK, the Japanese national TV broadcaster, captured controversies on low-level radiation at ICRP's last meeting, in October 2011, and then succeeded in interviewing Charles Meinhold, an ICRP member emeritus, who received them at home and confessed that, by the time of the 1990 recommendations, there was a heated discussions within the ICRP committee, which was under pressure from both the nuclear industry and the US Department of Energy.¹⁰ The documentary also challenged the independence of ICRP, since its main sponsors are nuclear companies from North America, Europe and Japan. On 12 January 2012, NHK was sent a protest letter by a group of 110 executives from the Japanese nuclear industry's main companies, 70 of them were retired and none of them was an ICRP member.¹¹ They accused the NHK, in a threatening tone, of using biased interviews and that some parts of the interview with the present ICRP head had been mistranslated. However, they did not provide evidence that could challenge the testimony of Charles Meinhold, which was consistent with his previous comment on ICRP recommendation,¹² which is also congruent with Nagasaki's statement that there is no epidemiological basis to ICRP's recommendations.

Conclusion

Radiation protection and epidemiology are of course not homogeneous and consensual bodies of scientists. But before Fukushima disaster, in Japan, those who were raising questions about the effects on human health of low-doses were limited to the opponents to nuclear plants, previous

10 *Tsuiseki shinsō fairu*, NHK, 26 December 2011.

11 NHK's answer was made public by an article in *Tōkyō shinbun*, 1 February 2012.

12 Charles Meinhold, "View Comment item; ICRP 2005 Recommendation:" http://www.icrp.org/consultation_viewitem.asp?guid={3EF99290-65CF-45B0-A8CA-EC3469DA66D8}.

nuclear engineers like Koide Hiroaki, and NGOs supporting the victims of Hiroshima and Nagasaki disregarded by the public compensation scheme. After Fukushima, to some extent, the controversy on low-doses has penetrated the nuclear establishment itself.

So I tried here to capture some important points of this debate in Japan, and how the apparent contradictions of the Japanese government mainly reflect the dominant international paradigm for radiation protection norms and its epidemiological basis. The irony is that the main argument of this model is that of Hiroshima-Nagasaki, rather than the legacy of Chernobyl. The irony is twofold: first, because the root of the model is in Japan; and second, because it is based on the first nuclear bomb tests rather than the first level 7 nuclear plant disaster. WHO-IARC has produced conclusions that could challenge that model, but so far, they have been disregarded by UNSCEAR itself, as well as ICRP's governing committee (though some tensions have appeared in the latter).

A serious limit of this article is that it focuses on radiation caused by external contamination, eluding the even more important issue of internal radiation caused by the contamination of the food chain (Koide and Kurobe 2011). The idea was first to present the contradictions in the current international norms set by ICRP for radiation protection as a cornerstone to the dilemma of cost reduction and nuclear safety, then to try to capture key aspects of the scientific controversies based on epidemiology, which have consequences for the population at large. ▶

References

- Akrich, Madeleine, Yannick Barthe and Catherine Rémy. *Sur la piste environnementale. Menaces sanitaires et mobilisations profanes*. Paris: Presses des Mines, 2010.
- Busby, Chris. "Fukushima Children at Risk of Heart Disease." *The Asia-Pacific Journal* Vol. 9, 39-4 (26 Sept. 2011). <http://japanfocus.org>
- Cardis, Elisabeth *et al.*
- . "Risk of Cancer After Low Doses of Ionising Radiation: Retrospective Cohort Study in 15 Countries." *British Medical Journal* 331 (29 June 2005): doi: 10.1136/bmj.38499.599861.E0
- . "The 15-country collaborative study of cancer risk among radiation workers in the nuclear industry: estimates of radiation-related cancer risks." *Radiation Research* 167 (2007): 396-416.
- (The) Chernobyl Forum. *Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts*. Vienna: AIEA, 2005.
- ECRR. *Recommendations on Radiation Risk*. Brussels: Regulator, 2003.
- Fuse, Yūji. "Tōden wa rōdōsha o tsukai suterunoka." *Sekai* 2 (2012): 101-111.
- Gould, Jay and Benjamin Goldman. *Deadly Deceit. Low-Level Radiation, High-Level Cover-Up*. New York: Four Walls Eight Windows, 1991.
- Guérin, Sylvie *et al.* "Cancer Mortality Among French Nuclear Contract Workers." *American Journal of Industrial Medicine* 52 (2009): 916-925.
- Hirschman, Albert. *Exit, Voice, and Loyalty*. Cambridge: Harvard University, 1970.
- Hōshasen eikyō kyōkai. *Genshiryoku hatsuden shisetsu nado hōshasen gyōmu jiyūjisha nadi ni kakaru ekigakuteki chōsa; dai 4 ki, heisei 17-21 nendo*. Tōkyō: Hōshasen eikyō kyōkai, 2010.
- ICRP. *ICRP Publication 60. The New International Commission on Radiological Protection Safety Standards*. Annals of the ICRP, Vol. 21/1-3, 1990.
- ICRP. *ICRP Publication 103. The 2007 Recommendations of the International Commission on Radiological Protection*. Annals of the ICRP, Vol. 37/2-4, 2007.
- Iwasaki Tamiko *et al.* "Second analysis of mortality of nuclear industry workers in Japan 1986-1997." *Radiation Research* 159 (2003): 228-238.
- Jobin, Paul.
- . "Dying for TEPCO? Fukushima nuclear contract workers." *The Asia-Pacific Journal* Vol. 9, 18-3 (2 May 2011). <http://japanfocus.org>
- . "Fukushima ou la 'radioprotection'. Retour sur un terrain interrompu." In *Santé au travail, Approches critiques*, edited by Annie Thébaud-Mony *et al.*, 83-104. Paris: La Découverte, 2012.
- Koide, Hiroaki and Shin'ichi Kurobe. *Genpatsu hōshanō; kodomo ga abunai*. Tōkyō: Bungei shunjū, 2011.
- Kodama, Tatsuhiko. *Naibu hibaku no shinjitsu*. Tōkyō: Gentōsha, 2011.
- Mancuso, Thomas, Alice Stewart and George. "Radiation Exposures of Hanford Workers Dying from Cancer and Other Causes." *Health Physics Journal* 33, 5 (1977): 369-384.
- Murata, Motoi *et al.* "Life-style and other characteristics of radiation workers at nuclear facilities in Japan: base-line data of a questionnaire Survey." *Journal of Epidemiology* 12 (2002): 310-319.
- Nagataki, Shigenobu. *Genshiryoku saigai ni manabu hōshasen no kenkō eikyō to sono taisaku*, Tōkyō: Maruzen, 2012.
- Petersen, Gerald *et al.* "A case-cohort Study of Lung Cancer Ionizing Radiation, and Tobacco Smoking among Males at the Hanford Sites." *Health Physics* 58 (1990): 3-11.
- Thébaud-Mony, Annie.
- . *Nuclear Servitude: Subcontracting and Health in the French Civil Nuclear Industry*. New York: Baywood, 2011. (Original French edition: Paris: EDK-INSERM, 2000)
- . "Risques industriels, effets différés et probabilistes: quels critères pour quelle preuve?" In *Santé au travail, Approches critiques*, edited by Annie Thébaud-Mony *et al.*, 22-39. Paris: La découverte, 2012.
- Tondel, Martin *et al.* "Increased Incidence of Malignancies in Sweden After the Chernobyl Accident—A Promoting Effect?" *American Journal of Industrial Medicine* 9 (2006):159–168.
- UNSCEAR. *Report of the United Nations Scientific Committee on the Effects of Atomic Radiation. Fifty-seventh session, includes Scientific Report: summary of low-doses radiation effects on health*. New York: United Nations, 2011.
- Yablokov, Alexey, Vassily Nesterenko, Alexey Nesterenko and Janette Sherman-Devinger. *Chernobyl: Consequences of the catastrophe for People and the Environment*. New York Academy of Science, 2009.

The introduction of nuclear power in Japan and the antinuclear movement from Hiroshima to Fukushima



Kolin Kobayashi (Japan), freelance journalist in Paris, contributor to "Days Japan"

In order to understand nuclear power in Japan today, you have to go back in time to Hiroshima-Nagasaki. Only then can you understand how it was possible to introduce nuclear power in Japan after the double tragedy, how the question of low dose radiation was sidestepped and denied, how the anger of bomb victims was repressed under the effect of the "double constraint" in Gregory Bateson's terms, through guilt about the colonial war and submission to the imperialist regime, and finally why the anti-nuclear movement was unable to block the nuclear threat.

After the bomb attacks on Hiroshima and Nagasaki, the Americans imposed silence on the victims and prevented them from testifying to the press for seven years. During this time, the Atomic Bomb Casualty Commission (ABCC) of the USA, carried out careful investigations on wounded and irradiated victims, without however, providing necessary health care. In the ABCC investigations, victims who were more than 2 kms from the epicenter of the explosion were not qualified as irradiated, because the symptoms they displayed were far less spectacular.¹ People from outside the city of Hiroshima who were exposed to black rain or

people who came into the city after the explosion were not considered to have been exposed to radiation either.² Because of this, a certain number of important indications of exposure to low dose radiation were dismissed as unimportant. International radioprotection norms were based exclusively on data from studies undertaken in the 2 km zone.

Meanwhile, the USA massively increased its nuclear tests including on its own territory, which provoked indignation throughout the world and the creation of antinuclear movements. In order to calm the protest, Eisenhower, who was President at the time, delivered a speech at the UN General Assembly, on 8 December 1953³, entitled "Atoms for Peace".

On the 1st of March 1954, the USA tested their hydrogen bomb "Bravo" - one thousand times more powerful than the Hiroshima bomb - on the Bikini atoll in the Pacific ocean, without issuing any warning. Several hundred fishing boats were heading in the direction of the test zone; the crew of the fishing boat *Daigo-Fukuryu-maru* (*Lucky Dragon No.5*) were seriously affected. Their bodies were covered with highly radioactive ash (fallout). The consequences were grave. The tuna fish in transport were completely irradiated, members of the crew were hospitalized and M. Kuboyama Aikichi, the boat's radio operator, who had been severely irradiated, died 6 months later⁴.

The Japanese were not the only ones exposed to radiation. Several hundred inhabitants of the island of Rongelap received 3 cms of fall-out but they were abandoned to their fate without assistance for 50 hours under conditions of intense radioactivity. They were evacuated to another island but after 58 years, i.e. today, they are still not recognized as radiation victims and they have received no compensation or care.

Until 1954, there was no anti-nuclear movement in Japan, it was forbidden. It was only after the tragedy of the *Daigo-Fukuryu-maru* that a small group of women from Tokyo, revolted by this incident, began to protest against the nuclear bomb, and this movement attracted a lot of public

2 Idem

3 「核の世紀 マーシャル諸島 1914-2004」豊崎博光 著、日本図書センター、2005 Hiromitsu TOYOSAKI, "The century of the atom - Marshall Islands 1914-2004", Editions Nippon Tosho Center, 2005

4 「核の世紀 マーシャル諸島 1914-2004」豊崎博光 著、日本図書センター、2005 Hiromitsu TOYOSAKI, "The century of the atom - Marshall Islands 1914-2004", Editions Nippon Tosho Center, 2005

1 「放射線被曝の歴史」中川保雄著、明石書店、2011 Yasuo Nakagawa, "History of irradiation by ionising radiation", Editions Akashi, 2011

attention throughout the whole of Japan, which made possible the setting up of a permanent office of the antinuclear movement in Hiroshima “Gen-sui-kyo”, the next year.

Concerned about the increasing protest in Japan against their nuclear testing, the Americans geared up to obstruct the movement. Their strategy was to present civil and military nuclear power as separate issues, giving prominence to civil nuclear power for the peaceful production of energy, a strategy to which I will return in a moment.

In contrast, the day after the US test which irradiated the *Daigo-Fukuryu-maru*, the conservative politician NAKASONE Yasuhiro, future prime minister of the 1980s, who supported the creation of a nuclear arsenal, submitted a project for the development of military nuclear power, taking no account whatsoever of the anger of the Japanese people.

Since then, on the one hand, Japanese authorities have been developing military nuclear power. A budget of 235 million yen, corresponding precisely with the number Uranium 235, was voted/accepted. In his presentation of the project to the lower parliament in plenary session, the MP KOYAMA Kuranosuke, explicitly stated that the budget had been requested in order to master atomic bomb technology and acquire capacity for use⁵. On the other hand, the Americans imposed a pacifist vision through civil nuclear power on the Japanese in order to extinguish the antinuclear movement. The Prime Ministers of the 1950 and 60s, KISHI Nobusuke and SATO Eisaku⁶,

as well as the famous media magnate, SHORIKI Matsutaro, CEO of the newspaper “Yomiuri”, and senior official in the police force, were all co-opted by the CIA as collaborators.

This is not crime fiction but documented historical facts which can be consulted in the official archives of the US diplomatic documents⁷. The US strategy was first of all, to launch their own programme of nuclear deterrence and then to direct Japan towards civil nuclear power, simultaneously manipulating powerful figures in politics and the media. They also wanted to hide the harmful effects of radiation and in particular, of low dose radiation.

In 1957, Shoriki, future Minister of Science and Technology under the Kishi government, campaigned very successfully for “Atoms for Peace” by organizing grandiose exhibitions, even in Hiroshima, in order to gain approval for the new technology, presenting this science as a force for social development and human happiness. The majority of Japanese were lulled by the slogan into accepting civil nuclear energy as scientific progress.

As for the anti-nuclear movement “Gen-sui-kin” set up in 1955, after the women’s action, it split into a communist faction “Gen-sui-kyo” and a socialist faction “Gen-sui-kin” in 1963, because of Soviet nuclear testing. The former group accepts peaceful use of nuclear energy, the latter opposes both but cooperates nevertheless with the former. This split has considerably weakened the antinuclear movement which has lost its global perspective. The anti civil nuclear energy movement has remained active locally in regions where the construction of power stations is planned.

One of the biggest protests - against the Shiga plant - began in 1973 and lasted 23 years. A similar struggle took place at Kaminoseki, where it was supported by the fishermen of Iwai-jiwa, the island just opposite the site, in the inland sea of Setonai-kai. Movements against power stations have been easily crushed because they were isolated and the municipalities concerned were massively subsidized by the power companies. At the time of the Chernobyl accident in 1986, or the Rokkasho project in 1993, the antinuclear movement seemed to take off but it didn’t last long. However the protest against Rokkasho continues today.

It was only in the 1990s that there was growing awareness of the consequences of nuclear power, both military and civil, due to testing, wars and

5 「隠して核武装する日本」槌田敦、藤田祐幸 など共著、藤田祐幸<戦後日本の核政策史>、影書房、2008. Tsuchida Tatsushi, Fujita Yuko and others “Japan secretly acquires nuclear weapons”, Editions Kage, 2008

6 Eisaku Sato, who became Prime Minister, was forced in 1967 under pressure by the U.S. and the antinuclear movement, which was very strong at the time in Japanese society, to declare the three principles of non-use of nuclear power in Japan: neither possession nor manufacture nor import. Thanks to the “application” of these principles, Sato was awarded the Nobel Peace Prize in 1974. These principles remain officially valid today. However, we now know that there was a secret agreement with the United States to import military applications of nuclear energy to U.S. bases in Japan. This was revealed in 2007 by Takashi SHINOBU, Japanese political scientist, who discovered notes by Henry Kissinger in the U.S. archives. Furthermore, it is clear that successive leaders of the Japanese government intended and still intend to possess the technology for the manufacture of the atomic bomb. For this reason, it is important to remember the beginnings of Japanese post-war policy in the nuclear field.

7 The New York Times, 11 Oct 1989

accidents. And a new notion saw the light of day: “Global Hibakusha”, which grouped all victims of radiation together irrespective of cause, military or civil, and activists regrouped. Since then, Fukushima has really wakened the conscience of the Japanese people, in short, that nuclear power is incompatible with life and health. Many people are starting to understand what radioactivity is, and understand the various measurements, micro or mSv, becquerels, by taking measurements themselves, with their own Geiger counters. They are worried about the effects of low doses.

Although the mobilization is not yet as strong as in Europe, something has changed for good. Because the Japanese have understood that nuclear power exploded in their country for the third time and this time they were responsible. Without doubt, Fukushima is the beginning of the end of the era of “Atoms for Peace” and the end, in general, of nuclear power. ▶

DISCUSSION 3

Points raised

Number 4 reactor at Fukushima – Earthquakes – Apocalypse – Memory – Atoms for Peace – Women's Appeal – Restarting power plants in Japan – Civil and military nuclear power in Japan – Negationism – Crime against the biosphere.

Question

Isabelle Chevalley, National Councillor, Swiss Parliament

I am very worried about Reactor number 4, because of its cooling pools and what they contain. Recently, I saw a report by a Japanese scientist, specialist in earthquakes, who stated that in the next five years, there is a 75% chance of a new earthquake occurring in the Fukushima region. Looking at reactor number 4, I am not sure that the building would resist a second earthquake, in particular the pool which contains fuel. If the pool was to empty and the situation became uncontrollable, I think that Fukushima is just an aperitif. In Japan are people really aware of this worry and have measures been taken to remove the fuel?

Reply

Kolin Kobayashi, journalist, correspondent in Paris of '*Days Japan*'

It is true, for over a year now there have been more than 10,000 quakes, some of them sizeable, even level 4-5, almost every day. And three major quakes are predicted under the city of Tokyo. Off the coast of the Shizuoka region near Mount Fuji, there is a power plant called Hamaoka: a big earthquake has been expected here for a long time. Our paper *Days Japan* devoted an issue in January 2011 to the possibility of this earthquake. In the month of March, Fukushima happened. Obviously the question of probability is extremely difficult for the experts, but it is expected that there will be major quakes in the near future. So in relation to the pool in reactor 4, Professor Koide raised the alarm, spoke in the media, on television, on internet¹. It was widely discussed. But neither TEPCO nor the Japanese authorities are preparing for or taking into account this serious probability, because if the pool of reactor 4 were to collapse, it would really be a catastrophe, which could contaminate the whole of Japan. The Japanese authorities are afraid of creating panic so they don't talk about it.

Comment

Paul Jobin, Director, CEFC Taipei

Just a word to reinforce what Kolin said. Maybe you were making a distinction between the real catastrophe which Fukushima already is – and for years to come – and an apocalypse. This is what Koide, and others, have shown. There was a former Japanese ambassador to Switzerland, his name escapes me, who wrote a letter to the United Nations², and notably during that conference of world leaders which took place in South Korea on nuclear power. In that conference, they focused on North Korea and its little bombs, while the real threat is Fukushima. Fukushima represents a much bigger, more real, and concrete threat.

1 <http://fukushima.over-blog.fr/article-appel-urgent-pour-eviter-une-nouvelle-catastrophe-nucleaire-mondiale-107834979.html>

2 Letter from Mitsuhei Mukata, former Japanese ambassador to Switzerland to the Secretary-General of the UN Ban Ki-Moon <http://fukushima.greenaction-japan.org/2012/05/01/an-urgent-request-on-un-intervention-to-stabilize-the-fukushima-unit-4-spent-nuclear-fuel/>

Comment

Kolin Kobayashi

TEPCO is actually preparing to move the fuel rods which are in Reactor 4's pool – there are 1535 of them - but preparation takes two, three years. Meanwhile, will there not be earthquakes? We don't know.

Comment

Jean-Marc Royer

I am the author of a paper entitled “*Hiroshima, Chernobyl, Fukushima crimes against humanity*”. I would like to say something that I think is of great importance in relation to Kolin Kobayashi's presentation. The question of remembering what happened in relation to nuclear power is capital. And I agree with what Wladimir Tchertkoff said this morning. We should no longer talk about Chernobyl, Three Mile Island or Fukushima in the past tense, we must continue to talk in the present tense. The question of Reactor 4's pool is extremely complex. I recommend you look at Pierre Fetet's blog on Fukushima³, which is very well documented. Arnie Gunderson (formerly a chief nuclear engineer), of Fairewinds⁴ also talks about it. And I would like to just give you an example of this question of memory. From end 1945, before the ABCC was set up (*Atomic Bomb Casualty Commission*), a commission set up by the Americans, more or less directed by General Groves, who was the director with Oppenheimer of the atomic bomb project (the 'Manhattan project'), Groves said *the bombing of Hiroshima is not expected to have any consequences*. Today we must call things by their real names, that is to say, name those people as nuclear negationists.

Comment

Yves Lenoir, President, “*Enfants de Tchernobyl Bélarus*”

Just a couple of words on what Kolin said. You mentioned President Eisenhower as the man behind *Atoms for Peace*. During his administration, which lasted eight years, about eight atomic or hydrogen bombs were built every working day, representing ten megatons of power every working day. Afterwards, in relation to *Lucky Dragon*, President Eisenhower knew nothing about radiation and was very surprised that Japanese sailors, several dozen of them, hundreds of kilometres away from the BRAVO explosion, had been seriously contaminated. So he asked the USA Academy of Sciences: does it really represent a danger? And after a quick session the Academy convinced him that it didn't.

Comment

Nicole Roelens

Kolin Kobayashi mentioned the women in Tokyo who have revived the anti-nuclear movement in Japan. I would like to say that everywhere in the world, the nuclear question, the revolt against nuclear power, particularly affects women, and they are many of them in antinuclear movements. There are friends, a group of women in France, who have launched a call by women for the immediate end to nuclear power.⁵ It is not an organization, it is not an association, it is just the expression of women's wish to demonstrate their utter rejection of this energy, of the spirit of overwhelming power, absolutely illusory and absolutely destructive which is, unfortunately, a characteristically male thing. It has to be said: we have had enough of the fact that our children, our future, our genes, our genetic heritage may be destroyed by this deadly illusion.

3 <http://fukushima.over-blog.fr/>

4 <http://fairewinds.org/>

5 <http://www.fairea.fr/>

***Women's Call for Immediate Stop to the Use of Atomic Energy*, read by Veronique Ratel**

Some of us are well-known, others less or not at all. Some of us are long-time activists, others never will be. Some of us are close friends, while others display profound differences of opinion in numerous fields. Still, all of us now share the conviction that putting an immediate end to the use of nuclear energy, be it for the production of electricity or weapons, has become a vital necessity. Our lines of argument are many. Our networks are varied, as are our possible means of action and initiatives. And we shall invent others on the way. For now, a year after the beginning of the Fukushima disaster, we do feel it is urgent to start counting our numbers. And also to stop letting ourselves be deceived. No financial contribution, no bureaucratic organisation: an informal sisterhood is what we shall be. By signing this call, each one of us simply commits herself to be, in her own way, a Women's call for an Immediate Stop to the Use of Atomic Energy, and to speak and act as such, by herself or with others, wherever and whenever she finds it possible. <http://www.fairea.fr>. For all queries, please write to: contact@fairea.fr

Question

Thank you to the women. And I would like to pose a question: what do you think about the 54 power plants that have been closed? Are they going to start them up again or will it all stop for good?

Reply

Kolin Kobayashi

Obviously for the industrial nuclear lobby, it is extremely serious to be unable to start them up. So they are going to try to start them up again. In fact, that's what is planned this year. But there is so much incoherence, confusion and contradiction in what the Japanese authorities say. Public opinion is extremely hostile to restarting nuclear power plants. Every Friday, there are thousands of people demonstrating in front of the Prime Minister's residence. So, could the current government force the issue without taking account of pressure from civil society? That is a problem. And then there is another problem. As it is very hot in Japan, everyone is using air conditioning so this puts into question Japanese people's lifestyle, who are must also take responsibility for saving energy. Can a solution be found? All Japanese people need to think about this and propose an alternative so we can get out of nuclear power.



Question

Sylvie Sauvage, Collective “*Stop EPR ni à Pelnny ni ailleurs*”

I just wanted to say to Kolin Kobayashi, that at this moment, I think Japan is much more democratic than France. Because there, in relation to starting power plants up again – civil society carries some weight while in France, there is nothing we can do. We just can't manage to do anything. We have 58 power plants. And I think that even our own antinuclear movement does not dare to call a spade a spade, and state things as they are. I think we are much too nice with the nucleocrats.

Question

Has research in nuclear power for military uses also been stopped in Japan?

Reply

Kolin Kobayashi

After 1955 Eisaku Sato, a CIA collaborator who certainly came under pressure from the USA, declared that Japan, as a democratic country, was not making an atomic bomb. The *three antinuclear principles* were set out at that time and were established as the basis for policy in Japan.⁶ So, officially, there was no research into nuclear power for military purposes, but the technology is the same, isn't it? If a superegenerator works, you get plutonium that is 98% pure and can be transformed into atomic bombs without much difficulty. So between nuclear technology for civil or military uses, there isn't a clear line.

Comment

I would like to make a comment as a lawyer. At the end of WW2, we were fed up with the impunity of war criminals and we introduced the notion of “*crime against humanity*”. I think that today, it is urgent to introduce the notion of “*crime against the biosphere*” which would cover not just those responsible for nuclear power programmes which ran into problems but also other technologies which are seriously damaging the biosphere on which we depend and to which we belong.

⁶ The three principles are: no production, no possession, no transit. These principles were established in 1967 by Prime Minister Eisaku Sato (for which he won the Nobel Peace Prize in 1974) and they were defined as national principles.



5. After Chernobyl and Fukushima, the actions of civil society

Moderator: Marc Molitor (Belgium)

The syndrome of long living incorporated radionuclides (SLIR) and the development of radioprotection programmes and policies: an example of an integrated model

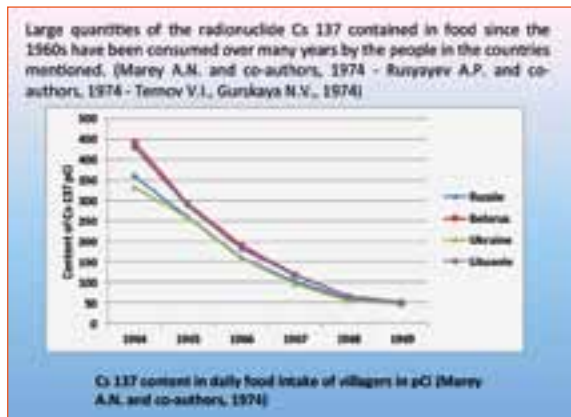


Yuri Bandazhevsky (Belarus) Anatomical pathologist, President of the Centre for Analysis and Coordination "Ecology and Health"

I think that the task in front of me is far from easy – to describe, on the basis of scientific data, the project that we have been struggling to set up. I will begin my presentation by setting out the principles that have guided me over many years, since I started to deal with the health protection of people living in the disaster zone of Chernobyl. Real information and expertise on the situation are extremely important for the health protection of the inhabitants.

When I arrived in the Gomel region in 1990, I did not really understand what was happening around me. A coherent approach was needed in order to start work, which did not just consist of setting up the institute which would train – and which has trained – senior medical staff – but also to undertake serious, scientific research. We have developed this and now I am going to try and show you how this coherent approach to the evaluation of people's health can serve as the basis for the development of health protection programmes. We avoided all populism, actions and ill-judged statements which do not provide a real foundation but which lead others, as well as ourselves, into error.

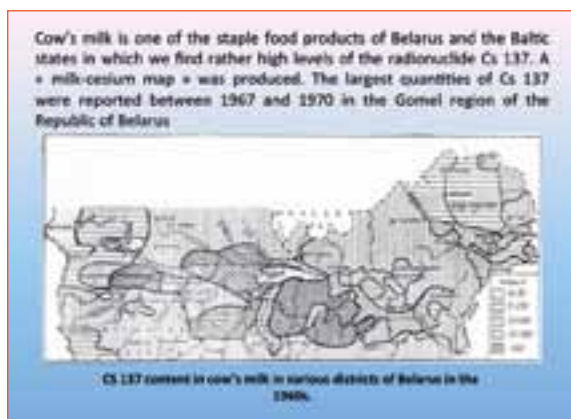
There has been significant radioactive contamination in various countries of the former Soviet Union including Belarus since the 1960s



The information shown in this graph does not come from people opposed to nuclear energy. It is information from the Biophysics Institute of the USSR Ministry of Health, published in 1974. [1]

These are levels of contamination in food products in various countries of the former-Soviet Union, which are closest to my country, Belarus: Ukraine, Russia, Lithuania, and the nearby Baltic States. In the 1960s, high levels of contamination with Cs 137 were indeed found in food products.

This map shows contamination in milk in Belarusian territory in the 1960s. [2]

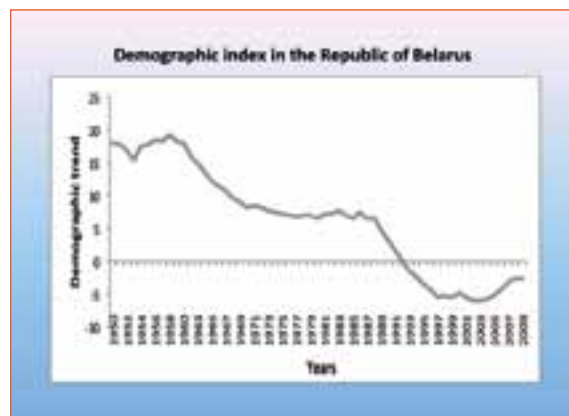
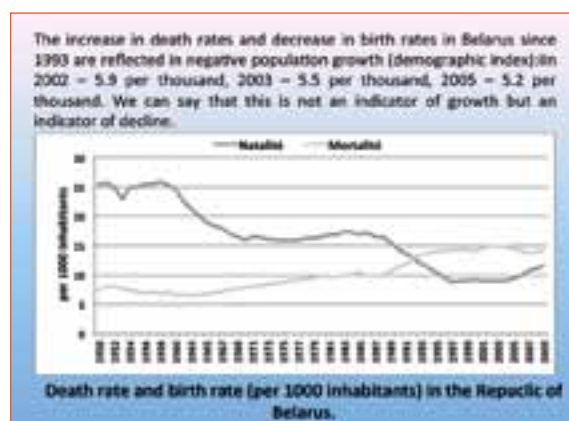


When we started to investigate the consequences of Chernobyl, we drew an identical map in the 1990s, with comparable levels of contamination. What did we discover? We did not just discover Chernobyl, we discovered the radioactivity that existed before Chernobyl. Look, this is the photocopy, it is the scanned version of this map; it is not an invented map. This map shows that the

European part of the population of the former empire of the Soviet Union was significantly exposed to the effects of radioactive substances through food products, and in particular, through milk.

At present, we can say that we are analysing the health situation of inhabitants who have been exposed for more than half a century to radioactivity, to significant internal radioactivity. Obviously, attempts were made to hide this map and it took some effort to reveal the fruit of the work of the great USSR Institute. [1] After Chernobyl, the information was forbidden and the book that we have currently in photocopied form does not officially exist in the Soviet Union. I knew about it through the editor of the major Russian newspaper "Top Secret" (*"Soverchenno Secretno"*) who requested an interview with me and then was afraid to publish because I referred to this book. No reference is ever made to this book; officially it does not exist.

This is what happens with people's health: the death rate is increasing, of course, in Belarus, the birth rate is decreasing and that did not start with the Chernobyl years, but started much earlier, when radiocontamination of the population first started. [3]



Of course the demographic index is also negative [4] and whatever embellishments senior officials of these countries use to improve the picture, the health situation of the inhabitants remains dreadful. Galina Bandazhevskaya has shown this in her presentation on the state of children's health.

The graph below shows the mortality rates in the regions that were the most contaminated – and I stress – before the Chernobyl accident and after the Chernobyl accident: Khoyniki, Narovlia, Braguine, the Bouda-Kochélio district, all these districts are near Gomel. Note the high mortality rates, up to 30‰. In comparison, even the rates in the towns of Gomel and Grodno are considerably lower.



Here is the district just beyond the frontier. It is the district of Ivankov, in the region of Kiev in Ukraine, 30 km from the nuclear power plant of Chernobyl. [5]



With death rates which are also high, virtually the same as in the other districts. And note,

that the situation is scarcely better in the region of Kiev: 17, 18, 19, per thousand, it's a lot. Mortality is increasing and what is tragic is to see that it is starting in the working population, before retirement age, especially in men. [5]

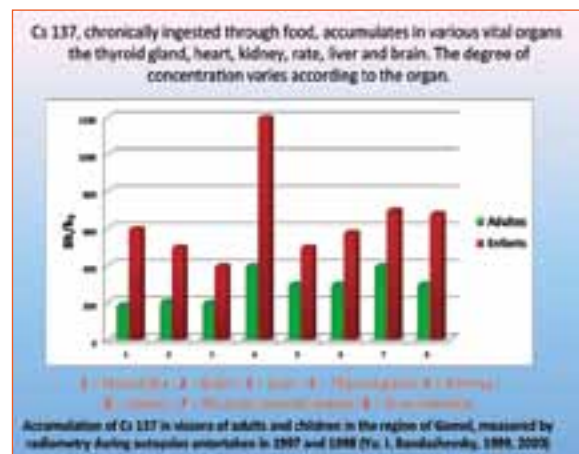
Heart and circulatory disease, then cancers, take first place, of course, among causes of death. Today these are the main illnesses in Ukraine, Russia as well as in Belarus [6] as the graph shows.



The percentages are practically the same, i.e., the population has received huge doses of radiation. These figures are, of course, the result. [6]

The syndrome of long lived incorporated radionuclides (SLIR)

Fundamental to our discussions is the incorporation of radioactive cesium in vital organs [7, 8]. This is what our research on autopsy material at the Gomel Institute between 1990 and 1999, has shown.

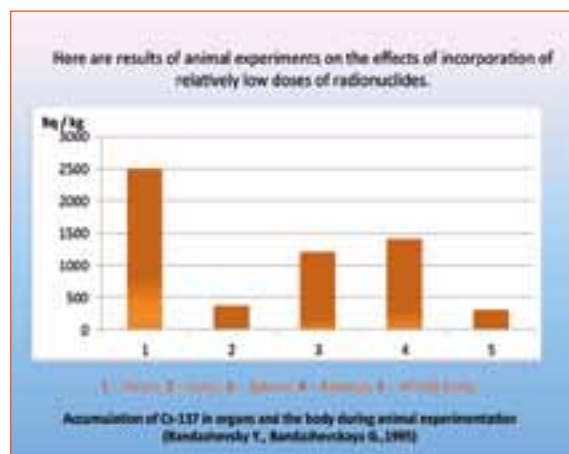


Unfortunately, not a single laboratory specializing in pathological morphology has continued our work. I understand perfectly well why this is. They have not been allowed to. While I was Dean of the university, where I was Chair of Pathology and I controlled all the anatomo-pathology work in legal medicine, it was possible to do it and the people who worked under my direction undertook this work. Unfortunately no one else has confirmed it. To be precise, it is confirmed in reports on animals. In the national report of the Republic of Belarus of a recent year of the 21st century, there is a sentence which says that radioactive substances also penetrate the internal organs of animals. (9) But before our work, official medicine never stated that radioactive cesium penetrates vital organs, of which – I stress – the thyroid gland is one. Note, we are not just talking about radioactive iodine. We should no longer talk about thyroid cancer related only to iodine. The whole question is a lot more complicated and serious. The heart, the brain, the kidneys, the liver, the vital organs also incorporate cesium.

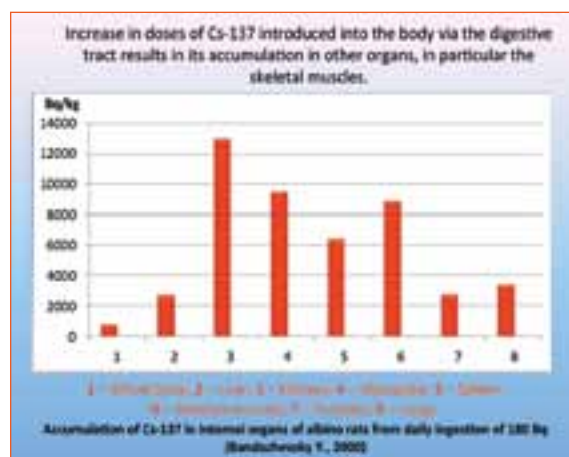
Now, let me turn to the notion of a syndrome, which I have defined as the “syndrome of long lived incorporated radionuclides”. A syndrome linked to the fact that the people living in radiocontaminated areas continuously accumulate radioactive cesium in their bodies, and particularly in internal organs. That is to say that all the organs simultaneously receive radioactive effects. What we are seeing is a breakdown of all the body’s vital organ systems. In this situation the question of health status must be approached not from the point of view of disorders of organs or systems separately but of the pathological state of the whole body.

Of course, we pathologists, who are guided by the study of the complexity of body functions and the regulatory activities of the systems of all vital functions, we understand how dangerous these effects are. That is why we study the effects of relatively small quantities – I don’t like the term ‘low dose’ – there is no low dose for cesium. This radionuclide – I correct the response of one of the presenters – radioactive cesium, produces beta radiation just as much as gamma radiation, over and above the fact that it affects all organs. It is an extremely dangerous radionuclide for human health.

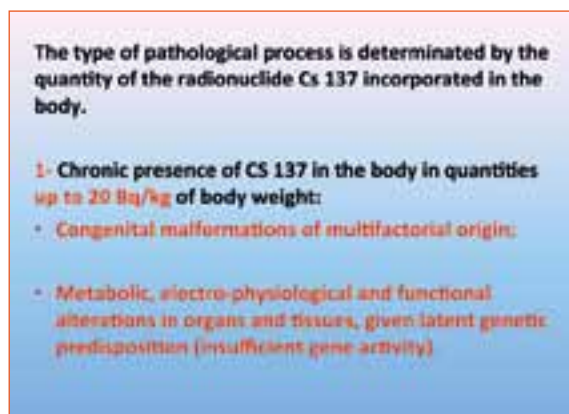
Below are shown animal experiments which confirm what we found on autopsy material. The same picture: heart conditions, even with low doses of incorporated, radioactive cesium.



In the graph below we see the muscles, the accumulation in the muscles. When we start to introduce 180, 200 becquerels in the body, we observe, of course, serious damage.



So what happens to the body when organs are exposed to such complex, simultaneous, permanent and prolonged radiation? For years, people have had 10 Bq/kg, 20 Bq/kg, 30 Bq/kg in their bodies. A mutation process occurs, destruction of the genetic apparatus. There will be mutations in somatic cells



and germ cells: the burden of mutations will be substantial. Furthermore, cesium affects the whole energy system. The same effects have been observed with relatively low amounts, 40-50 Bq /kg, in the body of an animal. Serious damage to the energy system is observed. And of course these effects occur, I must emphasize, in the heart, the liver, the kidneys and other vital organs.

We have shown that with just 10 Bq/kg, functional alterations are observed.

If you have 20 Bq/kg in the body, you will have more pronounced alterations linked to disorders of electro-physiological processes.

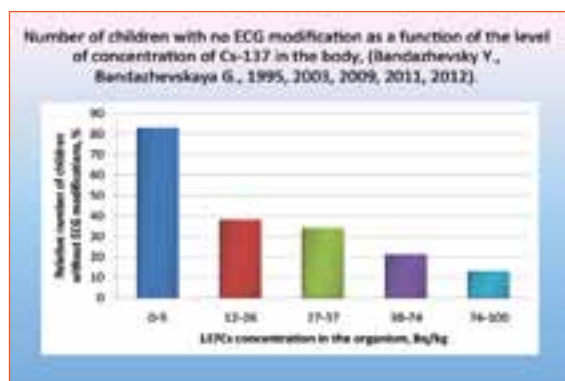
The nature of the pathological process is determined by the amount of Cs 137 incorporated in the body.

2- Chronic presence of Cs 137 in quantities of 20 à 50 Bq / kg of body weight:

- Conditions characteristic of Group 1;
- Dystrophic alterations in the cells, tissues and organs, leading to functional insufficiency.

I would like to draw your attention to what we discovered and verified extensively by analysing material which we obtained at the medical faculty of Gomel during the period I was director and during my work from 1990 to 1999. We published this material in a series of books which you may have seen here, published last year and this year, in French.

In particular, there is the book that was published in Russian. Y.I. Bandazhevsky et al. *25 years of Chernobyl: Incorporated Cs 137 radionuclides and human health*, Kiev 2011. In this book, we showed that with 10Bq /kg, the frequency of problems of cardiac conductivity in children suddenly increased.

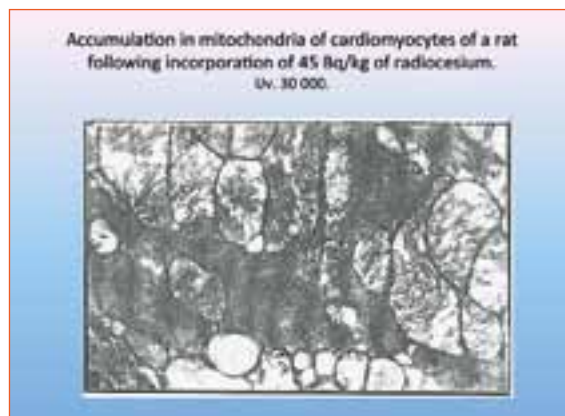


We explain this effect, which progressively worsens as dose increases, by changes in the kind of pathological alterations. If the dose is minimal, 10 Bq/kg, it induces predisposing genetic problems in functioning of the cardiac conduction system. It is extremely important to understand the inductive effects of low doses of radioactive cesium. Extremely important for the radiological protection of the inhabitants. The people, their families and their relatives who have lived for long periods in contaminated areas are extremely vulnerable to low amounts of radioactive substances.

They represent an entirely different population from those who have lived elsewhere and have had no contact with radionuclides. I would like to draw your attention to this in particular. Their metabolism is altered. There is a predisposition to induction of blockages of the conductive system of the heart by low dose radioactive cesium. When the quantity of cesium increases in the body – it increases because you eat food products – metabolic problems dominate the picture. Let's look at these metabolic problems in detail.

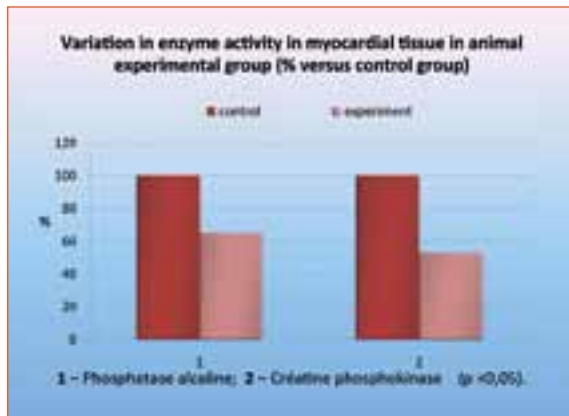
Metabolic disorders

Effects on the heart

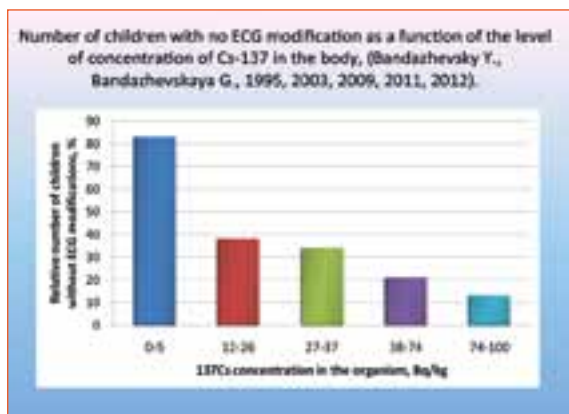


These are mitochondria. Let's look at their ultrastructural alterations. These are the electrical factories of the cell which produce energy, ATP molecules are the primary energy currency of the cell.

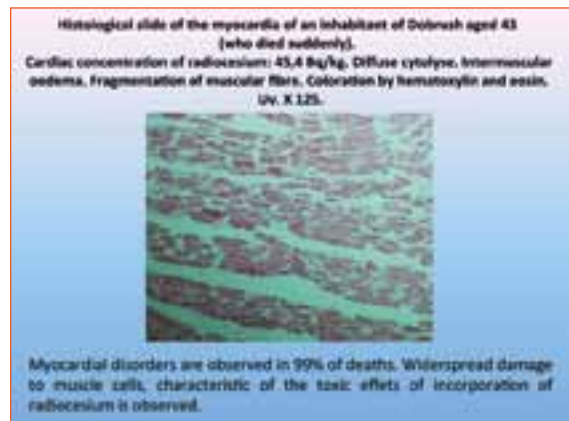
We have shown that incorporation of 40-50 Bq/kg reduces by half the activity of principle enzymes of the energy cycle, creatine phosphokinase.



When I lived in Belarus and worked in Gomel there were many children like this in the area. In Gomel itself, the average level of concentration in children in 1995 was 30 Bq/kg, which is high. Well, if it was 40 Bq/kg the energy potential of children would be halved. And we observed sudden deaths. I will never forget the loss of students, my students, apparently in good health. When I was in Japan, I was told about the sudden deaths that are occurring now. Unfortunately, it is not possible to collect data on this – unfortunate not simply because of the scientific implications, but in order to organise real protection for these people. So, people who have been exposed to radioactivity for long periods, become vulnerable even to minimal amounts of radioactive cesium.



You have already seen this curve. It is a fundamental curve; you can insert any data. We have confirmed and checked these research results many times. Research which shows how the heart activity of the child as well as the adult depends on incorporation of radioactive cesium in the body. [7]



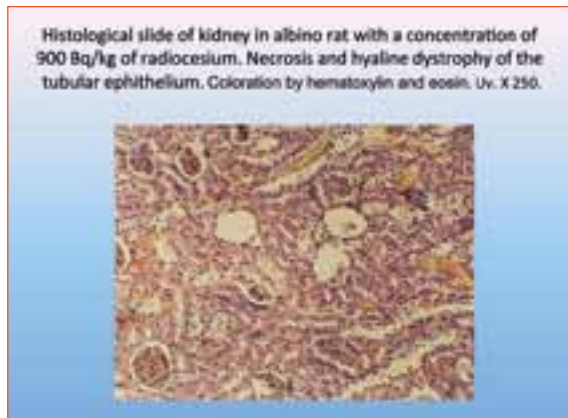
This slide shows a morphological manifestation of the myocardia of a person who suffered sudden death.

This is a unique document from the morphological point of view for specialists who study these processes, a very characteristic and interesting slide. This paved road with its contractures. I am reminded of something I read five days ago on the work done by some Ukrainian scientists. They irradiated animals with a dose of 6 Gray, which is an enormous external dose. I was astonished and I even took the article with me, and have it here. We described the same morphology in animals with 50-60 Bq/kg in the body. Such a difference in the radioactive effect: external irradiation of 6 gray or 50-60 Bq/kg (internal) which we encounter constantly today in people. This shows the extent to which internal irradiation is dangerous, the extent to which radioactive cesium is dangerous from the perspective of human life.

Effects on the kidney

The kidney is an organ which is very interesting from the point of view of incorporated radioactivity.

We discovered these “melted ice cubes” in the syndrome of long lived incorporated radionuclides, because practically nothing remains of the glomerulus, just a shadow. The cesium blocks the contractile structure of the arterioles which bring blood to the glomerulus, which results in ischemia and destruction. The “melted icecubes”



are characteristic symptoms of degenerative damage to the kidney by radionuclides of cesium. This is to be expected as the kidneys eliminate cesium, it is the principle organ responsible for the elimination of radionuclides. It is normal that it would be damaged in people living in contaminated zones; they suffer from permanent, chronic renal insufficiency. It is latent and it worsens depending on the lifestyle and conditions of the people who continue to live in contaminated areas. In fact, it constitutes an important stage in pathogenesis and cause of death of inhabitants from hidden causes, I repeat, from hidden causes.

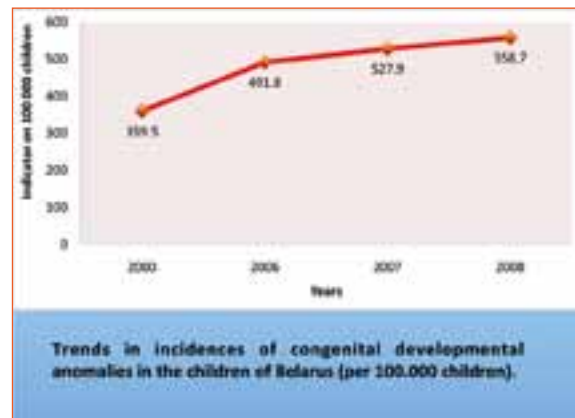
Effects on the liver

The pathological process of this organ is characteristic of the syndrome of long lived incorporated radionuclides.



Congenital disorders

In 8 years, from 2000-2008, there has been an increase – almost a doubling – in congenital malformations.



Congenital malformations of the heart are a very serious pathology: they make up 30-35% of all congenital malformations of the human body.

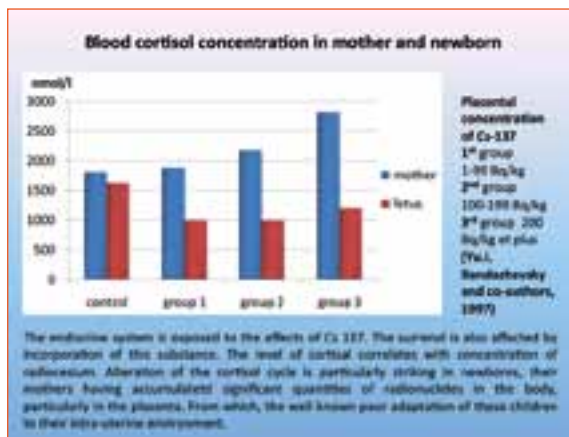
The most characteristic congenital malformation are multifactorial: face, brain, heart, digestive tract, kidneys. A genetic defect is at the root of the problem but it is induced by radioactive cesium.

Below are malformations we obtained through introducing radioactive cesium into pregnant Syrian hamsters. (10) These are analogous malformations.



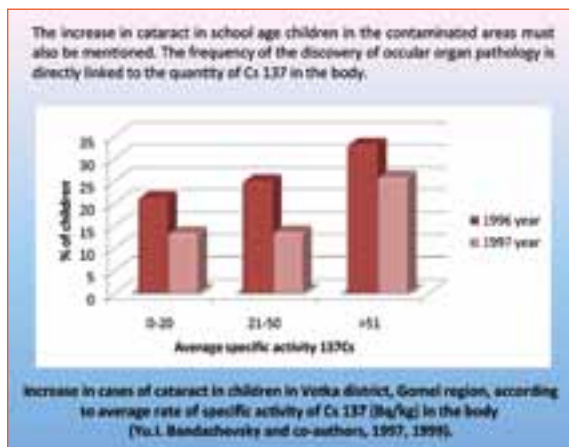
These are very easy to induce. I can tell you that in my extensive experience of experimental teratology, this is the first time I have seen an external environmental factor that induces congenital malformations so easily. This is the cause of what we are seeing in the human population today.

The pathology in newborns in the form of alteration of hormonogenesis (cortisol insufficiency in the new born) causes reduced resistance to illness; these are disorders of surfactant, and atelectasis of the lung, this is another congenital pathology, it is the cause of infant death in the first week of life.



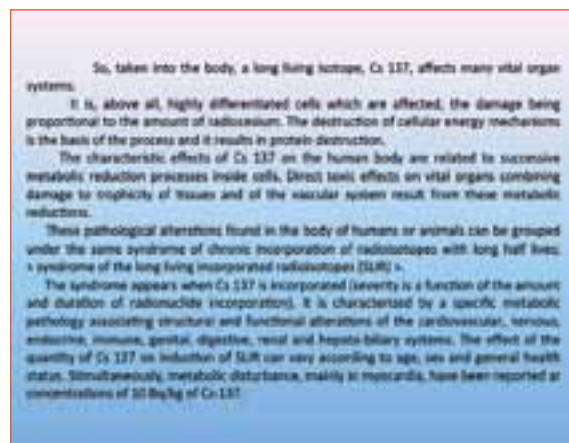
Cataracts

Here are the cataracts that Dr Bandazhevskaya talked about. We were the first to show this correlation. If you have any idea how we suffered because of this from retrograde ophthalmologists and how difficult it was to defend my student Kirilenko, in Moscow, when she showed these photos. It is really not simple. Today, we talk about all this but in 1996, it was a discovery: the occurrence of cataracts depends on incorporation of radioactive cesium in the body.



So, there is a syndrome linked to the action of radioactive cesium on all vital organ systems.

Based on knowledge of this syndrome, we can develop a protection strategy for the health of the population. The strategy should be related not to the effects of external radiation but to the quantity of radioactive substances incorporated in the bodies of residents. And people who live permanently in contaminated areas should have no radionuclides in their bodies.



Centre for Analysis and Coordination: Ecology and Health, in Ukraine

The centre for Analysis and Coordination: Ecology and Health that we have set up in Ukraine with the support of the European Parliament, has initiated an international project entitled "The integrated model for living in radioactively contaminated areas." The major objective of the project is to improve the health conditions of the population. You have seen from the data I have presented that the situation is dreadful. We chose the most tragic area for our work: the area of Ivankov in the Kiev region of the Ukraine.

The major objective of the project is to implement a model life system that is truly safe, in conditions of exposure to radiation, with the aim of improving the demographic situation and the health status of the populations living in the areas contaminated by Chernobyl. The project is based on principles of individual and collective radioprotection.

Following analysis of the post-catastrophe situation and in consultation with representatives of the local authorities, it was decided that Ivankov would be selected as the pilot project. This is the area that is the most seriously contaminated by heavy concentrations of the radionuclides Cesium

137 and Strontium 90. All of this, of course, implied the need for coherent measures.

First we had to assess the degree of contamination of the area. Because it turns out that in 25 years, no one had prepared maps of radioactive contamination in which people live, in which two and a half million people live, in Ukraine – in a zone described as radioactively contaminated.

The major objectives of the project are as follows:

Project 1

*Prepare an **up-to-date, accurate map of radioactive contamination** in the area in the sector of Ivankov, as the basis for future work to improve the functioning of the biological chain “earth – vegetation – animals – human beings”.*

Project 2

*Healthy, preventive and balanced **nutrition** for the population in the pilot sector. **Monitoring of internal radiation** of the pilot population.*

There should be no radioactive cesium in food products. No health norm should authorise any quantity of this radionuclide in food products.

Project 3

***Public Information** about the serious health problems experienced by the population living in contaminated zones. The aim of this initiative is to attract international attention and humanitarian assistance, particularly in the current political context of disinformation. Information to the pilot population.*

Of course, people need information. They do not know how to protect themselves, what they

should do, which dose of radiation is dangerous. Because they do not know the dose they have been exposed to, they have not been measured, there is no follow up, nor system of control or protection. The situation is extremely dangerous. And the international community does not have access to the objective information that it needs either. The site we have created [12] provides a great deal of information in several languages.

Project 4

*Construction of a **modern hospital centre** equipped to carry out systematic and meticulous medical examinations and provide adequate treatment, with appropriate preventive measures for patients. The hospital, as it exists today, is in no condition to receive or to treat patients.*

Among us today is the European Deputy Michèle Rivasi who has seen all this. I don't even know what words to use, for the scorn, the disdain towards people. This is truly an example of discrimination. Look at the Central District Hospital: it's an old barracks that served as stables during the Second World War.



The actual hospital.



Look at this. It's the operating theatre!



Look, this is the recovery room!



The kitchen!



And that is the dissecting room,
where autopsies are done.



When we showed this to Mr Joulia, head of the Commission for Nuclear Energy of the EU, his eyes nearly popped out of his head. He did not know that in this most stricken area, close to the Chernobyl power plant, where delegations pay tribute every year and place flowers on monuments, the local population is living in abject conditions.

Project 5

*This is the Regional Hospital Centre of the city of Ivankov, where **patients who have been contaminated will be treated**, once medical and diagnostic equipment has been installed. The regional hospital centre will also undertake preventive work in relation to health problems associated with exposure to radioactive substances.*

Do you think we are allowed to do it? How we have struggled and how hard we tried to get the money. How Michèle Rivasi has fought to get it! Four million have been allocated, but we still have not been told we can have it.

Our Centre for Analysis and Coordination "Ecology and Health" does not receive a single kopek, and is still "lobbying" for this project. They invent different tricks of legerdemain to conceal the objective facts and to keep us away from the project, which we came up with in the first place. The project will cost 17 million Euros.

That has already been estimated by experts from the nuclear committee.

Project 6

*Development of **readaptation programmes for children with heart conditions** in areas affected by the Chernobyl power station.*

Below is the plan of the medical health centre that we want to build.



The programme for rehabilitation of children with heart conditions is very important. Because there are many such children. Almost all of them have this condition. Each child in this zone with a heart condition must be treated. But above all, exposure to radioactive contamination must cease.

Project 7

Development of maternal and child health protection programmes in the pilot area.

The development of mother and child protection is an extremely important component of the programme. We will completely eliminate radioactive cesium for pregnant women; we will begin to correct the metabolism and thus avoid many congenital malformations of multifactorial origin, which account for a large proportion of these malformations.

Project 8

Development and implementation of technologies for producing health promoting food in the pilot sector.

Of course, we must develop technologies for the production of clean food products. But I must emphasise once more, we are referring to food

products that can be assimilated by the bodies of people who have been subjected to radiocontamination for a long time. The metabolism undergoes significant alterations; metabolism of lipids, minerals, proteins, glucids. A huge number of children and adults have latent insufficiency of the thyroid gland, the surrenal, and the pancreas. This does not always clearly manifest as a specific illness, but it increases risk of death in these individuals.

Thank you. 🍅

References

- [1] Marey A.N. and co-authors, 1974 - Rusyayev A.P. and co-authors, 1974. - Ternov V.I., Gurskaya N.V., 1974
- [2] Marey A.N. Barkhudarov R.M. Novikova N.Y. (1974) Global precipitations of caesium-137 and human being, Atomizdat, Moscow: 166 p. (in Russian)
- [3] NATIONAL STATISTICAL COMMITTEE OF THE REPUBLIC OF BELARUS, Statistical Yearbook 2010, Births, deaths, and natural increase of the population (p.60)
- [4] NATIONAL STATISTICAL COMMITTEE OF THE REPUBLIC OF BELARUS, Demographic Yearbook of the Republic of Belarus 2012, Crude rates of births, deaths and natural increase by regions and Minsk City (p.163)
- [5] Sécurité alimentaire pour les habitants du territoire affecté par la catastrophe de Tchernobyl, protection sociale et soutien humanitaire des liquidateurs et des victimes de la catastrophe de Tchernobyl /Matériaux de la conférence des 29-29 avril 2010. Sous la direction du prof. Y. I. Bandazhevsky. Kiev, 2010. P.24.
- [6] NATIONAL STATISTICAL COMMITTEE OF THE REPUBLIC OF BELARUS, Social conditions and living standards of population in the Republic of Belarus 2010, Deaths by main death causes in 2009, p. 252 (253 du pdf)
- [7] Y. I. Bandazhevsky, Medical and biological effects of radiocesium incorporated into the human organism, Minsk, "BELRAD". 2000. 60 p.
- [8] Swiss Medical Weekly, Y. I. Bandazhevsky, Chronic Cs-137 incorporation in children's organs (Incorporation chronique de Cs-137 dans les organes des enfants) No. 133, 2003, p. 488-490
- [9] 20 ans après la catastrophe de Tchernobyl : les conséquences dans la République du Bélarus et leur élimination. Rapport national // Sous la présidence de V.E Chevtchouk et V.L. Gouratchevsky. – Minsk : Comité pour les problèmes des conséquences de la catastrophe de Tchernobyl auprès du Conseil des ministres de la république du Bélarus. 2006. P.22
- [10] Bandazhevsky Yu I., Radiocaesium and congenital malformations, Internat. J. Radiation Medicine, 2001
- [11] Y.I. Bandazhevsky et al. *25 ans de Tchernobyl : radionucléides du Cs-137 incorporés et santé humaine*, Kiev-2011.
- [12] www.chernoyl-today.org

Independent initiatives and actions after Fukushima



Joint presentation by Wataru Iwata and Aya Marumori (Japan) representatives of the Japanese NGO Citizens' Radioactivity Measuring Stations (CRMS)

Wataru IWATA is a musician. He is the co-founder of CRMS (Citizens' Radioactivity Measuring Stations), a project launched in cooperation with the French association CRIIRAD¹ following the Fukushima disasters of March 2011.

I went to Fukushima at the end of April of last year with ten portable Geiger counters and two sets of professional equipment provided by CRIIRAD. At that time, it was really hard to obtain a measuring device in Japan, the price on internet auctions was between 10 to 30 times higher than before the Fukushima accident. We checked all the distributors in Japan, the U.S., Germany, France and elsewhere... and all those we contacted were out of stock.

When I started to measure in Fukushima, I felt that it was like war-time, people could not speak out about their anxiety concerning radiation exposure and the nuclear plant accident. Strong pressure was felt not only from the authorities and media, but also from their own families and community. With those pressures, they feel stigmatized.

I started to measure the air dose rate with the mothers and fathers of Fukushima, they are not the activist type, just ordinary people who really wanted to know the situation for themselves. It may sound a bit strange, but at that time, to measure, to know, was like a kind of civil disobedience.

I handed out portable counters, trained the people how to use them and asked them to put the results on the internet site which we prepared, so then it would be useful information to many others, too. Also, they started to work for others who wanted to know the level of radiation in their houses. Now, those young mothers and fathers with whom we worked have evacuated during the last year and this year. Even now our colleagues, most of whom are originally from Fukushima, are taking the decision to move or migrate.

With two sets of professional equipment, people led me to measure at the community park, nursery and school grounds and buildings. I asked them to gather more parents when I measured, so I did it with the parents and teachers who were following us while I was measuring. At that time, most were clamoring to ask the school and the teachers to do something about the school lunches, because the policy of the prefecture was "Eat local, Produce local", which was good before (the accident), but it was not good any more and is still not today. There was no trustworthy food control for the residents; that gave me the idea to install the measuring station. Simply because it was necessary.

In the beginning of May, CRIIRAD had already decided to send two researchers, so then I asked them to bring a food screening device and they did. These are photos of the cooperative research with CRIIRAD.



We started in Ishioka, Hitachi, and Kita-Ibaraki, then in Fukushima. We also went to Iitate village, which is located in an "indicated evacuation zone". There we met with one cattle farmer living in the Nagadoro area of Iitate where the air dose rate at 1 metre above the ground was 12-15 μ Sv/h on

¹ Commission de recherche et d'information indépendante sur la radioactivité

his personal dosimeter, which he had carried from April to the middle of May; it was already exceeding 5mSv when we met him.



Prof. Koide from KURII and many other researchers and citizen's groups, by the end of 2011 we were able to set up nine measuring stations in Fukushima prefecture, and one in Tokyo to back up the activity in Fukushima.

Here are some photos of the activities of CRMS in Fukushima.



In 28 May we held a “Food Measuring Event” at Fukushima city. A lot of people were lined up before the beginning of the event. We could only accept around 30 food items at the event.

After the CRIIRAD research, I went back to Fukushima in the beginning of June to install the measuring station. With the help of CRIIRAD,



Finally, I'd like to show you some figures to give you an idea of the current situation, what was happened and what is going on.

According to a report published by the Nuclear and Industrial Safety Agency (NISA) of METI (Ministry of Economy, Trade, and Industry), the total amount of diffused radioactive substances was 770,000 Tera Becquerel. On February 2, they changed their estimation down to 480,000 Tera Becquerel. It is not easy to claim that they are underestimating because there is still no clear agreement or investigation, no inclusive research on the full effects of the accident. And we have no way to cross-check these data.

Present situation

72,000,000 Bq are disseminated in one hour, reported by NISA on January 29. On February 27, 10,000,000Bq are being disseminated.

This data was restored by a prefectural officer from monitoring devices initially thought by the authorities to have been lost in the Tsunami. The officer asked on internet for help, the devices were found and now we have the information. These data show that the radioactive plume, especially a huge amount of I131, passed through Iwaki city. Part of Iwaki city is recognized as a “less-contaminated” area, and so what we know from this is that the initial plume is not related to the amount of fall-out that we detect now. Continuous investigations are necessary.

A big difference between Chernobyl and the Fukushima nuclear plant accident is that the accident itself is still going on. It is not shielded yet and we still sometimes have quite big after-shocks, the 4th reactor building is unstable and a large amount of the fuel is still stocked inside the cooling pool.

CRMS runs measuring stations, so of course we measure, but not only that. We are aiming at being an over-all radiation protection group.

Our Executive Director Aya Marumori is also in charge of our health and care programme. She will tell you more precisely about our health and care project and also what is going on at Fukushima as regards health. ▀



Aya MARUMORI

Aya Marumori is Executive Director of Citizens' Radioactivity Measuring Stations (CRMS), a project to protect the future of children from low dose exposure. She is an emergency relief coordinator and physical therapist. Her activities in other areas include helping war orphans and children with infectious diseases in Southeast Asia.

Our government has not correctly informed the population of the risks or of the exact situation after the accident (at the Fukushima No. 1 nuclear power station on 11 March 2011).

A lot of residents have been exposed to radiation without any warning since the beginning.

Furthermore, the government has been announcing “No effect on health from such a low dose, and no need to evacuate.”

Our children have been obliged to live in the contaminated areas without any protection from exposure. The authorities say “The problem is stress: people are afraid because of their ignorance (illiteracy) about radioactivity,” that **radiophobia** is more dangerous.

We have been unable to express aloud our concerns and anxiety...

A government health survey was undertaken in Fukushima starting in June last year.

The reply rate recorded by the survey is 21.5% until March this year (2012).

In a public opinion poll about the Fukushima health survey, to the question “Do you think this survey is useful or not?”; 51% of the residents answered “Useless”.

Why do residents say this? It is because the Fukushima health survey does not appear to be independent from politics and industry. Those who seek to protect health must be independent from any politics. The same goes for WHO.

We have held “Child Health Consultation Meetings” from the Spring of last year with volunteer therapists and doctors.

The mothers speak out with tears in replying to the doctors. They say they could not consult with local doctors. How to save them? The government’s health survey is not enough to save them.

CRMS continues to hold “Child Health Consultation Meetings” and to measure radiation doses in the body using the “Whole body counter”. We distribute notebooks called “Life Record Book” for parents to be able to estimate the personal exposure dose and to record the physical condition after the catastrophe... we need an epidemiological survey.

We are researching on health issues by ourselves with the cooperating volunteer scholars and experts through our own independent network.

We need more doctors and experts. We need more of your advice. Please join us!

Please help us to protect the children from radiation for our future and for your future. ▶

What is Europe doing in the area of radioprotection?



Michèle Rivasi (France) European Member of Parliament, founder of the Independent Commission on Research and Information on Radioactivity (CRIIRAD)

Good evening everyone. I am very happy to see you again. I’m thinking of Michel, of Roland Desbordes of course, Yves Lenoir, lots of people and above all Paul Lannoye. In 1986, there were not very many people saying that lying was the characteristic feature of nuclear power.

Action by CRIIRAD (Commission on Independent Research and Information on Radioactivity)

In relation to Hiroshima, all the information that was provided, we had such difficulty getting hold of it and we didn’t manage to get all of it. In my case, it was the Chernobyl catastrophe with its share of disinformation that made me set up CRIIRAD.

With the testimony from Fukushima, history shows that it is always the same kind of disinformation from organizations that are there to promote nuclear power. And that’s why I wanted to speak just after our Japanese friends from CRMS because the only way to guarantee access to objective scientific information is to set up independent laboratories. And that means that we have to mobilize citizens at the international level. We have the power. We just have to get organized.

And at the same time, we have to acknowledge that it is not easy. In 1986 it was very hard, because to establish an organization like CRIIRAD in a country as “nuclearized” as France – well it was a revolution. I don’t know if you realize but it was really not easy and above all to convince MPs to get instruments installed to measure radioactivity in the air on a continuous basis.

But today you can see the importance of this: after Fukushima we had access to independent measures of radioactivity. That is why we have to really help the Japanese in CRMS. Christian Courbon went there with Bruno Chareyron to take measurements. It is international coordination and solidarity that allows independent and accurate information to be obtained.

Radioprotection norms

Before I move on the subject of Europe, I would like to remind you of the different levels of authority that fix radioprotection levels. When I was elected deputy in France from 1997 to 2002, I understood that at the national level, and above all in France, the rule is that you can’t interfere with norms because they are set by the ICRP and after that there’s the European norms and then they are applied in France. Except that until now, France did not apply radioprotection norms to children.

Remember Chernobyl, the norms only applied to adults not to children. While there were European guidelines that said that you had to take children into account.

And when I was elected as deputy, I could not focus on the question of radioactive waste, they just didn't want me to deal with that subject at all telling me: "you're a woman, devote yourself rather to bioethics, the men will take care of radioactivity". The climate in France is really deadening, and often, when I discuss with German, Swiss or English people, they just don't understand what is going on in France.

In relation to regulations, the European Union has always encouraged the development of common radioprotection norms, based mainly on data provided by the International Commission on Radiation Protection (ICRP). From the moment of its creation, the EURATOM Treaty foresees the establishment of basic standard norms for health protection of the European population and workers from the dangers of ionising radiation.

Signed in 1957 and in force in 1958, the aim of the EURATOM Treaty is to develop nuclear power. This is the same Treaty that is supposed to ensure the protection of people and workers from the negative effects of ionizing radiation. So here again is conflict of interest that we are familiar with in the case of the IAEA: the promoter is the one that is supposed to protect.

So this is the context in which the Commission develops guidelines for radioprotection that member states must integrate into national legislation. However, Member States may adopt stricter regulations than those set out in the Euratom guidelines.

Basic norms were established for the first time in 1959 and have been modified several times since then to take into account developments in scientific knowledge in the area of radioprotection. The regulations cover ionising radiation from artificial as well as from natural sources.

Radioprotection and Europe

So what was my experience in the European parliament?

When I was elected in 2009, I immediately got interested in what I could do about the ongoing catastrophe of Chernobyl. Europe had given millions of euros to ensure the safety of the nuclear power plants and I wondered if this money could also be used in projects that would be more useful to the populations of contaminated zones. Do you realize: Europe has spent (with other international partners) more than 600 million euros making the reactors safe and now we are allocating more

millions for the dome, which will hide the reactor that is leaking. Above all we want to demonstrate that technology can hide what we would rather not see. On the 25th anniversary of Chernobyl, it was explained with some difficulty to managers in the energy sector that it had put millions of euros into the safety of the reactors, on storage of nuclear waste and that in the end, no radioactive waste is currently stocked there? You need to know that. There is a site for stocking radioactive waste but you're not allowed to enter and everything that was financed by the European union is in perfect shape. There are computers, walls of them, but they still do not have the required qualification for stocking waste in sites funded by Europe. And, in relation to that, we managed to convince some Members who came – Yuri Bandazhevsky met them – to see the situation in Ivankov in the contaminated areas.

At that point, we had hope because there was an amendment in the European Parliament voted by all MPs to assist populations that were victims of radioactive contamination. We managed to get 4 million euros for this project. So we were quite optimistic, we said to ourselves, we're going to be able to finance the Ecology and Health Centre of Yuri Bandazhevsky. And then, we had to put it out to tender, which took a year and a half. Recently, three days ago, what did I learn? It is no longer out for tender, the project will be undertaken directly with the Ukraine and it's hard to find people more corrupt than the Ukrainians. So sometimes, I'm close to throwing in the towel. You think there's an opening, you grab it, you think we're finally going to be able to help Yuri and his team and in the end, the franco-ukrainian lobby gets the money, chooses its own experts and undertakes the follow up of victims. This is where we are today and it's a disagreeable experience.

In relation to Fukushima, I went there and we got experts from the European Parliament to investigate the food situation there, because the EU imports Japanese food products. And recently the Commission told MPs – I'm a member of the Health and Environment Commission – that we were going to abandon controls on food imported from Japan. Now only cesium will be considered, whereas before, cesium 134-137, iodine, strontium, americium and plutonium were measured. No-one else reacted so I intervened and asked by what right were controls on food from Japan being limited? I was told that the Japanese authorities had said that there were no problems. So we're dropping all that

because it costs a lot. Yet we had requested that no food products be exported from Japan. Why contaminate ourselves pointlessly with tea, seaweed, with products from Japan while we have the same products that are uncontaminated? Well, all of that is the free market: the Japanese and their imports must not be penalized! In the end, we failed to block the system and a few products are being imported.

So now, what about radioprotection? In relation to this, there is the EURATOM Treaty, inescapable and terrible. This Treaty was signed in 1957, and came into force in 1958 and it foresees the establishment of basic norms for health protection of European public and workers. It is also there to promote the development of nuclear energy. Rather paradoxical: on one side we have a treaty that promotes nuclear energy and on the other side it sets radioprotection norms for the public and for workers. There are also huge democratic deficits, because it is the Commission alone that develops guidelines on radioprotection, the parliament may be consulted if the Commission so wishes.

EURATOM Guidelines 96-29 are the most important. Paul Lannoye is very familiar with them. They set the basic norms. Well, I'm not going to go into details but just provide a few indications about some of them, for example: Member States forbid the intentional addition of radioactive substances in food products, toys, jewelry, cosmetics, and the import and export of such products. Remember CRIIRAD and its battle to prevent ISOVER from putting radioactive substances in glasswool? We were able to block that on the basis of texts which forbade the addition of radioactive substances. But it is a battle every day.

The second major area of concern is the dose limits applied to people under 18 years of age who are not allowed to work in conditions where they would be exposed. I can tell you that at this moment, there are lots of young trainees in French nuclear power stations who work in proximity to contaminated areas. There is the limit of course for exposed workers which is 100 mSv over 5 years, thus the 20 mSv per year, and of course there is the limit for the public of 1 mSv.

It is Guidelines 96-29 which sets out these provisions. But there are also some which – in the event of an accident – stipulate that workers can be exposed to levels higher than the limit. When the Fukushima accident happened, we realized that we had not insisted enough on the situation

of sub-contracted workers in the nuclear industry who are exposed to higher doses. These workers are less well protected, less well followed up even though they are the most exposed. And we asked French people how far they would go. In the beginning, it was 150 mSv, then afterwards 250 but we are prepared to go to 500 mSv. So what we are asking for in France is the list of workers who will sign up for 500 mSv. You have to go that far to get a reaction. If tomorrow there is an accident, who will sign up?

So, let's look at the lacunae. First of all, the European Parliament is very rarely involved in EURATOM, the Commission decisions and when it is, it is only in consultative status. So, what we can do for example is not vote the EURATOM budget. And there, what do we face? We face a conservative European Parliament. The majority of the European Popular Party is pro-nuclear. And a majority of the European Socialist Party is pro-nuclear. So that leaves who? The Greens, a few GUE, a few Liberals, but we never have a majority. So there has been a little progress on the question of radioactive substances in food in the event of a nuclear accident.

That was before Fukushima. I spoke then as co-rapporteur and the rapporteur was confusing natural and artificial radioactivity. I had to work pretty hard to tell him that when a child ingests food containing 1000 becquerels per kilo, the maximum permissible dose in mSv is exceeded. You see, you have to go back to the basics.

And there was also the problem of the three norms: one for adults, one for children and one for animals, so very simple in the event of a nuclear accident to control all these levels. We managed all the same to get the Parliament to use only the dose limit for children. And I made an official request that they provide the scenarios that allowed them to calculate levels for contaminated food of about 1000 Bq. I have still not received these scenarios. So you see, we always come up against confidentiality of data. And after the Fukushima accident, we were at 1000 Bq par kilo for food and the Japanese were at 500 which obliged the European Union to align themselves with norms that had been set by the Japanese.

And here's another concern: the lack of detection. You remember that CRIIRAD launched a petition when there was the famous cloud – it was in November 2011 – coming from Hungary. It was over Europe for a month. And it was radioactive

iodine. And no one knew the emission source of the radioactive iodine. I challenged the Commission expressing surprise that Europe with its 142 reactors could not detect the presence and origin of a radioactive cloud? And I realized that in spite of articles 35 and 36 of the EURATOM Treaty which obliges States to have instruments to measure radioactivity, detection instruments, that there were only detection instruments measuring μSv per hour. And micro-sieverts per hour cannot be detected if it is iodine. And that only two countries have these instruments, Sweden and Germany in the context of the ECTE which deals with nuclear testing. So I reported that to CRIIRAD which does have these means of detection.

One more paradox: in Europe we have provided ourselves with huge numbers of nuclear power plants and we have very few means of detection of radioactivity. This means that tomorrow if CRIIRAD did not exist with all its detection instruments, we would be in the same situation and we would know nothing about a radioactive pollution incident if it happened.

What can we do?

Taking all this into account, what can we actually do today? When I see the 1959 Agreement between the WHO and the IAEA, I say to myself that as a Euro MP I could perhaps make a written declaration to the Commission to put an end to the cover up. It does not fall directly under the competence of the Europe Union but at least MPs would be informed. A written declaration must be signed by half of all MPs, bearing in mind that there are 756 of them – so we need more than 350 signatures. On the basis of the written declaration, the Commission takes up the question and can do something. I think that from the point of view of the media, it would be a good thing to make a declaration to say that this situation just cannot go on. We've had Chernobyl, we've had Fukushima, and we see the disinformation. We have to cut the umbilical cord and demand that the Commission express our disagreement on that to the WHO.

You see, we've got to do something. I'm ready, I have all my renewable energy for you! But we have to find a way to cut the cord and at the same time, force each State to equip itself with its own detection instruments and above all to share the information. But in the last analysis, what we need, above all, is to get out of nuclear power. That

is the solution. If we don't want nuclear accidents, whether in Japan or in France, in any country, we have to abandon nuclear power. Thank you. ▶

DISCUSSION 4

Points raised

Real levels of exposure – Financing independent research – EURATOM group “Article 37” – Dr. Marcel Junot – Synergies between electromagnetic hazards and nuclear hazards – Stress test – The Aarhus Convention – Free radicals and reactive oxygen species – Evacuation of areas contaminated at levels exceeding 20mSv/year in Japan

Comment

Chris Busby, chemist and physicist

The result of all this is a lot more serious than you think. People’s exposure to radioactivity really started with nuclear tests and this set off an increase in cancers of about 30% in most countries. We can show that about 60 million people have developed cancer because of this. Fertility in the world has decreased, congenital malformations have increased and Mrs Rivasi says that we should do everything possible to prevent this because without doubt, life on earth has reached a critical point. But we can’t wait for the organizations that we’re talking about – WHO, the IAEA, the “Article 37 group” and all these people in power – to do something simply because we ask them to. There seems to be an impenetrable glass barrier between what people want and what is done. It is an impossible situation because we are living the worst public health scandal in history, in the history of life on earth and yet it seems to be impossible to do anything.

Two things are absolutely essential. The first is that funds must be found for independent research. People who are independent researchers like my colleagues, like Yuri Bandazhevsky, like myself, like other people – and there are not many of us – who work for practically nothing, and it is very difficult to function. They can’t get proper equipment, they can’t do the measurements, and yet the future of the planet and our survival depends on them. They have no funding to employ younger staff, to teach them about the studies that are needed. We’re all getting old, we’re not going to live forever, and perhaps we are just going to get fed up and go fishing.

The second thing we can do is to use the legal system. As expert witness I have won more than 20 court cases, serious litigation, involving millions and millions of dollars in damages – cases that I contributed to winning using the ECRR risk model¹ and using the argument that we have all heard today. But these legal cases don’t get media attention because they are always settled out of court. As soon as companies know, or the nuclear industry knows they are going to lose, they settle the case with a nice big cheque. But we can launch legal attacks using international human rights law and through legislation that is implicit in Euratom. Later, I’ll talk a bit more about this. But I just want you to understand; it is extremely serious, it is not something that we can afford to ignore.

Comment

I would just like to propose a homage to Dr Junot² of Geneva, who was the first to provide medicines to the victims of the Hiroshima catastrophe. I believe that there are several monuments dedicated to him in Japan, as there is here in Geneva in front of the Ariana Museum.

1 ECRR: European Committee on Radiation Risk, CERI in French. <http://www.euradcom.org/>
ECRR, which has 50 members, was set up in 1997, as a dissenting group in relation to studies undertaken by the European Parliament. ECRR examines the content of European Directive 96/29 which sets basic radioprotection norms.
Voir aussi : <http://www.euradcom.org/2011/ecrr2010.pdf>

2 See website of ICRC : http://www.icrc.org/fre/resources/documents/photo-gallery/photos_marcel_junod_05-2004.htm
(in various languages)

Comment

Jacques Surbeck, Director of Research, SEIC Genève, member of the International Commission on Health at Work CIST/ICOH

There are also other hazards and synergies that should perhaps be denounced. As Mrs Rivasi knows, CRIIRAD gave birth to CRIIREM³ and there are synergies between electromagnetic and nuclear hazards. We were invited by Professor Bondarovskaya to Kiev in 1990, and we observed that electromagnetic radiation from computer screens disabled the immune system in people previously exposed to radiation from Chernobyl. So there are synergies between the two hazards, and I work on this subject and I can provide more information if needed.

Reply

Michèle Rivasi, European MP, Europe Ecologie – Les Verts, founder of CRIIRAD

Of course, and furthermore, it has been observed that electromagnetic rays can break DNA bonds. Until now, it was thought that only ionising radiation could do this. So it's true that there are synergies, and at the same time there are biological interactions. And that shows that even though we are working in the scientific field, we are working in sectors, and we are not seeing the problem of the cocktail of chemicals, the cocktail there can be between ionising radiation and electromagnetic rays. That's why we need a really excellent Health and Environment centre.

Question

Claude Proust

I would like to know if the question of guidelines on the use of radioactive substances in construction material that will be made available to the public, will be addressed at the Forum on Nuclear Energy, organized by the European Commission 14-15 May 2012.

Reply

Michèle Rivasi

As you know, Europe prides itself on being democratic. So the Commission invites industry for discussions. By the way I recommend a film⁴ that has just come out, that I saw in Brussels, on corruption at the Commission which demonstrates the power of the lobbies on guidelines developed by the Commission. But this forum is about listening to civil society, so any question relating to nuclear power can be raised. It's the Greens who said: NGOs, and other associations must be able to say what they think about a subject and this forum, in a way, belongs to them. Last week, a whole week was devoted to stress tests, these famous tests of resistance, for which countries have not adopted the same criteria. We did not adopt the criteria of terrorist attacks because for us security is the responsibility of the High Commissioner for Defense, not of the ASN (Nuclear Safety Authority) which is responsible only for safety. In contrast, the Germans adopted criteria in relation to terrorist attacks. We would like there to be the same criteria and that we look at the 142 or 143 power plants in Europe: shouldn't some of them be closed down? At the moment, there is no transparency in this area, everyone congratulates himself saying: we did all that in one year, it's great what we did.

3 CRIIREM: Centre for Independent Research and Information on non-ionising Electromagnetic Rays. (Centre de Recherche et d'Information Indépendant sur les Rayonnements Électro Magnétiques non ionisants).

4 "The Brussels Business", documentary by Friedrich Moser and Matthieu Lietaert

Question

Claude Proust

I have another legal question. The Convention of Aarhus of 25 June 1998⁵ deals with conditions relating to public information on technological risks. A round table was held in February 2012 to see what should be implemented in case of a nuclear catastrophe. I would like to know if you have any information on this subject.

Reply

Michèle Rivasi

There is reference to the Aarhus Convention in relation to shale gas and lots of other things. What is worrying is that it has been ratified by most countries but it is not applied. We are very skeptical, we would prefer there to be a European directive, because afterwards a directive is translated into law in each country and becomes enforceable. The Aarhus Convention is not sufficiently dissuasive. In case of disaster, we want realistic life size exercises to be undertaken in every country that has power plants because for as long as it's just on paper, you can't see all the problems that could arise. In Japan, people left in buses and there were confinement zones. Where are the confinement zones in France? We behave as if an accident will never happen. So that means we must force our MPs and the state to assume their responsibilities and ask them: in case of an accident, what do we do? It's a really good lesson: encourage your MPs to do it in your countries.

Question

I would like to ask Professor Bandazhevsky and other pathologists who study the damage caused by nuclear power if anyone has studied free radicals and reactive oxygen species in these people, because someone mentioned conversions and synergies. For example, reactive oxygen species are found in all kinds of environmental insults including non ionising radiation and environmental pollutants, and if so, perhaps antioxydants should be included among measures to reduce damage from nuclear power.

Reply

Y. Bandazhevsky, anatomopathologist

We have some information, our information is from experimental studies. They showed activation of peroxydation and also of course, an increase in the level of free radicals and destruction of erythrocytic membranes. We have these data since 1995, in the first book we published ourselves. It was presented at that time with the imprimatur of the Minister of Health and the Gomel Institute of Medicine. We presented it with a foreword and the signature of the Minister: a mine of information, which the nuclear lobby cannot now ignore, even if it so wished. Between 1990 and 1999, when I was at the head of the University and Gomel Institute, a large number of studies were published. This is why the book contained this large quantity of material.

A scanned copy of the book is on our site⁶. You will find everything there. There is the recent book by N.V. Karpan in English, "*From Chernobyl to Fukushima*". He is an expert in radioprotection after Chernobyl, one of the main experts, he criticizes all the positions of the nuclear lobby. He has material on catalase, on peroxydation of lipids, from precise biochemistry which shows that 50-60 Bq/kg in the organism causes problems. I must emphasize again: a complex effect on the human system, on all organ systems, causes the problems. Undoubtedly we have to think of a system of security. I completely agree with you. There is a whole area of work on stabilization, with additives balanced

5 french: <http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43f.pdf>

English: <http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf>

6 www.chernobyl-today.org

with vitamins, with correction of metabolism of proteins, correction of metabolism of lipids. The situation is extremely serious.

Here is an appeal, it is a good proposal – I agree with Chris Busby – to form a group of independent scientists. Because if you do not bring together scientific competence you disappear. All this gathering of militant movements and support, if it is not properly supplied with arguments, you will not be able to make any demands. And yet your aim is to make demands on governments. Your task is to make demands that are well argued. When you present a well argued petition to governments and parliaments, when you take action with arguments, you cause will be won.

This is how in 2008 – Michelle Rivasi will back me up – we organized our scenario in relation to the Centre in Ukraine. Before that, we had been presented with conclusions that showed that everything was going fine – in parliament they showed me these reports, the one Mrs Nyagu produced – I intervened and said that it was false. In its previous composition, the group Ecology in the European Parliament did not allow us to set up the centre. It was only Cohn-Bendit, Rivasi and Lepage who came to parliament and we were able to obtain the resolution. You have to present arguments in order to make demands, you have to set up programmes that are properly argued. That requires experts, professionals, and when you have more professionals, you can use the existing antinuclear movement, in a well argued way.

Question

Marc Molitor, journalist

I have a question for Aya Marumori and Wataru Iwata. I expect you are often asked difficult questions by people such as “What should I do, should I stay, should I go?” There are families that are divided, children who have left with their mothers during the summer, while the father stayed on. How do you respond in such situations?

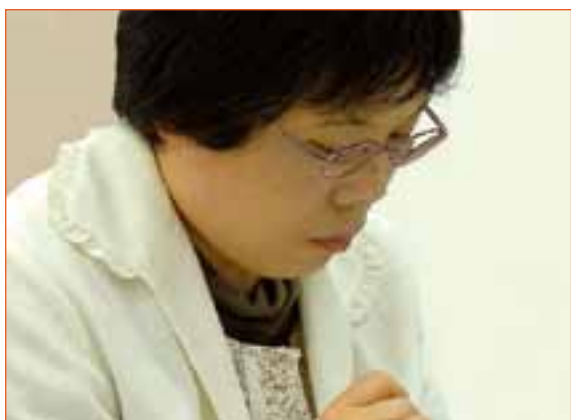
Reply

Wataru Iwata, CRMS

There are many different situations. Each local authority took different radioprotection measures. The government decided to set the maximum dose limit at 20mSv/year. Not only the government but citizens accepted this limit as the criterion for evaluating the impact of radiation. You have to remember that radiation poses problems not just for human health but also for social relations in communities. Our happiness does not depend just on being in good health and not suffering from cancer or from other illnesses. We are facing social, ethical and legal problems. The people who left the contaminated areas voluntarily are facing enormous difficulties. For example, in certain areas of the city of Date (Prefecture of Fukushima) where radioactivity exceeds 20mSv/year, residents are encouraged to evacuate. The authorities visit them and encourage them to go but they ignore those living in houses where the level is less than 20mSv/an. So you see neighbours suddenly disappearing without saying a word. Some women had to divorce in order to be able to evacuate the contaminated area. One woman had a legal case taken against her by her husband because she left with the children. There has to be a legal solution to the problem of people living in contaminated areas.

In comparison with the city of Date, the city of Iwaki is less contaminated. We have undertaken medical examinations. The ban on entering the 20 km area around the Daiichi power plant has been partially lifted. Grandparents are returning for the first time and they put pressure on their children and grandchildren to come back despite the reticence of certain mothers. There is pressure to return to houses in areas where radiation is relatively weak. I don't think there is one solution to these problems. Some people want to return to a familiar environment. Old people wish to die at home. There is not one solution for everyone.

Our struggle for survival continues



Miwa Chiwaki (Japan) Fukushima Mothers Association: "Kodomo Fukushima", The Fukushima network to protect children from radiation.

The accident at the Fukushima-Daiichi nuclear power plant that followed the huge earthquake on 11 March 2011 has caused loss and destruction to people in a number of ways. Its effects are being felt all over the world and we experience sincere regret about this. After the explosions, we were given no information by the Japanese government, by the Fukushima prefecture, or by the mass media.

It was via the internet, in a BBC programme, that we first saw pictures of the explosions at the power station. The Japanese government had information from SPEEDI (System for Prediction of Environment Emergency Dose Information) and they passed this information, first to the American government on 14th March, and then to the Japanese people on 23rd March. The Fukushima prefecture had in fact received an email on the subject on 11th March, but they did not inform the population. Later, when questioned by the media about this, they claimed that "they had not noticed the email and it had been deleted by mistake".

This is why many inhabitants in the 30 km exclusion zone found refuge in precisely the area where radioactivity had spread. If they had been informed, they would have gone in a different direction. They were exposed to massive contamination that they could have avoided. Distrust and anger among the population grew.

The true levels of contamination were also hidden from them. So, many mothers queued up with their children in the rain for several hours, to receive water rations when the water supply

was cut following the earthquake. They reproach themselves and have terrible regrets, that through their own ignorance, their children were exposed to radiation.

In Iitate, villagers were abandoned to very high levels of contamination for a whole month. Advisers on radiation control from Fukushima prefecture flocked to the villages and, with broad smiles on their faces, told the people that "there's nothing to worry about, you can let your children play outside". Three days later, the village was classified as a "planned evacuation zone" and the entire village had to find refuge elsewhere. The villagers cannot hide their fury at being treated like guinea pigs.

The circumstances of the accident and the real levels of contamination were only revealed in piecemeal fashion. A month after the accident, it was categorized as a Level 7 event. A "safety campaign" was initiated on 20th March. Professor Shunichi Yamashita of Nagasaki University was sent around the country, giving conferences, smiling broadly, and saying things like "100mSv? No problem", "Radiation is only a threat to people who worry about it", "Smile, and you won't be affected by the radiation".

The people have been left in a state of fear and ignorance and have reacted in one of two ways. Either they want to be reassured and hear the words "everything's OK" or they know the dangers and are very worried. There were cases of people being threatened with divorce if they even mentioned the subject of radiation, and some were told they were over anxious, even mentally disturbed. Even within families, or local communities, the subject of radiation was taboo.

But elsewhere, with Geiger counters in their hands, citizens began to measure the levels of radioactivity for themselves, in schools and in playgrounds. They discovered very high levels of radioactivity in the central part of the prefecture, Naka-dôri, which is very densely populated. One parent said "I have a child in primary school. Every morning, I send her to school with a smile, so as not to worry her. Then I spend all day feeling terrible. Am I doing the right thing to send her to school at the moment? Am I really doing the best to protect her? I spend all day asking myself these questions. Am I a bad parent..." We received many emails saying similar things.

76% of primary and secondary schools in the Fukushima department were found to be

contaminated at levels higher than 0.6uSv/h in the atmosphere, the threshold above which radiation must be monitored. On the 19th April, the Minister of Education and Science gave notification regarding children that “any contamination below 20mSv/an (or 3.8uSv/h) could be tolerated and was acceptable”.

Reading between the lines, parents in Fukushima understood that they were being told “there’s nowhere for you to go, you’ll have to stay put”, “no question of paying to decontaminate your schools, or removing the surface soil of the playgrounds”. In other words, we understood that our country is no longer protecting our children. We saw quite clearly that if the government does nothing, then it’s up to us to protect our children ourselves and each one of us got mobilized, for instance, by telephoning the Education Committee.

Some schools wanted to use this notification to justify restarting outdoor activities. This was when parents got together to protest. And after an appeal on the internet, “Kodomo Fukushima” was set up on 1st May. The network brings together 250 people from all over Fukushima, mainly mothers and fathers, to protect our children from radiation. We have come together with just one objective, namely “to undertake all and any action in order to protect our children from radiation” and each of us has our own activity; measuring levels of radioactivity, making maps of the contamination, and organising study meetings and conferences, that take place all over the Fukushima prefecture, to look at “The effects of radiation” or “Learning from Chernobyl” for example.

On 23rd May, we began negotiations with the Minister of Education and Science and this marked a huge step forward in the retraction of their “notification of 20mSv”. Seventy people set off early one morning from Fukushima, in two buses, to the Minister of Education and Science in Tokyo. The negotiations took place outside, sitting on the ground, under a fine rain. More than 600 people came from all over Japan to support us. With all of us united in strength, on 27th May, the Minister of Education and Science amended their advice; “this year, we will try to keep levels of radiation in schools below 1mSv/year”.

Today, centres for measuring levels of radioactivity in food are opening one after the other, not just in Fukushima prefecture, but all over Japan. The need has arisen because the provisional norms set by the government are high and the official

monitoring system has not yet been properly established. So, contaminated rice was being sold, following an announcement by the Fukushima prefecture that it was safe to eat. Consumers are becoming more and more anxious. The authorities use the term “damage due to rumour” when describing radioactive contamination of food, rather than acknowledging that it really is damaged, and they have a campaign called “eat and encourage”.

Parents worry that contaminated food, that has somehow evaded control, is being sold in shops. Households have no choice but to decide for themselves; some of them buy produce from far away, others do nothing and carry on buying local produce, and then there are those who understand the risks but do not have enough money to buy uncontaminated food. This is why we opened the “Cafe-Hamoru-vegetables”, where we stock organic food grown in the West of Japan to sell in the city of Fukushima. We provide information to customers and also organise information meetings.

School canteens

As for school canteens, parents have got together to demand that schools and local councils monitor radioactivity very strictly, use only uncontaminated ingredients etc. Some parents give their children a pack lunch to take to school or nursery. However, there is great disparity in levels of anxiety among parents and many of them are carrying on as normal and saying to themselves “if everyone else is saying its OK, then it must be OK”, “my children will be sad if they have to eat separately from the others” etc. But a national network has been set up to protect children and a number of projects have been initiated.

On 26th January 2012, the newspapers reported that 30% of children in the Fukushima prefecture whose thyroid gland had been examined, were found to have small nodules and blisters, but that these were not related to radiation. Dr Shunichi Yamashita wrote to members of the Japanese Thyroid Association “that no additional examination is necessary”. Is this true? Parents do not hide their anxiety and concern about their children’s health.

It is mainly thanks to independent networks that people have been able to go and stay somewhere else temporarily to take care of their health. The city of Fukushima organised a planning meeting

in the Ônami district, a zone that had been recommended for evacuation. These were their opening words: “evacuation reduces economic activity, so we would opt for decontamination”, in other words “We won’t let you leave”.

The city of Fukushima merely says that zones measuring more than 2.0 uSv/h in the atmosphere will be accorded priority for decontamination. In addition, they are asking inhabitants to volunteer in the decontamination process because the work will need to be done several times, and the local authority has not got the capacity to complete the job alone. But when they are asked about their decontamination plans, they say “we have no plan”.

We would like to ask the following question: “Undertaking decontamination proves that there is contamination in these zones. Why undertake decontamination while leaving children here?” But the administration continues to say; “with decontamination, there is no longer any need for evacuation”. Additionally, a number of schools seem happy to follow the example set by the government. One school, in a highly contaminated area, organised their sports day in the playground. Anxious mothers asked for the event to be cancelled or at least for it to be held in the gymnasium. The head teacher advised them to withdraw their children, on an individual basis, from school on D Day.

Another example ; in a primary school, the children were lined up and asked one by one if they were going to take part in sports day. No child in this situation is going to say “No, I won’t be taking part”. Naturally, they all said “Yes, because we’ve been asked”. So everyone said *ichiou*, “because I’ve been asked” or “as a formality”. Pupils in secondary school or at college place a lot more importance on their friends and on social activities than on their parents’ opinion. I have been told of girls who, even though they are refusing at all costs to move away, talk among themselves, and wonder if they will ever get married or have children. What right have we to make our children suffer in this way?

It was estimated in February 2012, that about 62,000 people had left Fukushima prefecture to seek refuge elsewhere. At the end of March, when the school year begins again, it is likely that there will be more spontaneous departures from areas outside the evacuation zones. In June 2011, 14 primary and secondary school pupils, from the town of Kôriyama, formally demanded that the local authority respect their right to be evacuated and to continue their education in a less contaminated

area. This initiative has been called “the Fukushima case for collective evacuation”. Dr. Eisuke Matsui has written a letter of support on our behalf. But six months later, the demand has been refused.

We have launched an appeal. Refugees from outside the evacuation zones are called “spontaneous refugees” and they leave however they can; sometimes the whole family leaves, sometimes the mothers leave with the children, leaving their husbands to work and to look after the house in Fukushima. Within a family there can be sharp divisions of opinion and sometimes people leave very abruptly after a dispute or divorce. When people want to leave but cannot, they reproach themselves for weighing up the situation for adults against the health of their children. Those who have left say “I left a lot of people behind in the contaminated areas. The area where I was born has been destroyed and I have no idea how I am going to survive and I have little confidence in my own existence”. Those who stay in the contaminated zones are done for, desperate and have been forced to abandon any right to a healthy life. Many refugees want, in their own turn, to support those who have stayed behind.

We organise meetings to create links between people who would like to move, organizations which would accomodate them and the local authorities, to enable people to take “a short break to take care of their health”, to care for children, their bodies and souls, even if it is only for a short period. Many people come to these meetings. We have learnt lessons from the experience of Chernobyl and will never give up in our efforts to protect the lives of our children and of everyone else. We ask the whole world to give us their support. Thank you. ▶

Small Area Cancer Epidemiology for the Citizen: Some approaches



Chris Busby PhD, (United Kingdom) chemist and physicist specializing in very low doses of ionizing radiation

I have been invited to many, many, many meetings like this in the last 20 years and we all end up agreeing that the situation is very bad and we all agree that everyone is being poisoned and there doesn't appear to be any change occurring in the people who continue to poison everybody, the nuclear industry continues to exist and nobody seems to be able to stop it. So I have changed my direction of approach to one of attempting to determine some sort of a strategy for stopping the nuclear industry and I will present this to you today. And I want as many of you as possible in this audience to help me in this project and particularly I want to enrol the heads of NGOs so if you have any organization (and I am sure there are lots of people who are running organizations here), in Europe, I want you to help me to bring down the nuclear industry and there's a way we can do this: the point is there are international rules or international agreements about human rights and in Europe there's the European Declaration of Human Rights and within this there's a question of human rights and the environment. Now it turns out that in Europe the control of exposure to radiation is defined by what's called the Euratom Basic Safety Standards Directive, which was developed in 1996; I was involved then in looking at this directive with some other scientists for the Greens in the European parliament; and we advised the Greens to try and stop this directive being brought into European law, which in the end they couldn't do; but they managed to include a little bomb inside this directive: it was a

clause under one of the articles of the directive that said that if any new scientific information should appear after the directive was taken into European law then they would automatically have to re-justify all nuclear practices, so now anything to do with nuclear radiation would have to be re-assessed on the basis of this clause. This is terribly important because 1996 was a long time ago and between 1996 and nowadays there have been hundreds of scientific papers that show that the basis of the Euratom directive is incorrect, that the science underneath the Euratom safety standards directive is no longer adequate; hundreds of scientific papers which are being ignored, as everybody has said, which are being totally ignored by the IAEA, by the ICRP: the latest version of ICRP risk model says nothing at all about Chernobyl, doesn't even mention it. The data from Chernobyl is completely ignored, but it cannot be ignored within the framework of the Euratom basic safety standards directive because this is now European law and there is a clause in the directive that requires re-justification if this new evidence becomes available. So there are two consequences of this: the first is that every individual in Europe as a member of a Europe state country has the right to petition the European parliament on any issue. They have a petitions committee that decides whether these petitions should be looked at or not: ... so if enough people send a petition to the petitions committee at the same time then they have to do something about it, they have to do something about it because it's within European law. So this is a legal direction we can all take. So I want every single person in this room and every NGO you know ... to contact us ... and all at the same time we want to produce a tsunami in the petitions committee of the European parliament, so thousands and thousands and thousands of petitions, all saying the same thing, which is that there should be re-justification of the European laws relating to radiation protection, should hit all at the same time and sweep them away in a global catastrophe for the nuclear industry. That's one. The second thing you can do, which I want you to do, is to write the same petition as a plea to the nuclear protection agencies of your countries: so in Sweden to the SSM, in Germany the *Bundesamt für Strahlenschutz*, the IRSN in France, in England the national radiological protection board and anybody else that you care to petition ... and you demand, on the basis of the Euratom directive that they reassess their radiation risk model, because of the new information that has

come out as a result of Chernobyl after 1996, and of course they will say “no” – but that’s good, that’s because we want them to say “no”, because as soon as they say “no” (and hope you’re listening) we will go around them to the European Court of Human Rights. Now in the European Court of Human Rights we will be dealing with philosophers and judges and not with physicists, and in any domain where we deal with philosophers and judges we will win, there’s no question, because our cause is just and because everything we say is true, and because the logic is irrefutable. OK, now I’m going to give my talk.

Why Epidemiology?

- For 50 years the biosphere has been filling up with novel chemicals and radioactive substances,
- Despite huge advances in scientific and medical knowledge the rates of cancer, diabetes, asthma, heart disease, congenital and neuro-degenerative diseases continue to rise.
- All of these diseases can be linked to environmental exposures. For example, the present cancer epidemic can be linked strongly to exposure to atmospheric nuclear testing in 1959-63.
- Data on cancer incidence rates in small areas is collected by cancer registries but is never released for independent studies. Epidemiological studies would show links with pollution sources and this would lead to panic, litigation and closure of many influential and powerful industries. This is a war.

There are victims. Gemma D’Arcy died of leukemia at the age of 6. She lived near the nuclear reprocessing plant at Sellafield. The 10-fold excess Cluster of child leukemias at Sellafield was discovered by Yorkshire TV in 1983. More recently, child leukemia clusters have been found by Welsh TV near the contaminated Menai Strait. I was involved in the epidemiological analysis of this data.

It is epidemiology that enables us to examine data and see if it shows the existence of a problem. It is not difficult. It involves simple detective work and a little bit of mathematics.

The first epidemiologist was Dr John Snow. Snow mapped cholera in London in 1854 and showed that it was water-borne because only those who drank from the pumps of one water company,

the Southwark and Vauxhall Company caught the disease. This was a straightforward mapping analysis. It is said that Snow removed the pump handle so that no one else could drink the contaminated water.

Snow did not have a PhD in epidemiology.

The pump itself has been preserved in Broadwick Street, London. Snow is now a hero. But at the time, his theories of cholera transmission were laughed at and he died young aged 45.

The spaceship Earth is flying through space and depends on its safety upon the correct policy. How do we know which direction to steer? What instruments do we consult. The most important one is not the Geiger Counter: it is the human health meter. It tells us if we are flying in the wrong direction. But the data is not released. The authorities have painted over the meter. Our response is to make our own instruments; get our own data and analyse it ourselves.

What diseases do we study to detect dangerous exposures?

- Childhood Cancer and leukemia: numbers too small.
- Stillbirth and infant mortality: difficult to draw conclusions because of miscarriages.
- Congenital malformations: numbers (usually) too small.
- Other conditions e.g. asthma: difficulties with controls or background rates, episodes, discrimination from wheezing, diagnosis etc.
- Adult cancer: advantages since large numbers, national rates are known and incidence acts as flag for genetic damage.

Types of citizen study

1. National cohort studies in time series before and after contamination or across differentially contaminated areas. Data generally available.
2. Ecological small area study at census ward level. Data kept secret by authorities.
3. Ecological small area study from questionnaire. Data obtained by researchers.

What do we ideally need to carry out a cancer epidemiology study?

- A population at risk which we believe has been exposed to some health hazard. This is the STUDY GROUP

- A control group of similar people who have not been exposed to the health hazard. This is the CONTROL GROUP.
 - Details of this population like age, sex, and exposure.
 - The numbers of cases (or the RATES) in both the study and control group of some disease that is linked to the exposure hazard in some biologically plausible way.
 - We need also to define also the time period of the study i.e. the number of years over which we look for cases of the disease.
2. Burnham (downwind Hinkley Point NPP); found 2-fold Breast cancer; 2-fold leukemia; confirmed later by local cancer registry. Huge Press coverage.
 3. Padeswood Wales; near waste incinerator; found no excess cancer of asthma
 4. Llan Ffestiniog Wales (downwind Trawsfynydd NPP) found 5-fold breast cancer excess; other cancers. Collaboration with TV company and made Documentary.
 5. Fallujah Iraq; found huge excess cancer and infant mortality: published in *Int.J.Envir. Publ.Health* 2009

But since 1995 all National Cancer registries refuse the incidence data for small areas; what can we do?

1. Ask for MORTALITY data from small areas and use these
2. Carry out a door to door survey to obtain the base population data and the number of cancers diagnosed in the previous ten year period.

An example of the first is the study of Breast cancer mortality in wards near contaminated mud near Bradwell NPP, Essex, UK which I did in 2002. The result showed a doubling of risk in the wards near the contaminated estuary.

The first **questionnaire study** was carried out in the Republic of Ireland to look at the effects of the pollution of the Irish Sea from Sellafield. Results of STAD/ Green Audit questionnaire study in Carlingford and Greenore, Ireland, 2000 are shown on a map below; red dots are cancer cases; blue region is contaminated coastal mud.

Other questionnaire epidemiology studies I have organised are:

1. Plymouth Nuclear Submarine base; found 5-fold excess leukemia in local streets <1km cf. distant group.

How do we start?

All epidemiology studies compare groups, the exposed or study group with the unexposed or control group to make a table, a 2 x 2 table

The number we want is the Relative Risk

$$RR = \text{Observed} / \text{Expected}$$

We also want to know if this could have occurred by chance.

We create what is termed a **Contingency Table**.

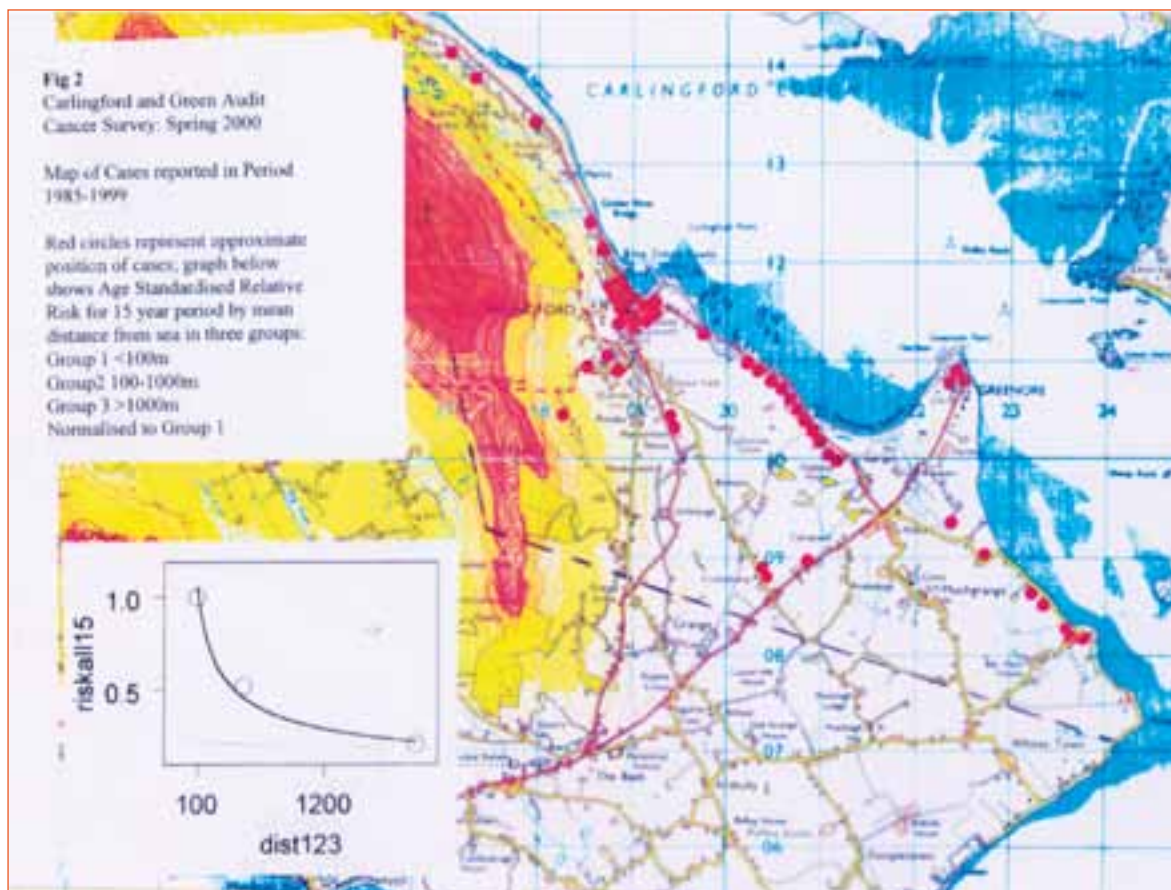
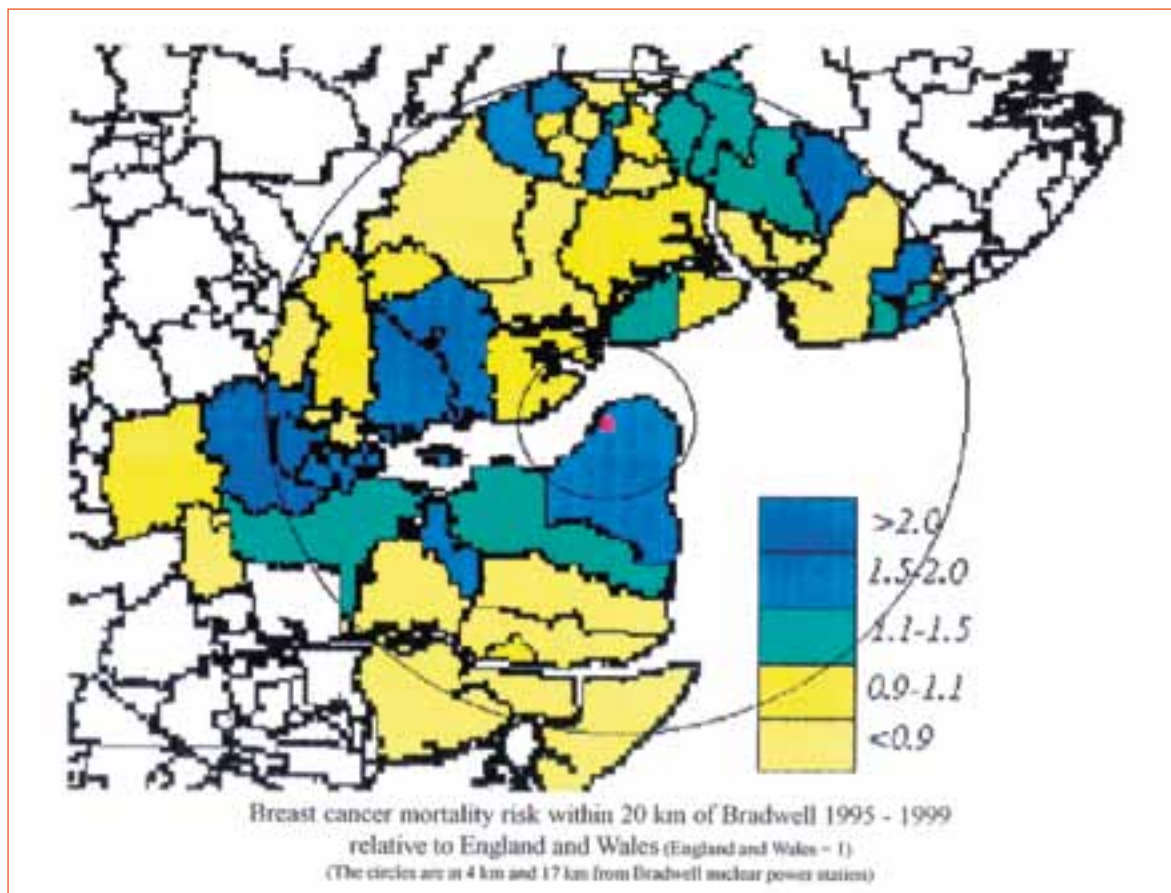
Here is an example. There were 200 people in the town of Downwind who developed cancer. In the county of West where the town of Downwind is located there were 1000 cancers in 20,000 people of the same age distribution. Then we write down See table 1.

In the above example, the rate in the exposed group is about 1 in one hundred or 1000 per 100,000 and in the non-exposed group about one in two hundred or 500 per 100,000. The Relative Risk is therefore 1000/500 or 2.0

We can see if this is statistically significant in various ways. First, we can calculate the expected number of cancers in the town of Downwind.

Table 1 Cancers in Downwind (example)

	CANCER CASES	TOTAL POPULATION
EXPOSED YES (Downwinders)	Number in study group with cancer 20	Number in study group with no cancer 2000
NOT EXPOSED (general population)	Number in control group with cancer 1000	Number in control group with no cancer 20000



Thus we apply the general rate of 500/100,000 to the population of 2020 to get an expected number which is $(500 \times 2020) / 100,000$ or 10. So we obtain Chi squared from the equation $(\text{observed} - \text{expected})^2 / \text{expected}$. This is $10^2 / 10 = 10$. Entering the Chi squared tables with one degree of freedom this gives us a p-value of <0.01 so the result is significant. The free program **Epi info** enables you to calculate the 95% confidence intervals also using their program routine STATCALC.

The above example we assume everyone is equally likely to develop cancer after exposure. But cancer rates increase rapidly with age so we have to allow for this. Because of this, we have to ensure that differences between the age make-up of the study and control groups are allowed for.

One way to do this is by calculating age standardised rates and comparing them.

The most used method is to calculate the EXPECTED number of cases on the basis of a standard (usually National) population and then compare this with the observed number in the study and local control group if we use on.

This is why we need to have the age breakdown of the groups we are comparing. (See Table 2)

In the above example, we have 185 women in our sample and we want to calculate the expected numbers of breast cancer death in this population. We have the numbers of women in each 10 year age group in the study area. We can see that there should be about 1 death in ten years from breast cancer. If there are five observed then the RR = 5.0.

We calculated the EXPECTED number of deaths in the group on the bases of the rates for each age group. We multiplied the number in each age group by the rate. The rates were expressed (in the reference volume from the national statistics office) as rate per million so we divided by 1,000,000 i.e.

$$\text{EXPECTED} = \text{NUMBER} \times \text{Rate} / 1,000,000$$

For the 55 to 64 year olds this was:

$$E = 37 \times 782 / 1,000,000 = 0.0289$$

We would expect 0.0289 deaths in the 55 to 64 year age group in these 37 women every year on the basis of national rates.

Next we find, from our questionnaire door-step survey, or from published official figures, the observed number of deaths from breast cancer in this group over a period of time.; This is the OBSERVED number O. We then compare O with E by merely dividing. We saw that in our example there were 0.0915 deaths expected in every year. Let us assume that the questionnaire showed that there were 7 deaths in our study group of 185 women in 5 years. Then we calculate a Relative Risk $RR = O/E$. In this case the expected number of deaths in 5 years is

$$0.0915 \times 5 = 0.4575. \text{ But we have observed } 7.$$

$$\text{The Relative Risk for mortality is thus } 7/0.4575 = 15.3.$$

Table 2 Comparison with age profile

A Number of women in age groups	B National UK annual Breast cancer mortality rate for this age group (per million)	C Expected numbers E of deaths from breast cancer in each age group per year
34 Aged 0-24	0	0
27 aged 25-34	33	0.000891
26 aged 35-44	174	0.00452
33 aged 45-54	472	0.0155
37 aged 55-64	782	0.0289
16 aged 65-74	1134	0.0181
8 aged 75-84	1684	0.0135
4 aged 85+	2684	0.0101
Total 185 women		0.0915

This is also sometimes called the Standardised Mortality Ratio or SMR. It represents the risk relative to the national average. We can also do this for incidence.

One example of a questionnaire study is the one I carried out with my friends for the Welsh TV company S4C. This was: *A survey of cancer in the vicinity of Trawsfynydd nuclear power station in North Wales*. Chris Busby, Angharad Griffiths, Eifion Glyn, Mireille de Messieres and Saoirse Morgan. Green Audit 2006.

Advantages of this type of study:

- You know that what you find is real and hasn't been controlled or adjusted by the authorities.

- You can study a much smaller population than ward level studies and can see effects close to the polluting sources, upwind and downwind by choosing your study area.
- You can do two study areas and include a control.
- You can carry out the study in areas where the population is not recorded, i.e. in post war zones where there have been large population movements and no census e.g. Fallujah.

There are disadvantages:

- The main one is that the study is retrospective and people who die of cancer in the 5 or 10 years prior to the study, called leakages, do not contribute to the observed number.

Table 3 Trawsfynydd survey study cancer risk table; not including non-melanoma skin cancer

cancer	1996-2005; Obs/Expect	10 yrs SIR p-value	2003-2005 Obs/Expect	3 yrs SIR p-value
All ages				
All maligs M	40/34.5	1.16	22/10.5	2.13 (0.0007)
All maligs F	27/30.6	0.9	16/9.18	1.74 (0.03)
All maligs P	67/65	1.03	38/19.5	1.95 (0.0001)
F breast	10/7.7	1.3 (NS)	6/2.32	2.6 (0.03)
Prostate	8/6.79	1.2 (NS)	5/2.03	2.5 (0.05)
All leukemia	3/1.28	2.34 (NS)	3/0.384	7.8 (0.007)
Leuk + lymph	4/2	2.0 (NS)	4/0.616	6.5 (0.003)
mesothelioma	3/0.37	8.1 (0.005)	2/ 0.111	18.0 (0.005)
pancreas	3/1.39	2.15 (NS)	2/0.417	4.8 (0.06)
larynx	4/0.425	9.4 (0.0008)	0	
colon	7/4.1	7/4.1 (1.7 (NS)	0	
0-60				
All maligs M	8/5.6	1.42 (NS)	3/1.68	1.8 (NS)
All maligs F	14/8.66	1.62 (0.05)	11/2.6	4.23 (0.0001)
All maligs P	22/14.3	1.54 (0.03)	14/4.28	3.3 (0.0002)
F Breast	6/3.42	1.75 (NS)	5/1.02	4.9 (0.004)
0-50				
All maligs M	2/0.7	2.9 (NS)	1/0.22	4.54
All maligs F	8/1.08	7.47 (0.0001)	5/0.324	15.4 (0.00005)
All maligs P	10/1.78	5.6 (0.00001)	6/0.544	11.3 (0.0001)

- But this means that what you do find is a Relative Risk that is LOWER than the real one. If what you find is BAD then the reality is WORSE.

As far as credibility is concerned, this type of study used to be quite normal and had to be employed in third world countries or by missionary doctors. I created this particular version of the method in 1999 for a study in Ireland. But it has recently been described: Hudson J, Pope HG and Glynn RJ (2005) *The cross sectional cohort study – an underutilized design*. *Epidemiology* 16 (3) 377-385.

The results can be taken to the media. Indeed, I generally do this rather than taking them to peer review. The results of such a study, even the fact that local citizens are going to do one, make the media very interested. They always report the result. I rarely bother to publish in the peer review literature. No one reads it and if ever you do get something into a peer review journal it is ignored or attacked in some way and you have been involved in a time wasting exercise if your object is to change the world through finding out and advertising the truth.

A word about computers. The modern PC computer has more power than any of the million pound University mainframe systems employed to do epidemiological analysis in the 1990s. This levels up the playing field considerably.

You need EXCEL to do the calculations and put in the data.

You can get EPI INFO free from CDC in Atlanta. This enables you to do confidence intervals and regressions (which I haven't talked about)

For general work I recommend SPSS, but this costs about £800. Other packages include SAS, STATA and SPlus which I use. All are expensive (more than £2000) and you don't usually need them. You may want to use a mapping program but there are now free mapping programs that handle GIS data for making your small area maps.

There are other studies you can do if you get interested. You can carry out National ward level or County cancer incidence and mortality studies if you can get the data. Usually you will find that you will not be given incidence data on the spurious grounds of confidentiality. You can however get mortality data and don't be fobbed off with a refusal. You can also look at Time series studies with large

national databases to look for cancer trends or birth cohort trends e.g. what cohort is driving the breast cancer epidemic? What were their exposures?

Remember!

We are the centre of our own beautiful world.
If we want to know what is happening,
Like children, we have to look (and think) for ourselves 🍌

Fukushima: precious time has been lost



Michel Fernex (Switzerland) Emeritus Professor, Basel Faculty of Medicine. Former Consultant, World Health Organization

After Chernobyl I questioned the absence of WHO in the field, or at least its always negative presence, repeating the findings of the International Atomic Energy Agency. And I asked, on behalf of the Swiss section of IPPNW (*International Physicians for the Prevention of Nuclear War*), an interview with WHO. Mr. Nabarro, Director General ad interim, received me and to my amazement, I was asked the following question: “What should WHO have done at Chernobyl?” .

I replied: “At the WHO when you have a difficult problem there is a rule that one follows: create a scientific working group. The twenty best specialists of the time on a given subject are combined, they are given a work week and are asked to respond. And the topic I would choose is primarily **genetics and ionizing radiation**. For the victims of nuclear accidents, it is always the same genetic damages that are transmitted to other generations. These genetic damages, seen in Chernobyl and that we’ll see each time there is a serious accident are not exclusively produced by ionizing radiation, alpha, beta, gamma or neutron, but they can also be caused by toxic substances.

My request to the WHO remains the same: when will you set up a scientific working group that renews knowledge for WHO and for the world, because the last *scientific group* was set up in 1956, before the existence of the IAEA. I would add today, genetics and ionizing radiation, peri-genetic problems, genomic instability and the “bystander effect.”

The position of the WHO in 1956:

In 1956, concerned about this issue, the WHO convened in Geneva a study group including Prof. H.J. Muller, Nobel prize-winner in genetics, Prof. R.M. Sievert and other luminaries of international repute in the field. Together, these scientists reminded the world that “The genome is the most valuable treasure of human kind. It determines the life of our descendants and the harmonious development of the future generations. As experts, we confirm that the health of future generations is threatened by the expansion of the nuclear industry and the growth of the quantity of radioactive sources. We also consider that the fact of appearance of new mutations observed in people to be fatal for them and for their descendants.”¹ Since a few years, this publication has disappeared from the records available at the WHO, as if the work had been censored half a century after its publication.

Since 28 May 1959, an agreement signed between WHO and the International Atomic Energy Agency (IAEA)², and then a number of additional legal texts, prohibit WHO from intervening in nuclear accidents. But in 1986, the Minister of Health in the USSR asked WHO to set up an international Research Project and aid for the victims of Chernobyl. There was no response for eighteen months, because WHO had no authority to intervene. The IAEA, promoter of civil nuclear power, responded. In the project they designed, there was no mention of genetics, but they gave high priority to dental caries and this became the subject of investigations and research.

The epigenetic effects

What have been added to the knowledge of 1956, are all the epigenetic problems. It seemed that ionizing radiation would reach the nucleus, chromosome or DNA and cause damage, tears that the body repairs or does not repair. It turned out that this is not a necessity: the radiation can reach the cell cytoplasm, touch DNA perhaps mitochondria, but also affect proteins that are enzymes and install a disorder that is not a genetic disorder. The cell can divide with an impeccable genome, two, three or a

1 OMS: *Effets génétiques des radiations chez l'homme, Rapport d'un groupe d'étude réuni par l'Organisation Mondiale de la Santé*, Palais des Nations Genève 1957.

2 Agreement WHA 12-40:
http://en.wikisource.org/wiki/Agreement_between_the_World_Health_Organization_and_the_International_Atomic_Energy_Agency

hundred times. And then at some point the disorder, found in the cytoplasm at the time of division, when the chromosomes divide and are evenly split into two kernels, is created: breaks of chromosomes that become attached or go in the wrong axis, all sorts of genetic disorders can be seen to appear.

The deteriorations caused by ionizing radiation in the cytoplasm are called epigenetic because the cell nucleus and chromosomes that house them are not directly affected. This damage, which can contaminate neighboring cells unaffected by ionizing radiation, is called “bystander effect.”

Children of exposed individuals will be more severely affected than their parents. Indeed, these epigenetic alterations increase from generation to generation, as seen in Chernobyl, for example in the offspring of liquidators. The parent gives a disorder to an offspring who can be more contaminated than his or her own genome and this change can be up to 100 times greater. Humans and rodents behave genetically in a similar manner. This brings Professor Hillis, at the University of Texas, to conclude in his editorial in the review *Nature*, 25th April 1996: “We know today that the mutagenic effect of a nuclear accident can be far more serious than we ever suspected, and the eukaryotic genome can present levels of mutation that, up to now, would not have been considered possible.”³

Research by R.I. Goncharova and N.I. Ryabokon in Belarus

The epigenetic effects of Chernobyl were followed from 1986 to 1996 by the team of Prof. Rosa Goncharova, who studied wild forest voles at different distances between 30 and 300 km from the destroyed reactor. Everywhere genetic damage had increased significantly and continuously, while the radioactivity was 150 times lower at 300 km distance than at 30 km. In recent years, the weakening of the genome has increased among voles: the least irradiated had almost reached the same degree of genomic instability as the most irradiated.

The geneticists of the Institute of Cytology and Genetics, Academy of Sciences of Belarus, noted a slowdown in the growth of genomic instability in the most contaminated areas, that is to say at 30 km from the destroyed reactor. Contrary to for the slowdown in the increase of genomic instability, a significant increase in intrauterine mortality was

observed after 15 to 20 generations. At 300 km from Chernobyl, with a radioactivity 150 times lower than at 30 km, increased genomic instability continued in rodents during 22 generations (which in humans represents several centuries). During these ten years, genomic instability not only persisted everywhere, but it was compounded from generation to generation. The authorities having changed, the study had to stop, so that the results would not negatively affect the IAEA, which wanted to supply Belarus with nuclear weapons.

How to counter the deterioration of the genome?

We would like to find a mechanism to break the deterioration of the genome and this is what I would like to talk about today. Of course we must irradiate the least people. We must fully protect pregnant women and evacuate the children. If forced to stay - what was done in Fukushima - the State must provide them with absolutely clean food as long as they are not evacuated. Then, if the population has been contaminated it is imperative to reduce the absorption of radioactive caesium, Sr-90 and derivatives of uranium by the chelating effect of pectins and protect irradiated subjects by acting against free radicals.

I would emphasize that there are many foods rich in pectin, and perhaps more in Japan than here, as the Japanese consume algae, rich in pectin. One of the best pectins from algae that were tested in the Soviet Union during the Cold War, is that extracted from the Black Sea *Zostera*, and the second for efficiency is the *Laminaria Japonica*, from the seas south of Japan. In Belarus, when Nesterenko tested *Spirulina* against apple pectin, this alga was found active, though less than the apple pectin used in Vitapect®.

When one gives beetroot, one also gives a product that is one of the richest in carotenoids, along with carrots and other fruits. And in nutrition one must take into account this contribution if one does not have the financial means to provide vitamin E, vitamin A, which are indispensable: because carotenoids will be used in the defense against peroxides which somebody spoke about a while ago. Acting against free radicals – the toxic peroxides formed by radiation – one can protect persons contaminated or subjected to external ionizing radiation by using antioxidants.

Let me clarify ... Carotenoids are used and wasted in irradiated subjects. Take for example the

3 Hillis D.M., Life in the hot zone around Chernobyl, *Nature*, Vol. 380, p 665 à 666, 25 April 1996.

birds. Irradiated birds eat their carotenoids and what do they lose? They lose the coloring of their feathers. And if you go to Chernobyl you find that the swallows, red-tails and sparrows are gray. There are no more brown birds, no more vivid colors, they consumed their carotenoids. This is why I think it is important to provide the population with carotenoids from foodstuffs, knowing that the two cheapest vegetables on the European market are carrots and beetroot, cooked or raw.

Now we will not stop there, there are studies works that have been done and which show that the permanent worsening of genetic abnormalities can be counteracted.

For example, A.M. Sloukvine, veterinarian responsible for factory farming of carp, working with the Goncharova team, studied a commercial farm 200 km from Chernobyl. Although there were large ponds of high quality water, the silt at the bottom of the pond contained a persistent deposit of Cs-137 contamination up to 1 curie per km². Over 70% of fertilized eggs of these carp gave birth to monstrous cell clusters. When the eggs were able to become fry these became baby carp that were often abnormal. These fish no longer looked like the carp: the scales were abnormal, the color was sometimes violet, fins absent, the skeleton and tail deformed, the lids or mouth could be missing.

The selection of molecules with antioxidant properties having an antimutagenic activity measured by the laboratory of Rosa Goncharova, in collaboration with chemists of the Baltic States who synthesized these products, has resulted in a molecule with anti-mutagenic protective properties: Diludine®. This molecule is now used in industrial fish farms producing various species, both freshwater and saltwater. Dr. Sloukvine has launched this product in Belarus, China and now in Turkey. Added to fish feed, this substance permits growth of normal, healthy young fish, which makes them very productive farms.

I think there is a mine of information here for Japanese researchers. I know Japanese research quite well. I worked in research in chemotherapy and I know where in the world the greatest progress has been made: the carbapenems, all come from Japan. I have tremendous confidence in the research capacities in Japan and I think it is urgent that that country develops substances related to or different from Diludine, something that can be widely used. But we must get to work quickly to break this kind of cascade of genetic abnormalities

we found in humans after Chernobyl, in three generations.

What should be undertaken by the authorities?

After giving up lies and minimizing health problems, the authorities must listen to the geneticists, to learn how to reduce risks for children.

To reduce internal radiation, which represents more than 80% of the risk for the inhabitants of the contaminated areas, the industry responsible for the contamination or the authorities should as soon as possible provide radiologically clean food, which children will need for many years.

In case of unavoidable contamination of the body by these artificial radionuclides, children and young adults should be regularly monitored and receive treatments with chelators that reduce the incorporation of radionuclides and accelerate the elimination of radionuclides.

For the medium term, molecules with antimutagenic properties should be selected and developed by the pharmaceutical industry, encouraged by governments. A stop must be put to the worsening of genetic damage in humans, victims of nuclear disasters that experts consider inevitable. Ending transgenerational transmission is just as urgent in the Chernobyl area as it is in Japan. Thank you. ▶

DISCUSSION 5

Points raised

The danger of internal radiation – Setting up of an independent institution in genetics – Petition to the European Parliament – Basic safety radioprotection norms – Challenging dose limits and norms – The role of national governments – Irradiation of children in Europe via food imported from Japan – Re-treatment of Mox – “The Justification Principle”

Comment

Eisuke Matsui, specialist in respiratory pathology and low dose

Thank you for giving me this opportunity to transmit my message. I am happy to have participated in this magnificent forum and I thank the organizers. The most important lesson for me today is to recognize what the nuclear industry is trying to obtain. How can we fight them? We have taken note of several ways in which the children of Fukushima could be helped. In the last session, Professor Busby insisted on an approach focusing on pathologies which we can share. Professor Fernex stressed the importance of analysing the genetic and cellular impact of radiation. I think that these points are systematically ignored by the WHO, the IAEA and the ICRP. It is important to be aware of this omission. I know that many people realize now the impact of internal radiation. It will not be possible to win against the nuclear lobby when 99% of the population does not understand the danger of internal radiation. There are numerous cases where the husband and wife are not in agreement about whether they should evacuate a contaminated area. Some mothers have gone far away and their problems have to be taken into account. Decontamination is a subject that is being discussed more and more. In my opinion, it is only with the aim of persuading evacuees to return to contaminated areas. Some people say you can live in these decontaminated areas but you can't decontaminate mountains or oceans. Radioactive particles circulate in the environment. Local government misleads people and promise the impossible. The suggestions and ideas of Busby and Fernex are very useful for refuting these lies. Until now, we have been concerned, above all, about gamma radiation but we need to pay attention to alpha and beta radiation as well. The results of studies done in Europe should be used in Japan. For example, strontium is a radionuclide that accumulates in bones and it is virtually impossible to get rid of it. Plutonium is also very dangerous. I am happy and encouraged to have learned how to deal with these problems. I would appreciate benefiting from your knowledge and your opinions in order to save Japanese children. Help the children of Fukushima. It is essential to raise the level of self sufficiency from 30% à 100% while at the same time ensuring supplies of uncontaminated food. We have to ban agriculture in contaminated areas, and not forget the problem of fishing. We have to reach mutual agreement to promote evacuation to less contaminated areas. We have to resolve these problems in a 50 -100 year perspective.

I will stop here and thank you once again for the success of this forum and I look forward to tomorrow's discussions.

Question

Franz Boutens

I agree with Professeur Fernex on the question of WHO in relation to genetics and ionising radiation. We can all see that the WHO has no competence in this area. There is a huge lack in this respect worldwide, as there in the nations represented here in Geneva. Can we look at this question in more depth tomorrow? Can we ask the United Nations to finance an organization supplementary to the WHO, but independent, to deal with these precise issues? We are ready, experts and citizens present here to urge the setting up of such an institution, also through a Press Release at the close of the Forum.

Reply

Michel Fernex, Emeritus Professor, Faculty of Medicine, Basel

Often, the WHO reaches the limit of its competence, or at least a limit that the world considers excessive, and at such time, a related institution is set up – for example for AIDS. There was an AIDS programme in WHO, the world judged that it was not making progress, that it was going round in circles, and so an independent institution was set up alongside. It is actually the building next door. So what you would like is for there to be an institution to advance progress in the area of genetics. I think that the world certainly has many experts who could coordinate the programme in the area of genetics and would be able to help victims of toxic products and radiation.

Comment

Chris Busby, chemist and physicist

I would like to alert you to the website¹ of the petition to the European Parliament which sets out the basic rights of European citizens. This petition is based on basic radioprotection norms, “Basic Safety Standards” of the Euratom Directive², the latest version of which states in Chapter V, Article 20, Number 3: “Existing classes of practices shall be reviewed as to justification whenever new and important evidence about their efficacy or potential consequences is acquired.”

This is the most dangerous thing they have ever written, because we can trap them with this, but we can only do it with your help.

Comment

Marc Molitor, journalist

There is a convergence between Chris Busby’ idea and the possibility raised by Michele Rivasi just now to refer the matter to the Commission or the European parliament. So there is a way to bring these ideas together and to do something convergent.

Intervention

Paul Lannoye, MEP, member of the Commission on Health, Environment and Consumer Protection

As I will not be present tomorrow, I’d like to make a suggestion on the same lines to support Chris’s idea, which is excellent, but adding a few possibilities. It is perfectly possible to refer such as case to the European Parliament and the Commission, but in each Member State, it is possible for associations to challenge the government and for this same government to question current dose limits and norms. Because governments carry more weight than the European Parliament, it is unfortunate but true, as Michèle can testify. The European Parliament is respected but no one takes any notice of it, if it starts to cause problems. And that is quite clear. The European Commission takes the Parliament into account for as long as it suits and when it no longer suits, it sends it packing. I think we need to be aware of that and in any case, we need to put ourselves in the position of claimants and not beggars but in a position of force with the European Commission. When the directive is so clearly violated, you have to focus attention on it, and I’d like to insist on that.

In this regard, I’d like to ask Michèle something. The norms relating to food originating in Japan are subject to certain limits for entry into European territory. These limits in no way respect the current directive. Let me explain. If you apply the authorized level of contamination to normal food to those foods, you get a dose which easily exceeds 1 mSv/year for a child whose diet is based

1 <http://nuclearjustice.org/>

2 Directive 96/29/ – pag. 41

French: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0242:FIN:FR:PDF>

English: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0242:FIN:EN:PDF>

on those products. You will tell me that a European child is not going to eat Japanese products exclusively, that would be absurd, but in any case, you would have to justify supplementary irradiation through this food. And it is absolutely unjustifiable. There is no reason to give European children contaminated products from which they get no benefit. In fact, the ALARA principle – as low as possible – is violated.

So I think we need to fight that, we can challenge the dose limits through governments. The Belgian government will be challenged soon: I can tell you because I contacted a whole series of associations in Belgium, to take on this initiative vis-à-vis the government together. I don't know if the Belgian government, which sees itself as virtuous in relation to nuclear power, will follow but it is certain that it will be embarrassed. That's already something. If we can do the same thing in different countries of the EU, it would be great. And in addition, at the level of Europe, through the Parliament and the Commission

The last point, which is really close to my heart, is the “justification principle” applied to a practice which involves irradiation. There is a justification which is unjustifiable, absolutely impossible to explain for the moment. That is the retreatment and use of mixed uranium and plutonium fuel: MOX. There is no justification except to keep the retreatment industry going. Why not raise this question again – it would be a good initiative to come out of the Forum – it involves enormous contamination. The two plants, La Hague et Sellafield, are the biggest radioactive polluting plants in the world. So we have to get at them. And I think that if our Forum can take one political initiative, political obviously, to the European Commission and to European governments, we are in a strong position because the justification principle is violated. So I contest these principles which are poorly applied for the moment and I think that the precautionary principle should take precedence over the justification principle, but these should, at the very least, be applied. Meanwhile in any case, and as long as we have to manage the waste emitted from the pro-nuclear 20th century, well, we will have nuclear power, so we have to apply all these principles.

Comment

Ditta Rietuma

I would like to thank IndependentWHO for this fabulous work and also thank the absolutely extraordinary and competent people gathered here today. As Chris Busby has suggested, there must be a re-evaluation of the Euratom Treaty. In these times of “radioactive annihilation”, it is also urgent to create a kind of centre of reliable truth and to find funds for this. The most urgent thing at the moment is to support the Japanese. But I come from the Baltic Sea region and we have the most radioactive sea in the world. So we all have an urgent need to find a solution, and to obtain funds for research on internal radiation. We could ask Bill Gates to send us a million dollars. I think a billion would be enough. We need institutes, laboratories in all countries, so we have to work together. We're talking about the survival of all forms of life on earth. So let's do something.

Concluding remarks



*Maryvonne David-Jougneau (France),
member of IndependentWHO*

Allow me first of all, in the name of Independent-WHO, to thank all the participants and other actors in this first day of our Forum and in particular the speakers to whom we have listened with great interest. You have not only impressed us with the high quality of your presentations, you have together borne witness to two things.

First of all, the disinformation disseminated by governments and by the directors of nuclear industry at both Fukushima and at Chernobyl. This manifests itself in particular in the problem of widely varying standards, when a disaster happens, in order to minimise awareness of the risks from radioactive contamination to the health of the population.

But at the same time, you have recounted your own **resistance to this disinformation** developing, each one of you a range of authentic scientific knowledge, information that truly reflects observed reality. You are trying to understand ALL the effects of external radiation and internal contamination on the environment and on health and you are looking for ways to improve the situation: unlike the scientific establishment and the international organizations who want to ignore it. Among the latter is the World Health Organization, which SHOULD BE leading this research and to whom we appealed, in vain, to organise this Forum jointly with us.

The disinformation and the resistance to it, dates right back to the early days of the atom, after Hiroshima and Nagasaki. In 1965, 20 years later,

the writer Kenzaburô Ôé reported in his *Notes on Hiroshima*, on the Japanese citizens who tried to establish the evidence on the effects of the A and H bomb... *effects which were denied* although the *hibakushas* remained as both victims and witnesses.

The scientists that we have heard from today are all resisters, even dissidents. Finding themselves up against the International Community and the power of the nuclear lobby, they encounter great difficulty in making themselves heard, their research projects under threat through lack of finance. When they have not been thrown into prison as Yuri Bandazhevsky was in 2001...

From their side, **citizens**, aware of the disinformation they are being fed about the risks of radioactive contamination, **have not given in**. In the search for truth and for radioprotection, they are organising themselves and forming self-help groups, in those places where they are the direct victims of nuclear accidents at Chernobyl or at Fukushima. They are listened to more and more by people all over the world who realise that they too could become victims of the atom...

This is how the idea of a bridge, between scientists and citizens, came about, to bring together all those resisting the disinformation. Politicians too are beginning to become aware of their responsibility should an accident occur in their country, in their area. In some cases, in the absence of any action on the part of the state, people are taking the initiative, as in Corsica, where an epidemiological study has been set up to evaluate the impact on health of the passage of the radioactive cloud from Chernobyl on their own people.

In the days that follow our Forum, we need to ask ourselves this question: **What can we do together?**

What can we do together so that the truth about the health consequences of external radiation and of internal radioactive contamination, caused by both the civil and military nuclear industry, can be established and recognised?

Scientists, elected politicians, citizens organizations from all areas of the world, what should our shared objectives be, and how can we translate them into shared actions? What bridges do we need to build, what networks need to be established, in order to bring together our efforts towards uncovering the truth?

6. Discussion – Meeting

Scientific and Citizen Forum on Radioprotection: from Chernobyl to Fukushima
Salle Gandhi, Maison des Associations – 15, rue des Savoises, Geneva – 13th May 2012



Introduction

What can we do to establish and gain recognition for the truth about the health consequences of external and internal radiation, resulting from nuclear activities, both industrial and military? What are our shared aims? What action can we take together?

As a preamble, let us remind you that the purpose of this discussion meeting is to complement the scientific contributions that were made yesterday, with the point of view of the citizen. At this meeting we will also be able to comment on a number of proposals that have been put forward regarding our aims and possible actions:

Objective No 1: That WHO should fulfil its constitutional mandate in the area of radiation and health:

Actions to achieve this objective:

1. Demand revision of the Agreement between WHO and the IAEA of the 28th May 1959 so that WHO may recover its independence; and denounce the clean bill of health that WHO awards to the nuclear industry.
2. Demand that WHO establish a department of "Radiation and Health".
3. Strengthen the action of the Vigil outside WHO headquarters as a continuing testimony to the suffering of victims of radiation and contamination and extend the action to other places (in other countries) in front of other

buildings of symbolic significance (Ministries of Health, Local Health Authorities...).

4. Organize a Scientific and Citizen Forum periodically to coincide with the World Health Assembly, with a collective made up of individuals and organizations who would like to be associated with IndependentWHO. This Forum would represent the annual focus for our permanent vigil.

Objective No 2: That independent science should be the reference in all matters relating to radioprotection

Actions to achieve this objective:

1. Make known the health consequences of ionising radiation through epidemiological studies undertaken at the request of citizens, financed by regions, governments and international institutions and undertaken by independent scientists.
2. Re-assess radioprotection norms in the light of these recognized health effects.
3. Set up an international network of independent scientists, elected politicians and associations to share and disseminate scientific knowledge and information from reliable sources.
4. Organise a campaign of citizen petitions such as the one that has already been proposed, to ask the European Parliament to re-examine the Euratom treaty regarding the new information.

The discussions on the various objectives and actions were organized as follows:

- 9.00 am to 11.00 am: three separate groups made up of scientists, elected politicians and representatives of associations, with other participants dividing themselves between them, exchanged views about the aims and actions that had been put forward.
- 11.00 am to 11.30 am: rapporteurs wrote up the minutes of what had been said in the three groups.
- 11.30 am to 1.30 pm: the minutes were read out and discussed in a plenary session.
- 2.30 pm: summing up, formal closure of the Forum and informal exchanges between participants.

1. Working groups

1.1. Extracts and summaries of the Associations group

Chair: **Paul Roullaud**

Minutes: **Alison Katz, Suzanne Urban**

Synthesis: **Alison Katz**

A large group made up of journalists, members of associations and NGO's, health professionals and individuals.

Franz Botens

Regarding the revision of the agreement between WHO and the IAEA, we need to put pressure, we need to inform the public, the press, the media, and, given the experience in Germany, above all, to inform young people. The question is: what to do, how do we mobilise people and get them to support us? Should I write to my Minister of Health, asking him to put the separation of WHO from the IAEA on the Agenda? To be discussed

Robert James Parsons, journalist

From what I have seen of the work done by other NGO's with WHO, I think they achieve their ends best when they create links with official delegations that are sympathetic to their cause. Sometimes it was people, or even delegations that were sympathetic to the NGO and so agreed to work on the

wording of a resolution, or a project for a resolution. If you want to address WHO directly, for example, to put forward a resolution to the World Health Assembly, you need an official delegation, after all there are people, even governments who are sympathetic to the cause. You need to ally yourselves with these people, get to know them. There are quite a few who would actually like to see WHO break its links with the IAEA.

Alison Katz

We need to ask Member States to propose a resolution. That is partly what Robert Parsons has said: we need to find sympathetic people in those delegations that we have mentioned. Another way is to join together with all the health and environmental associations and NGO's.

Susanne Urban, WILPF, Norway

WILPF¹ is an international organisation based in Geneva. In anticipation of the World Health Assembly in May, WILPF wrote a letter in January 2012 to all the members of the Executive Board of WHO copied to all the Ministers of Health of the member countries, demanding the revision of Agreement WHA 12/40 between the WHO and the IAEA. Even though it was a very good letter,² it may not result in any concrete action, but at least people are being told about it.

A Geneva citizen

Informing the media is necessary but there are longer term actions that need to be taken too. Taking as an example Mr Jobin's report about the question of health and safety at work, he would like to see that action followed up. In France, as regards health, people are mostly pro-nuclear in order to maintain jobs but the question of health and safety in the workplace can be pursued in the long term and is a stronger argument and has a bigger impact.

Franz Botens

IPPNW³ in Germany had a representative in government who tackled the whole problem of the



1 WILPF, Women's International League for Peace and Freedom <http://www.wilpfinternational.org/>

2 Letter sent by Madeleine Rees, Secretary-General of WILPF, see: <http://leicesterwilpf.files.wordpress.com/2012/01/1st-edition-international-ewg-e-news-january-2012.pdf>

3 IPPNW, International Physicians for the Prevention of Nuclear War. <http://www.ippnw-europe.org/>

WHO/IAEA agreement in Parliament, in April 2011. In Germany, we have a saying “*wie einem Ochs ins Horn gepetzt*”, it’s like pinching a cow’s horn. It had no effect.

In Germany, most actions are built up through the Internet. It’s more effective than writing letters. The first thing is to set up a *mailing list*, because we come from here, there and everywhere.

Monica Von Der Meden

We should continue with the Vigil in front of WHO. Why not encourage the Austrians to set up a Vigil outside IAEA⁴ headquarters in Vienna?

Paul Roulland

Jean-Yves Peillard and Véronique Ratel have already held a vigil outside the IAEA in Vienna. It’s a bit disappointing because of its geographical position – it’s on the outskirts of town and there is hardly any traffic. After some discussion within the group, we decided that our action is aimed at WHO, demanding that it be independent, and do its work properly.

Anne Cécile Reimann, ContrAtom, Geneva

In 2000 ContrAtom had already begun an action against WHO, which was then taken up, fortunately, by IndependentWHO. The problem then was that ContrAtom is antinuclear, whereas IndependentWHO is not. “*We have been a bit excluded from the story, because we would arrive with our yellow banners chanting our slogans, and this wasn’t what the Vigil was about.*” That’s why ContrAtom has backed off a bit. In the IndependentWHO action, we needed to be silent, to stand silently and put the emphasis on the health aspect and not the anti-nuclear position.

Paul Roulland

I’m replying to Anne-Cecile. I know all about the anti-nuclear movement. We fought for 25 years against the nuclear power station at Carnet. We won. I am completely anti-nuclear. But this is a question of strategy. So I’m all in favour of anti-nuclear groups attacking WHO with their specific actions. But we will achieve more with IndependentWHO if we concentrate on the issue



of health, without identifying ourselves with the anti-nuclear label. WHO would much prefer it if they could label us as anti-nuclear; that was obvious during the meeting we had with the Director General of WHO. But, the great thing is that we can almost give ourselves a “medical” label. We can say: no, listen, we’re not anti-nuclear or anything, we want to talk to you about health issues. Does nuclear power damage your health, does it kill you or doesn’t it?

Michel Gueritte

All of us, while we are here, are representatives of an association – or most of us. We have our own strategies to combat our local problems. So it gets quite complicated because in a way it’s a bit everyone for himself. Each of us is defending his own position, his own strategy. If I’m honest, this is what I think about the vigil: it’s a strategy, you decided to hold a vigil. That’s really good, it’s one idea, it’s as good a way as any other. You’ve been there now for five years, so it’s time to ask: are you going to carry on for another five years, what do you hope to achieve? That’s your problem. If I was asked to vote on it I would say: I’m against it. I also voted against the human chain, and then I went with 70 other people. It’s difficult.

If you asked me to come to Geneva to do something, I would block the entrance to WHO for a week and set fire to tyres in front of the building. That’s the problem of image and communication

4 The International Atomic Energy Agency (IAEA), set up in 1957 and based in Vienna. It is an autonomous international organisation under the aegis of the United Nations. It reports to the United Nations General Assembly and to the Security Council.

The whole of my professional life, nearly 40 years, has been dedicated to communication. The problem is: how to get recognition, how to get our ideas across. Our ideas are in opposition to the government's ideas, so they prevent us from talking. They wanted to throw me in jail for three months. It didn't work. They thought they would shut me up, but I'm still shouting.

Philip Gordon-Lennox

I know Japan very well having lived there for a number of years. I'm here to help the Japanese speakers and I've spent a lot of the weekend talking to them.

According to Japanese government regulations in Japan, in the event of a major accident, all nuclear power plants should be shut down for a period of verification, after which they could be started up again. So what has happened is that when the Japanese saw that all their plants had been shut down, they said to themselves, this is our chance to make sure they don't start up again. But it could still go either way. Ms Chiwaki told me that in Japan, May 5, which is 5-05, is a national holiday, Children's Day. This year, on the 5th of the 5th, they said it is an opportunity to set up a movement for a nuclear-free Japan. There is a power struggle between all concerned, the lobby, the government and the people who want to stop the nuclear power plants starting up again. But all the

tests have been completed, the checks have been carried out. In principle, the key is in the ignition, anyone can restart the plants. So, the demonstrators in front of the Ministry of Industry and Commerce in Tokyo – the group that has a tent – have launched a hunger strike and other actions to prevent the plants starting up again. This had been very successful. Oe Kenzaburô, who won the Nobel Prize for literature, gave a talk, and there have been many celebrities, famous people who have spoken. And it helped launch the movement for a nuclear-free Japan from May 5. That is what is happening in Japan right now. I have a suggestion to make: we all understood that the key to all this is the relationship between WHO and the IAEA. This point really needs to be exploited, so that the anti-nuclear movement, worldwide can make progress. As long as WHO does not publish truthful figures, the real information, certified "WHO data", as long as this continues, we won't make any progress. So everyone taking part in the vigil, should take this opportunity and join in the fight with the Japanese. At this moment, it's Japan that's in the news. For the wrong reasons, but that's how it is. We should exploit the opportunity, because this is the news that's "hot off the press" and it will sell. And if that's what will sell, we should exploit it. I think we have to take advantage of this opportunity. After all, it's for a good cause. Ms Chiwaki said to me: "*Of course, you should use us! Hold a vigil in Geneva about our 54 reactors. After all, you're taking on our cause.*" We're all working for the same cause, we are alerting the media to a subject that will sell right now. Because, ultimately, stories about the IAEA don't sell papers. It's really sad but people don't understand what an important problem it is, but it doesn't sell.

Robert James Parsons

I would like to make two practical points about creating a department.

First, there is the question of a conflict of interest which people are up in arms about at the UN. I got into a big argument with Harvey Fineberg who is in charge of the enquiry into the corrupt practices at WHO during the H1 N1 flu business. Those involved were people who had come directly from the industry. So, if we want them to set up a department, we have to bear this in mind: they will recruit people from the nuclear industry.

Secondly, there is the NGO question. There has been a showdown between the NGO's





1.2. Extracts and summaries of the discussion in the Scientists' group

Chair: **Eric Peytremann**

Minutes: **Nicole Roelens, Maryvonne David-**

Jougneau, Cathy Bonny

Synthesis: **Nicole Roelens**

Scientists present speaking in Russian:

Galina Bandazhevskaya, Vladimir Babenko,

Alexei Nesterenko, Alexei Yablokov

(translators: W. Tchertkoff et S. Mouraviev)

Speaking in Japanese:

Eisuke Matsui (translator: K. Kobayashi)

Named professionals:

Marie-Elise Hanne, General Practitioner and

biologist; **Françoise Ducloux**, Vice President

of *l'Association des Médecins Français pour la*

Prévention de la Guerre Nucléaire (AMFPGN)

(French Physicians for the Prevention of Nuclear War)

and WHO about the status of NGO's. It's quite funny... in English ONG is NGO. So we talk about "Pingo" and "Bingo". Pingo is public interest, NGO's that have a public interest – and Bingo, which is business interest NGO's. WHO refuses to make a distinction between the two. So all the lobbyists, including organisations from the pharmaceutical industry, are classed as NGO's and have the same access to meetings, documents etc. And it is their documents and in depth studies that are used by the secretariat to put forward proposals. And of course they have enormous funds to do this. It's a question that needs to be resolved, because if we want to demand the creation of a department, straight away we're going to have NGO's representing the nuclear industry at the heart of WHO, all correctly accredited, acting as if they are public interest NGO's.

Annie Griffon

So, if we demand the setting up of a department in health, we need also to define its mission.

Eric Peytremann

What is the point of view of researchers? What do researchers need from elected politicians and associations?

Yves Lenoir

We need to discuss two points: Modification of the Convention of 23rd October 1986 that accords responsibility for management of radiological crises to the IAEA; and scientific weakness at the WHO.

Eisuke Matsui

At a conference in September 2011, two WHO representatives supported the idea that there were no problems below 100 mSv per year. What were their scientific qualifications? Are there any experts working in regional offices of WHO? We need answers to these questions. In any case, we should denounce WHO for approving the exceeding of norms today in Japan and in 1989 after Chernobyl.

Yves Lenoir

In 1989, in the USSR, the level for mandatory evacuation was set at 35 rem lifetime dose. In other words 350 mSv lifetime dose. The population opposed this because they could see that the

children were ill. WHO sent three experts, two from the ICRP – Beninson and Pellerin – to lend weight to the Soviet lobby who wanted to keep the inhabitants in areas up to 35 rem. And they won: 92 radiotherapists from the USSR signed a letter to Gorbachev saying “It’s OK, we approve non-evacuation below 35 rem”. Today, scarcely a year after Fukushima, as at Chernobyl, we see WHO, in an attempt to forestall the fears of the population, coming forward to support the recommendations of the nuclear lobby and the Japanese radiotherapists in the way Fukushima is being handled. We have to denounce this, it’s criminal.



Alexei Yablokov

WHO simply puts government policy into practise. Only the World Health Assembly of WHO can change the agreement. What we need to do is to challenge the norms by changing the ICRP. It’s the concept of “dose” that must be challenged. I have written three articles (requested by the Blacksmith Institute⁵ in America) which will appear soon, in which I attack the ICRP concepts. In 1986, among

nuclear professionals, a Japanese scientist⁶ had already put forward criticisms. More critical analyses are needed.

Eisuke Matsui

Regarding risk coefficients, there is a discussion going on between the Japanese about the ICRP recommendations concerning gamma and alpha radiation. The conversion coefficients for converting Gray to Sievert are too low (for beta and gamma radiation above 1).

Regarding internal radiation, there is a large discrepancy – as Chris Busby has shown – between norms and the reality for people exposed to radiation. We need more research in molecular biology in order to prove the effects on DNA, on mutations. We all need to work together, doctors and research scientists.

What research has been done on strontium 90 that accumulates in the bone and the teeth and has a half-life of about 30 years, like caesium 137? WHO and the ICRP minimise the effect of beta radiation and only recognise external radiation. The Japanese government is making no effort to inform the population about the dangers of radionuclides and only talks about caesium. The Japanese government should be undertaking studies of strontium 90 and caesium 137. Doctors should be taking preventative measures.

Françoise Ducloux, medical doctor, vice-president, AFPMGN,

How can doctors learn about radiation? I have just enrolled on a course on radioprotection, run by the CEA of course, but I have no choice.

Marie-Elise Hanne general practitioner, biologist
Some of the scientific questions posed by the Japanese have already been answered by scientists like Yablokov and Busby. What we really need is for all these scientific documents to be translated into Japanese and Russian and to set up teams to do this. I am willing to bring all these doctors together around a “*newsletter for victims of radiation*”, the

5 <http://www.blacksmithinstitute.org/>

6 Kazuaki KATOH, Critical comments on the current system of radiation and suggestions for improvement* KEK- National Laboratory for High Energy Physics Oho-Machi, Tsukuba-Gun, Ibaraki-Ken 305, JAPAN

*Presentation to the IVth European Congress, XIIIth Regional Congress of IRPA, “Twenty Years Experience in Radiation Protection, – A Review and Outlook –”, Salzburg, Austria, Preprint 86-52, September 1986.



first of which I have already prepared, looking at the problems of radiation exposure.

A citizen

What is lacking is any kind of data bank of accessible information. I wanted to ask all of you, from the scientific world, a question. I get the impression that what you need is a data bank – which is what we need because I’m concerned here too – of general information, instantly available, about the real situation. Listening to you, the scientists here today, Japanese and Russian, I get the impression that you need some way of discussing all this together at the same time.

Maryvonne David-Jougneau

Building bridges between scientific knowledge, accessible only to specialists, and the general public, is one of the central aims of this Forum.

Alexei Yablokov

We need to make contact with dissidents inside nuclear establishments who are not all in agreement among themselves. There are scientists who think that thorium would be a less dangerous fuel than those used currently. They have knowledge inside the industry that we need.

For example there was the release of iodine, the source of which was finally identified as Hungary on 17 November 2011. For two months,

the IAEA could not locate where it was coming from. WHO and the IAEA are incapable of guaranteeing safety in Europe. As was proved when measurements were made during just one day, of emissions from German power plants, where safe levels were exceeded to an intolerable degree. Of course, these levels will not appear in annual averages, supposedly spread around evenly. The IAEA makes its “recommendations” without taking into account these peaks of concentrated pollution, in particular during maintenance, when people are exposed most if the wind is blowing in their direction.

On 18 April 2012, the Japan Times published an article by Kenichi Ohmae,⁷ a nuclear engineer and dean of the Business Breakthrough University showing that all the calculations from nuclear reactors are false and it’s dangerous to put your faith in calculations about probability.

Eisuke Matsui

Our lack of knowledge about strontium 90 since Chernobyl is a problem. And we need to look at the role of the media.

⁷ The Japan Times Online, Fukushima: probability theory is unsafe. <http://www.japantimes.co.jp/text/ea20120418a4.html>

Alexei Yablokov

On 26th April this year, we put on a play (theatre) in front of the Ministry of Nuclear Energy: skeletons – with scythes, masks, paraded in front of the government offices. Cars stopped, people stopped. There were probably only about a hundred or so. But when that was shown on television, thousands and tens of thousands of people called in, they remembered it was the 26th anniversary of Chernobyl and that Fukushima had happened a year ago. We need to get ourselves organised socially, and present actions that get media attention.

Isabelle Taitt

How can we put pressure on the Japanese government?

Eisuke Matsui

According to the Japanese government the accident is over, people can go home after decontamination. Our association ACSIR,⁸ made up of scientists and citizens who are concerned about internal radiation, has 330 members, and provides alternative information. A first meeting of doctors was held in April and brought together 200 people. In opposition to the government position, ACSIR

disseminates information about the persistence of a lot of radioactivity, showing that the method of decontamination being used is dangerous. The association has created a national network to make known its criticisms, and organise meetings, conferences where we show films, and distribute newsletters and books.

Biochemistry student

We need to wage a real information war. Doctors need to be made aware so that they can talk to their patients and anti-nuclear activists need to understand the principles of radioactivity. Scientists, like yourselves, need to make all this information more accessible so that ordinary people can see that it is possible to understand it.

Pierre Ferrandon

CRIIRAD assisted in the setting up of CMRS,⁹ and they continue to work together. We should remember that the CTBTO,¹⁰ is paid for by the world's people, but does not give us its results. In France, the CEA receives these results, and also refuses to communicate the data to the public about the movement of the radioactive cloud from Fukushima.

Galina Bandazhevskaya

I would like to pay tribute to the role played by Amnesty International in freeing Yuri Bandazhevsky and I wonder if we should present the problem of people's health in terms of "human rights" with the support of Amnesty International.



⁸ ACSIR, Association for Citizens and Scientists Concerned about Internal Radiation Exposures <http://www.acsir.org/>

⁹ CMRS, Citizens' radioactivity measuring station <http://www.crms-jpn.com/>

¹⁰ Comprehensive Test ban Treaty Organization is an international treaty forbidding all weapons testing and any other type of nuclear explosion either for peaceful or military reasons, in whatever environment.

1.3. Extracts and summaries of the discussions among elected politicians

Chair: **André Larivière**

Minutes: **Françoise Bloch** et

Anne Marie Moutault

Synthesis: **Françoise Bloch**

Participants

Groups and individuals:

André LARIVIERE, IndependentWHO, (IWHO) – **Véronique GALLAIS**, French Collective against Radiation in Food – OHIO Corée – **Claude PROUST**, IWHO, Children of Chernobyl Belarus – **Françoise BLOCH**, offers accommodation to IWHO Hippocratic vigils in Geneva – **Anne-Marie MOUTAULT**, **Christophe ARONICA**, Sortir du Nucléaire Marseille – **Odile GORDON-LENNOX**, Care for the Children of Chernobyl, Women For Peace – **André JACQUES**, Rennes, the problem of the EPR at La Hague – **Jacqueline COLLARD**, active in various health and environment NGOs (one of the founder members of CRIIRAD) – **George GORDON-LENNOX**, former international civil servant, journalist – **Paul JOBIN**, sociologist based in Taiwan, (involved in the studies undertaken by Annie Thebaud Mony, interviewed workers after the Fukushima catastrophe) – **Anne Cécile REIMANN**, ContrAtom.

Elected:

Alain CHABROLLE, Vice President of the Regional Rhone-Alpes Council, Europe Ecology, Green Party, in charge of the Commission on Health and Environment at the regional Council – **Olivier FLORENS**, former activist with Greenpeace and in the uprooting of GM crops in Provence-Alpes-Côte d'Azur, Vice-President, General Council Vaucluse – **Pierre VANEK**, ContrAtom for 25 years, Secretary, SolidaritEs (political party and movement) Geneva, City Councillor, Geneva – **Christian VAN SINGER** – Sortir du Nucléaire, French speaking Switzerland, National Councillor for the Green Party (VD) Switzerland.



Véronique Gallais

Local politicians have more leverage than national politicians. Ordinary citizens and local inhabitants (in Japan) were able to get things moving and forced the shut down of all the nuclear reactors. What can we do at a local level, to put pressure and act?

Claude Proust

What do elected politicians on the Local Information Commissions (CLI) at each nuclear power station think? France has just recognised that a nuclear accident is possible and has agreed to put radioprotection plans in place in case of a nuclear accident (the CODIRPA operation).

Alain Chabrolle

One of the biggest problems is that most elected politicians are not convinced about the risks of nuclear power and refuse to look at the reality.

Regarding WHO, there are a number of local bodies and industries that finance IARC. We should be pushing for these organisations to introduce criteria in their funding policies. For example insist on objectivity and independence as a condition for giving aid and grants. As far as the CLI's go, these bodies are useless... and completely obsolete. They are partly financed by the nuclear industry itself, and by a generous tax benefit system. Those local politicians involved are closely linked and dependent on the nuclear industry. The CLI's are not independent organisations.

Olivier Florens

Let me tell you how I heard about the accident with the furnace at Marcoule: from the television, even

though I'm an elected politician! I got no more information than that... This was what prompted my visit to Japan. You'll understand my astonishment when I asked the authorities what plans they had in place for radioprotection in my area: knowing that iodine tablets should be taken, at the latest, six hours after a nuclear disaster, I asked them if I should buy myself a crystal ball so that I would know an accident had taken place and at what moment I should distribute the tablets.

George Gordon-Lennox

The policies of international organisations are decided by the governments of Member States who themselves are made up of elected members. When members of the public express an opinion, they don't get themselves heard. If you want to influence policy, you need the elected politicians to put pressure on their government in the name of the public that elected them.

Odile Gordon-Lennox

We should put pressure on the Austrian government which has declared itself quite clearly anti-nuclear, to protest against the WHO/IAEA agreement. We need to put pressure on elected politicians to get things moving higher up.

Claude Proust

Pressure needs to be put on member States; only they can influence WHO policy.

Véronique Gallais

We should concentrate on Point 1 and Point 2, that WHO needs to fulfil its mission to inform populations in cases of radioactive contamination and that the truth about radioprotection needs to be told.

Jacqueline Collard

The majority of elected politicians do not know enough about the subject to form an opinion: they rely on experts to tell them and all of these are pro-nuclear. But, as and when members of the public take action, elected politicians get more information. The experts do not like it when members of the public appropriate information in what they consider to be "their" domain.

Olivier Florens

On my return from Japan, I was invited to Tricastin. TEPCO's biggest fear, and the biggest fear of the Japanese government also, is the solidarity of the people. But, in France, at Tricastin for example, solidarity can be undermined by money. Compensation deals and other monetary rewards encourage divisions between people and we need to guard against that.

Christophe Aronica

We need to be informed, to get out there and find the information we need. It doesn't come automatically. Pro-nuclear people say "you can't stop nuclear". What will motivate me to find out more and start taking responsibility?

Alain Chabrolle

Local politicians are starting to think about: 1) energy transition; 2) the problem of sub-contracting; 3) the economic arguments; 4) the link between chronic illness and radiation.

But it is vital that pressure be maintained on elected politicians: 1) by informing them; 2) by financing projects (Circee¹¹ among others) and research based on cancer registers; 3) initiating actions at an international level.

Odile Gordon-Lennox

This concerns the Member States and WHO: IndependentWHO has visited a number of UN missions. The response from members of the



11 « Les Amis De Circée », Environmental education for sustainable development, <http://amisdecircee.fr/>

European Union has always been that the members of the European Union will take a unified position when it comes to international decisions.

Paul Jobin

As regards epidemiology, IARC¹² undertakes many studies. The results are not always spectacular but Elizabeth Cardis has been discredited and is no longer part of this organisation. Could WHO not assume responsibility for studies which one of its own institutions actually undertook?

Françoise Bloch

I think Point 3 of objective 2 is important because of the increasing collusion between economic power (in this case the nuclear lobby), research (increasingly financed privately) and expertise. On top of that, elected politicians find themselves with real dilemmas that form a vicious circle: the need to encourage employment in their area, to attract subsidies for this purpose, appealing to experts who are financed by lobbies. And in Japan and elsewhere, we know that it is local politicians who are directly confronted by the effects and consequences of a nuclear accident on the members of the public.

Christophe Aronica

Would it be possible to set up a CRMS in Europe so that people could measure samples from their own area? It's possible but no one actually does it. In the struggle against nuclear power and against GM crops, you come up against a lot of fear, but also repression, of things people don't want to talk about – a kind of taboo. It would be useful for sociologists and anthropologists to meet and discuss this.

Alain Chabrolle

I would like to raise a number of points:

- A multi-disciplinary approach is very important.
- Whistle-blowers, for example, are very important for elected politicians.
- At the legislative level there is the problem of competence when you are visiting and there is no cooperation between areas (ex. going to Ukraine or Japan). There is a real problem

12 *International Agency for Research on Cancer* (IARC) is an intergovernmental organisation for research into cancer, created in 1965 by the World Health organisation. Its offices are in Lyon. It forms part of the Cancéropôle Lyon Auvergne Rhône-Alpes (CLARA).



bringing information from this Forum to elected politicians. There is a real imbalance between the findings of this Forum and the “official” view. And in any case, getting information across to politicians is really hard because for most of them Chernobyl is over!

- We need to reinforce safety limits for nuclear workers.
- The Yasuni project¹³ was successful. We should be able to advance the cause against nuclear power by using influential people for Yuri Bandazhevsky's project at Ivankov.

Claude Proust

On this subject, the organisation “Health and Radioactive Contamination” based in Grenoble is ready to continue the partnership with the Rhone-Alpes region to subsidise, help and make known this project.

Jacqueline Collard

CRIIRAD was created in 1986 to inform people about measurement of levels of contamination. It is its only mission. It doesn't take the initiative on EPR or anything else. On the subject of the Big Loan (*le Grand Emprunt*) in France: Three quarters go to the CEA (*Commissariat à l'Énergie Atomique*) and to start-ups which are completely infiltrated by the

13 See note 25.

CEA. Scientific research in France is under threat. The lobbies are at the forefront of the research on ionising radiation. The Bill Gates Foundation also.

Olivier Florens

Among members of the public – at least those who can claim to live in democracies – 80% of them don't know what the IAEA is. I visited a number of villages after I returned from Japan: being anti-nuclear or pro-nuclear makes no sense after Fukushima. Nuclear power simply makes no sense and we need to approach the question in a very practical way, because the workers are also members of the public.

André Jacques

All local associations in dangerous areas have an important role in informing the public. For example, the people living near La Hague, do they understand the risk that the 108 reactor cores

stored in a steel hangar represents? An accident at this hangar would cause a far greater disaster than reactor 4 at Fukushima.

Olivier Florens

We undertook a disaster scenario exercise with farmers and workers in my region. We imagined a cloud like the one at Fukushima over the region Provence-Alpes-Cote d'Azur: "What would you do, faced with a cloud like the one over Fukushima, coming from Tricastin?" The 200 villagers were completely at a loss. Then I requested an interview with the Prefect of the region: what about drivers to evacuate the population? No plans. What about iodine tablets which are the only protection measure and need to be administered within six hours of the accident? No answer from the Prefect.

This exercise had a significant effect on the farmers and also on local government representatives who felt helpless and realised they had no advice or information to give.



2. PLENARY

2.1. Reports from groups

Report from the group “Associations”

Objective 1: that WHO fulfil its constitutional mandate in the area of radiation and health

Actions 1 and 2 of **Objective 1** were discussed at the same time because they were dealt with together in **IndependentWHO’s action regarding the World Health Assembly**. Revision of the 1959 Agreement between WHO and the IAEA and the creation of a department on Ionising Radiation and Health at the WHO are two of the recommendations put forward by IndependentWHO in the current proposed resolution to Member States. For the question to be included in the Agenda at the World Health Assembly, it was suggested that our next action should be based on this resolution and that a letter should be prepared by the **Women’s International League for Peace and Freedom (WILPF)**. Both will be circulated so that people can comment, revise and produce a final version.

It would be a good idea if a **coalition of NGO’s working in the area of health and the environment** could support the resolution and put pressure on Member States to put the proposal on the agenda of the World Health Assembly. In connection with this action by NGO’s at the World

Health Assembly, we must support the coalition of NGO’s that is fighting to establish a distinction between NGO’s with public interest and NGO’s with commercial interests (PINGOs and BINGOs), a scandalous situation in which conflicts of interest are institutionalised and legitimised.

The work of IndependentWHO with the missions of Member States in Geneva should continue but we should address ourselves to the **Ministers of Health of those Member States**, in particular of nuclear powers and of those who are more likely to support a resolution. We should also write to members of the European Parliament so that they will support the resolution at the World Health Assembly.

In order to put pressure on the Ministries of Health of different countries, we need to make an effort to disseminate more widely to other associations, information about the agreement WHO has with the IAEA, about its silence and lies, about its non-assistance to victims and about the clean bill of health it gives to the nuclear industry.

Other regional, national and international organisations, not necessarily directly involved with health or nuclear energy, such as **ATTAC, Amnesty International, the “outraged” of Stéphane Hessel**, should also be informed and mobilized about the problem with WHO and the health consequences of nuclear energy. Our information campaigns should use Internet networks that already exist, like Avaaz and CyberAction.

As regards the setting up of a department at WHO on Radiation and Health, we must make sure that **this department is independent of the IAEA and of the nuclear industry**.

The Hippocratic Vigil outside WHO headquarters in Geneva, enters its sixth year on 26th April 2012. It is becoming more and more difficult ensuring the maintenance of the Vigil. Should the Vigil continue? Should we be holding a Vigil somewhere else?

Is the Vigil attracting fewer volunteers because they do not see any significant progress? Because WHO is an empty shell? Because Geneva is not the centre of decision making?

In theory, the Member States determine the policies of the WHO at the World Health Assembly, and for this reason, some participants have suggested that we move (or start) a Hippocratic Vigil outside various national Ministries of Health. People have expressed a particular interest in setting up such a Vigil in Paris.



It is disappointing that the Forum has attracted so little interest from the established media, which has led some participants to conclude that the action in Geneva is weak and is having little impact. On a positive note, the presence at the Forum of members of the public shows that the Vigil and the fight for the independence of WHO is becoming well known in alternative networks.

Up to now, the great majority of volunteers for the Vigil have been French, with a few Swiss. But IndependentWHO needs an international dimension if it is to make things happen. The priority is to mobilise the networks from Germany involved in health and the environment, partly because of their government's decision to abandon nuclear energy and partly because the German people are extremely well informed about environmental pollution. On the other hand, they do not seem particularly well informed about the WHO/IAEA agreement nor about WHO's lack of independence.

The Vigil is a permanent action but so is the dynamic that keeps it going, which translates into other actions such as this Forum. The participants are in favour of holding a regular Scientific and Citizen Forum but are undecided about whether these should take place once a year or every two years.

Objective No.2: that independent science should be the reference in matters of radioprotection

Educating the public and making accessible scientific and medical information is essential for Objective 2. Everyone today should be able to understand the basic concepts, such as internal and external radiation, the problem of chronic, low level radiation through ingestion and inhalation (eating and breathing), caused primarily by incidents and accidents in the nuclear industry, rather than the use of nuclear weapons.

It is unlikely that the public will demand a **re-evaluation of the scientific basis for the ICRP norms** (International Commission of Radiological Protection), unless it really understands the true effects of Chernobyl on health, and in the next few years, of Fukushima.

On the other hand, **the inadequacy of current norms should be denounced now**, using the many books and articles by independent scientists and by organisations involved in health and the

environment that are already available, and that explain how the ICRP model came into being and why it is totally inappropriate.

Japanese citizens in particular need help now, in the form of support for an international campaign demanding the evacuation of children from the contaminated zones, to denounce the criminal decision of the Japanese government to declare 20 mSv per year as an acceptable limit and to demand that it is brought down again to 1 mSv per year.

Legal action, based on international human rights legislation and instruments needs to be investigated and pursued, including through the United Nations Special Rapporteurs on the Right to Food and the Right to Health and in collaboration with Amnesty International. The Euratom Treaty is of particular interest, because it stipulates that, should new scientific and medical information become available, the norms must be re-examined. Legal action could be initiated on the grounds that new information is indeed available. The ICRP model takes no account of the advances made in molecular biology over the past fifty years, including the discovery of DNA.

Any proposal for an international network of independent partners must include health professionals. This group should be mobilised as a priority, because of their responsibility in the field of medicine and their contacts within the community. By their own admission, their knowledge of the science of radiation is largely inadequate. Their training focuses on medical radiology and often they have no experience or knowledge of the conditions resulting from radioactive contamination. The proposed network should also work closely with the **nuclear workers' trade unions and with medical staff in the workplace.**

Report of the group “Scientists”

During this discussion three languages were spoken – Russian, Japanese and French. Despite the time taken up with translation, the discussion was very full. In this summary, we present the priorities for citizen and scientific action that were identified by the participants.

1. The scientists consider that it is an aberration that the IAEA should take responsibility for managing crises caused by the nuclear industry:
 - Because it does not have the necessary skills. For example, it was noted that after the explosions at Fukushima, but also more recently in Europe, it was unable to record useful data that might provide the population with information about the radiological situation.
 - Because its role as promoter of nuclear technology does not allow it to take the necessary decisions to protect the population against the effects of ionising radiation. As a result, WHO, which should take responsibility, plays a subordinate role and simply approves the IAEA’s management of nuclear accidents, whose main aim is to deny the reality of the contamination.



2. The norms established by the ICRP have no scientific basis and the concept of dose is an artifice since all contamination has consequences. The participants emphasised that risk coefficients are underestimated. Professor Yablokov has presented an argument in three articles that will appear soon which will invalidate the official theory. His arguments may convince other scientists but his scientific initiative will need to be supported by action on the part of the public to get his findings heard by governments so that they can fulfil their responsibilities. He is counting on the possibility of dissidence from within the nuclear industry itself, to introduce a fault line in the pronuclear front that organises disinformation.
3. The Japanese point out that even these official norms have been raised, scandalously, so that the contamination to which the inhabitants of Fukushima prefecture are being subjected, can be officially considered as safe. WHO has approved this manipulation. Japanese researchers, faced with this urgent situation, faced with a government that is dealing with the crisis in a totally irrational manner, want to support citizens who are organising themselves (CMRS-ACSIR). They need urgent access to information about the danger posed by the various radionuclides they encounter at Fukushima. They are relying on the knowledge that has been gathered by practitioners and researchers who have worked on the consequences of Chernobyl since 1986.
4. A data bank, that would bring together all research findings, would be a useful tool and would be greatly appreciated by all those who are taking care, and will continue to take care, of victims of radiation. In order to have a comprehensive and up to date picture of the effects of radionuclides, particularly strontium 90 and caesium 137, on DNA, Professor Matsui is asking for epidemiological research to be undertaken now. But what official organisation would support this kind of research?
5. Participants note that scientists and citizens who try to help the population living in contaminated zones find themselves up against

the negationism organised at an international level by the nuclear lobby. This systematic disinformation prevents the population from realising the seriousness of the situation, but this is also true for health professionals who have no training in this area.

6. Ongoing information and training of doctors about the health consequences of radioactivity can only be undertaken at present by associations like IPPNW and through alternative sources of information like the “Newsletter to victims of radiation” that Dr Hanne has proposed. We need to do more in this area.
7. To counter this disinformation, we need to make information accessible to the wider public and this is not easy. Professor Yablokov suggests we create media events, through use of the arts, and theatre. This would interest journalists and make the public more aware.
8. Galina Bandazhevskaya believes that our priority is to stop the censorship about the health consequences of ionising radiation. She thinks our struggle should be based on the issue of human rights, particularly the Human Right to Health, and that we should ask Amnesty International and other organisations that defend human rights for their help.

N.B: *In summarising the discussion that took place, it was noticeable that the Japanese scientists and those scientists involved with Chernobyl were concerned with different things. The former group had come to the Forum with urgent questions about the danger posed by the radionuclides that they are encountering in Fukushima prefecture, and had come to seek information from the latter group. They find themselves faced with the management of the situation by the Japanese government on the one hand and by citizen organisations like CMRS and ACSIR, on the other. Yablokov, who spoke for the latter group, was more concerned with the strategy needed to stop the disinformation about the health consequences of ionising radiation.*

Report of the group Elected Politicians

The central point: Elected politicians, who share our ideas, need us to get themselves heard because their point of view is dismissed by other elected politicians who often, are not convinced by their arguments.

Objective: Take collective action

Other important points: We should have no illusions about official epidemiological studies (even when they are large scale and financed by regions) because in the current situation, such studies are the result of a collusion between the economic power (of the lobby) and research. What point is there in fighting for a Radiation and Health department at WHO, if it will consist of scientists from the nuclear lobby?

But many local entities finance WHO: we should target our information at elected officials so that they make the independence of WHO a funding condition. Only elected officials who have begun thinking about the energy transition can influence international organisations like WHO. But constant pressure needs to be put on these elected politicians by showing them the illness that follows radioactive contamination.

Once more, it was emphasised that there is a need to set up an international network (point 3 of objective 2) of independent information and research to combat the disinformation and the lies emanating from “official science”.

This network would be useful first of all to inform local elected politicians because they themselves are either ill-informed or influenced by experts from the nuclear lobby: in which case they need to hear the counter arguments

Also, elected politicians are pressured from all sides: they are supposed to protect the populations that they represent, but also encourage employment in their areas, attract subsidies to this end and appeal to experts who are very often financed by lobbies themselves.

An example from Switzerland shows one way to put pressure on governments. On 10th May 2006, the medical doctor and National Councillor of the Canton of Vaud, Luc Recordon, tabled a parliamentary question to the Swiss National Council



about the collusion between WHO and the IAEA.¹⁴ He received the standard response from the public relations office at WHO, but his example could be taken up by other representatives in other countries.

Organise public campaigns at a national and European level.

Integrate the skills and knowledge from the social sciences into our campaign.

Hold Scientific and Citizen Forums like this one, periodically, on advances made in « independent science » and on research in order to disseminate the truth.

Publish articles in the press (Christian van Singer would be willing to write an article in “*Le Temps*” if a scientist co-signs it).

Continue the Vigil.

2.2. Plenary Discussions

Claude Proust

Now that the three summaries have been read, you have the opportunity to contribute to a discussion of the objectives and actions that have been proposed. Afterwards, there will be a final summing of all that has been said at this Forum.

Man

Is it a question of money or of logistics that stops us asking for help or support from the big organisations like the pacifist nuclear scientists for peace or medical doctors who are aware of the problem, senior scientists in the USA or other Anglo-Saxon countries?¹⁵

Paul Roulland

Do you mean, should we be asking for their help?

Man

For the sake of credibility, visibility in the scientific world and to sustain our actions.

Yves Lenoir

When the organisations that have been mentioned do real work, it should be read. Recently the *Bulletin of Atomic Scientists* published an extremely interesting study. Those people really know what they’re talking about and like us, they are very overworked. You can’t ask them, with all they do already, to get in contact directly with activists to create some kind of joint institution. What we should be doing is making use of the work being done by these “watchdogs” – because that is what they really are. They publish serious studies on a regular basis, and they are clearly experts and authoritative in their field. The historic process, in other words, the chronology of facts and statements, like a precise knowledge of the past is vital. We need to remember that, within the scientific literature, you can find everything: but you need to sort, evaluate the relevant material, and above all, discover the weak points in studies so that you can contest these points, and give effective responses to our adversaries. I am thinking here of Bandazhevsky’s work, interrupted at a very preliminary stage, work that was completely empirical.

14 Interpellation 06.3208 « Bonne gouvernance et indépendance de l’OMS » http://www.parlament.ch/F/Suche/Pages/geschaefte.aspx?gesch_id=20063208

15 ICSU, International Council for Science. Universality of Science, Freedom and Responsibility <http://www.icsu.org/freedom-responsibility>

Alexei Yablokov

I have attended several meetings of the pacifist nuclear scientists. It is an elitist committee of scientists against nuclear weapons formed during the Cold War. Many of them are supporters of nuclear industry. Contact with them is possible but very difficult.

Wladimir Tchertkoff

This is what Alexei Yablokov was proposing during the scientists meeting. That we should make contact with dissidents inside the industry.

Alexei Yablokov

It all depends on what we want from them. If it's expertise about the nuclear industry, we can provide that for ourselves. On the other hand, what would be useful would be to contact independent organisations in Austria, and Norway who are against nuclear power.

Claude Proust

I would like to ask Mr Yablokov a question. The IRSN in France is currently setting up a programme, EPICE¹⁶ for example, about caesium – and ENVIRHOM, which has been set up by INSERM, to study rats just as Rosa Gontcharova has done. And even the supposedly “official” science in France has shown that we know very little about low dose radiation, and where we have some knowledge, there are lacunae – that is the word used by the IRSN (*Institut de Radioprotection et de Sûreté Nucléaire*) in its publications. And the epidemiological studies that have been set up by these people will last for decades. Could we not share the studies we have done with them to save time? How could we associate ourselves with them? Is it possible to associate ourselves with them even though we doubt their credibility?

Alexei Yablokov

I will deal with this question myself. On the Internet, I have found several people questioning these issues, the same ones that I am dealing with. According to data that I have provided, nearly a hundred scientists in the world – in the United States, in Russia, in Germany, in England – are looking in great depth at the issue of low level radiation and the danger it poses.

Woman

Listening to the summaries that have been presented on the work we did this morning, I asked myself this question, so I am putting it to you: where are ordinary members of the public in all this? Have we had the public in mind when we have been talking? In the texts that we have just been looking at, I find that not enough importance has been accorded to the ordinary member of the public. It's quite simple.

Claude Proust

In the elected politicians group, they asked that members of the public launch petitions so that they can do their work. If they do not have public petitions, no-one will listen to them and they cannot put forward their ideas. For them, action from the public is important and necessary.

Franz Botens

I would like to remind you of this question. What can we do together? In two hours we will all go our separate ways. What can we do together when we are not actually assembled here in this room? Can we just give ourselves three aims, three short sentences that bring together the work we did this morning, so that we have something concrete to work on after this Forum? If I understood properly, someone suggested a network, and in another group, there was the idea of creating a contact list. We



16 ÉPICE, Evaluation of Pathologies induced by Caesium 137 contamination

began to get together a list of Email addresses: those who are interested can put their name on the list. Then, following this conference, using this list we can communicate with everyone all over the world, together, to continue our discussion and take part in projects together. I think it's really important.

Michel Gueritte

I've a complaint about our rapporteurs who forgot to mention something I said quite forcefully, that IndependentWHO should participate more, especially at conferences, symposiums, meetings organised by the ASN (*Autorité de Sécurité Nucléaire*), IRSN (*Institut de Radioprotection et de Sécurité Nucléaire*) that our friend Professor Yablokov was talking about earlier. After all, within your group you have a number of scientists, you know many scientists, you support them, you invite them to meetings like this. I don't know, you have considerable expertise within your group. There are a lot of scientists here today, and it's great. I would like to see IndependentWHO representing us at these meetings, but you are not there.

Paul Roulland

I'm replying to you Michel in a personal capacity. I'm only human and there is a limit to the number of things I can do. I completely agree with you that we should be there. But I am not a scientist. I've spent my life in the fields, weeding carrots. I'm not a scientist. No, no, don't laugh, because I'm being serious. To attend meetings like that, you need to be better qualified than I am in science. And so I'd prefer not to go rather than make silly mistakes that could be picked up and used to discredit the movement that I represent.

Nicole Roelens

I'm not sure I agree completely with what's just been said. I went to a meeting about earthquakes and the nuclear industry, organised by the AIS in Strasbourg, and we asked a number of questions as simple members of the public and we are quite well informed. It upsets the smooth running of this sort of event, but that's good. I'd like to make a suggestion, quite an ambitious suggestion, that we should think about an organised campaign. Think about an international public campaign; we could contribute to the discussion by exposing the real health consequences of the nuclear industry. Personally, I think that in organising a group, thinking about it, we might come up with a number of different

actions at different levels with different objectives but always on a global scale. And here the scientists could bring us their observations, their knowledge, but we need to really start opposing the nuclear industry, and I'm thinking particularly now of Japan. There are so many people suffering from the effects of the nuclear industry. We have to start things moving, so that people are not left on their own.

Paul

I'm completely with you here. I feel more able to approach ordinary members of the public. I feel more able to say something in that situation, and be heard. Everyone has their own strengths, rather than going to meeting where I don't feel comfortable. I would rather someone else, Michel Gueritte for example, if he had time, would go and speak.

Nicole Roelens

I just wanted to say how useful it can be to hear what social scientists have to say about this. They are scientists too and what they say is very important. I wanted to mention a meeting I went to recently in Paris. The moderator was Kolin Kobayashi, with Bruno Chareyron from CRIIRAD, Wataru Iwata from CRMS and a French scientist, a sociologist. She told us about a study she had done. The results,



which were appalling, have not been published yet. For those people who don't seem to be able to grasp the effects on human health, seeing the rates of depression, divorce, alcoholism, people who just let themselves die in the barracks that have been provided for evacuees, seems important to me. Making these facts known could get through to a lot of people. Perhaps we should invite one of these social scientists to the next Forum, or distribute their studies once they are published.

George Gordon-Lennox

I just wanted to go back to the question of political will. Alison has told us about the approaches that have been made in Geneva to the government permanent missions, and she said that they were given a warm welcome. Diplomats are trained to behave politely. It's obvious that all they can do is to relay the information we give to them to their capitals. So, it's obvious to me that it is in those capital cities that we need to act and put pressure. That's not to say that we should stop our approaches to the missions, but we shouldn't expect too much from what these polite diplomats say to us. That's my first point. The second point is the one raised by Galina Bandazhevskaya. I think there is another organisation in Geneva that we have ignored, the Human Rights Council, that has a Special Rapporteur on the Right to Health. Galina suggested that we join forces with Amnesty International and all the other non-governmental organisations, of which there are many, very many at the Human Rights Council, to get the Special Rapporteur interested in the issue and do something in that area.

Claude Proust

I'd like to support what George has just said. This is what we said yesterday when Chris Busby proposed his citizen petition that the Euratom treaty be re-examined to take account of the new information about the effects of radioactive contamination that has come to light since it was signed. He added that he was certain that there would be no response to this petition but that it would then allow us to take the case to the European Court of Human Rights. The arguments and information that would accompany the petition could be used in other actions, in particular at the Human Rights Council.

Vigil

Just now in the other workshop, people were questioning whether we should continue with the Vigil.



I just wanted to say, as someone who has done the Vigil myself, that it is a fantastic action and that we absolutely must continue with it. I just want to say, don't interfere with the Vigil!

Paul Roulland

Message received.

Olivier Florens

There is one form of action that the anti-nuclear struggle has not tried, and that's civil disobedience. I speak as someone who has taken part in pulling up GM crops. We disobeyed and this brought the issue to the attention of the courts. We could refuse collectively to pay our electricity bills stating health, environmental or social reasons. At least that way, we would get public attention. It's one solution, one suggestion.

Alain Chabrolle

I want to go back to some earlier points. I think it's really important, particularly from the epidemiological point of view, to work with the unions and the nuclear workers and, particularly in France, the workers who are sub contracted, who are real guinea pigs within the industry. And particularly as regards studies, perhaps not to concentrate on epidemiological studies of huge areas, but just on people working in the nuclear industry. I'm thinking for example of the work that we eventually succeeded in getting done on agriculture and



pesticides, with the *Mutualité Sociale Agricole* (an association that deals with agricultural workers health pensions, etc.). So, it could be done.

The second point – and I’m speaking as an elected politician – that we need to make use of our scientists, make summaries of their work and distribute it, make it available to all of us. Because there is a complete asymmetry with the information that comes from the nuclear lobby, and this is why we must make sure that the findings from this Forum must be distributed everywhere, across all the networks. I think it would be good to get feedback, articles on living conditions now around Chernobyl. I went there last year on a mission of the Regional Council; it’s true that it’s disastrous, as in Fukushima.

I also just want to thank you – the organisers of IndependentWHO – and tell you that the Vigil is being talked about now and it’s a real point of reference when talking to elected politicians – just think, every day in Geneva someone is challenging WHO! It’s very symbolic and I think it should be continued, people are grateful and we congratulate you.

And finally, can I make this suggestion: I think it would be really important if, given what is at stake, we had some emblematic projects. It would be great if we could involve some international figures, I’m thinking of someone like Stéphane Hessel, with his “indignation” that you

are all familiar with (*Stéphane Hessel wrote a book in 2010 called “Indignez-vous” “Time for outrage” in English, to mobilise French people against apathy and stand up for their beliefs.*) Or we could have a big emblematic campaign like the one mounted for Professor Bandazhevsky – and I mentioned the project Yasuni, “black gold against green gold” where we succeeded in building it up brick by brick, even though it seemed impossible at the beginning – to support it and bring it to the attention of the public all over the world. Perhaps we could use this campaign as an emblem with the equivalent in Japan.

Liliane Perrey (Lamamo)

I want to make a proposal that we put all this citizen information on our web site. Because there is so much material – there is the foundation Copernicus, which does a lot of work in a variety of areas, but particularly in health, they set up inquiries. For instance, this work that has been done on workers that have been exposed to radiation in the nuclear industry, it’s extraordinary. I went to the summer school organised by *Sortir du Nucléaire* three years ago, and there was a worker from the nuclear industry there, a subcontracted worker and his testimony was more powerful than any of the other reports. It really got to us, it was terrible. Dreadful. Anyway, there is this wealth of information coming together from ordinary members of the public, and Stéphane Hessel’s 2012 collective had 40,000 people signed up within two weeks. What I mean is, it’s all there, we all just need to connect.

Paul Roulland

As regards the site, with Christophe Elain, we made the decision to stick to the effects of radiation on health. Of course, we provide links to other sites for people who want to find out more. But we’re not going to put every article that appears on the site, because we’re worried about people drowning in all that information.

Eisuke Matsui

This is not a reproach, I just want to say that while you are all talking, there are children in Japan who, potentially, are all going to, die, because they really are being exposed to radiation. Things happen very, very quickly. These children are living in areas that are exposed now, while the government and those scientists still repeating the government’s lies are telling them: there is no problem, it’s not serious, you can stay there, we’re going to clean a

bit around there, don't worry. Don't worry, everything's going to be alright. In fact, it is not alright at all, the children are going to die. So, my hope is that this Forum – I am not reproaching you – will take your actions in this direction, I would appreciate it enormously.

Paul Roulland

I don't think your request will be forgotten. You are very present in all our thoughts. That doesn't mean that we can turn those thoughts into actions straight away.

Kolin Kobayashi

I just wanted to say that in Japan, but it's the same everywhere, activists who want to end nuclear power and those who are concerned about the effects on health of radioactivity are quite separate. Those people who are interested in renewable energy are not terribly interested in the health consequences of Chernobyl. The children are still suffering today, but they are not that interested. In Japan, it's the same thing. There are mothers who are trying to change government policy on energy and those who are worried about the health of the victims of radiation and what to do about it: all these people are working on their own. So we need to think about bringing these movements and actions together. If all of us take into account what the others are saying, there is enormous potential support to reinforce our actions and movements. We need to find a way to link us all together.

Galina Bandazhevskaya

There are two countries which have suffered from the atom, Belarus and Japan. They have different economies, different governments, different levels of democracy. And if Japan had closed all its nuclear power stations, then all the experts and doctors could have united their efforts to look at saving the health of those exposed to the radiation. Telling us that the children are dying, that the children are irradiated, that they are suffering, in the end these are just words. What we need is for these words to be translated into action, for an international organisation of doctors to be set up and start working on it. And the Japanese authorities need to start work on it too. Japan has a chance of making some progress with it. But you have to start working within the country, the doctors within the country. Then everyone else can join them later.

Maryvonne David-Jougneau

In relation to follow up action to the Forum, I want to propose something. Yesterday, a lot of interesting things were said about the problem of norms, and the rather *flexible* way they can be applied for example, that was very accessible and easily understood. I think it's very important that the scientists present today write an article for the mainstream press – for *Le Temps*, *Le Monde* – it could be one of the Forum's achievements, that would offer a tool for understanding the problem of norms. As for Stéphane Hessel, we invited him, we asked him to open our Forum. He could not do it because he was too busy, but even so he offered us his support. And he was one of the first to sign the manifesto that we put out.

Berthe Fisch

I have just joined in the action against the burial of nuclear waste at Bure (France). I have really enjoyed the Forum, as an observer from outside the group, as a member of the public. I've heard a lot about communicating over the internet, exchanging letters, petitions and the Vigil. I admire you all for the work that you do, but honestly I wonder if we've got enough time. In other words, if you think that over the next five years it could be us who get it in the neck, I wonder whether the action you're taking isn't a bit too peaceful and polite. We need to be a bit more forceful, like Greenpeace. They don't hesitate to take direct action, like when someone para-glided onto a nuclear power station. Just now, a woman was saying she was going to do her



shopping wearing placards on her back. But you don't get the public's attention that way. We need to get Pamela Anderson on board, naked, carrying placards. Now that would have an impact.

Bruno Boussagol

What you're talking about here is a difference in style, and we have our style, and it's long term, enduring. Radiation lasts an infinity. People have been living in the contaminated areas for 26 years. You might say that our action, which has been going on for five years, is modest compared to theirs. So, we're living at the same pace, the pace of the disaster. We are living at the same pace as the disaster when we maintain the Vigil, and the people in Belarus, in Ukraine know this and they recognise the humanity of our action. It is an essential dimension. You need to understand that the vigil starts at 8 in the morning and ends at 6 at night. You need a strong constitution to keep going all the months of the year, every day, apart from Saturday and Sunday – that's our style. We took a long time developing this style, because all the people and the organisations who were there when IndependentWHO was set up, were people who had militated for years and years before. In particular there was the network *Sortir du Nucléaire*. Don't forget, there are 900 different associations from the network *Sortir du Nucléaire* who take part in our action. Symbolically, you could say, because they don't all come here. So, there is nothing to stop

more militant actions taking place in different circumstances. But you can't be chanting slogans for ten hours a day. The only way to keep going for ten hours is to keep calm. So we need people who are calm. Not all the militants who share our action can be with us. And from what I've learned over the last two days, these militants respect the vigil that we have set up. I have great respect for passionate people – I'm a passionate person myself – I find it very difficult to be peaceful and quiet and yet I support peaceful action. What I am saying is that it's that style that we are aiming for, that we want to impart to the whole world. When I hear that in Japan, there are mothers who are keeping going 24 hours. I think, there, that's the connection. We need to find the connection there.

Véronique Ratel

I would like Odile Bertella-Geffroy, who is a French judge, to come to the next Forum. She was in charge of the complaint filed in court on 1st March 2001. On 1st March 2001, 51 people suffering from thyroid disease and two organisations, CRIIRAD and AFMT, filed a complaint at the high court in Paris bringing a civil case against X, notably for poisoning and administration of harmful substances! The complainants who have cancer and other diseases of the thyroid believe their illness was caused by fall-out from the radioactive cloud from Chernobyl in April 1986, following the explosion at the nuclear power station.

I was one of the first complainants, I have thyroid disease. At the time, the French director of radioprotection was Professor Pellerin: he was indicted for misleading the public in 2005 and later, for failure to take precautionary measures. On 7th September 2011, the court ruled there was no case to answer. The case was withdrawn from the judge at the beginning of March 2011. When the next Forum is organised I would like jurists and magistrates to be invited to present this angle, the justice angle, and the victims. There are victims in Belarus, in Japan, in the whole world. I heard Judge Odile Bertella-Geffroy on the radio programme, *Terre a Terre on France Culture*¹⁷ and she explained that an international court to judge crimes against public health is being set up at the moment in Venice. In France, the victim needs to prove that their illness,



17 Émission du 17 décembre 2011 “ Santé, Justice, Environnement”. <http://terreaterre.ww7.be/sante-justice-et-environnement.html>

for example thyroid disease, is directly linked to radioactive fallout: it is the problem of cause and effect. Mme Bertella Geffroy talked about studies that are being undertaken in genetics, that are to be published soon and may help victims of the nuclear industry. Professor Fernex talked about it, we must support the work of geneticists. It's very important. Thank you.

Susanne Urban

I think this would be a good moment for us to go round the room and ask everyone what they are going to do after these two days together. Here is what I am going to do: Norway has no nuclear industry, but there is one thing to do, and that is to translate this little book, *“Après l'accident atomique”*. (After a nuclear accident). It should be translated into other languages. I will see if WILPF (Women's International League for Peace and Freedom) can translate this book into English and then into Scandinavian.

Robert James Parsons

I would like to draw your attention to an event taking place here in Geneva tomorrow morning at 10.30 that might interest you. At the Press Club there is a meeting and I will read you the title: *Switzerland in global health, Swiss foreign policy in the area of health, WHO's response*.¹⁸ It's very important because the four speakers are all ambassadors.

Christophe Aronica

I would like to ask some advice from Mr Matsui: what do you think we should be doing, about the things we're talking about? The first action all of us when we decide to become an activist, is to talk. That is our first action. We are all in agreement that the disaster is not only in Japan and Chernobyl but also here. We are all in agreement that all of us are contaminated. We are all in agreement that we are all potentially going to become ill etc. But, Mr Matsui tells us that there are Japanese children falling seriously ill now. A smaller percentage of our own children will suffer the same thing and so will we. Would it not be insulting to ask Mr Matsui to advise us: should we abandon nuclear power in twenty years? Or stop now? Are you shutting down your reactors? Because your children will be like



ours in Japan. I just want to ask him.

Eisuke Matsui

As you've said, it's true, there are children who should be born, who will not be born, and children born, who are already ill. It's true, this is what is happening at this very moment. In this situation some people say: we must shut down all the reactors. On the other hand there are people who say: it's a problem of energy. Then it becomes a huge discussion. But while this is going on, children continue to die. And we aren't doing anything about it. Then we all find ourselves frustrated, saying to ourselves, what should we be doing? And all the time knowing perfectly well what is going to happen, because we already know what happened at Chernobyl, from the information we have about Chernobyl, about uranium in Iraq, etc. We all know perfectly well what will happen in a year, in two years, in three years, in five years, in ten years. So now, on top of Chernobyl, we have the children of Fukushima joining the list of people who are suffering. We are at a point where obviously we all have to ask ourselves, how can we, reach out beyond the frontiers of our own country, and do something to help the children who are dying now. And that, for me, is the first thing. Obviously at the same time, we need to seek out those responsible – whether it's TEPCO, or the Japanese government, or even beyond that, the American nuclear lobby – but what counts at this moment in time is what we do now, today, for

¹⁸ http://old.pressclub.ch/doc/cr/comptrenderu_120514.html
See also: http://www.livestream.com/genevapressclub/video?clipId=pla_104a40f1-b7e3-43ba-9553-bad4f8b5d9d4

the children who find themselves in this situation. And that is where I need your help. Thank you.

Isabelle Taitt

I would like to know if you are asking us to push for the evacuation of children from Fukushima?

Eisuke Matsui

Of course, it would be helpful to put pressure so that people do not return to the contaminated areas. But the Japanese government needs to put in place a policy of relocation so that, for example, if they were dairy farmers before, they can continue dairy farming somewhere else.

Isabelle Taitt

So, should all of us here be saying: we are going to go to the embassy, the Japanese consulates, to make it happen?

Eisuke Matsui

What carries weight in Japan is if a politician voices an opinion. I was really impressed yesterday when a member of the Geneva government, Mr Remy Pagani took part in the Forum. I was

really impressed that a politician expressed himself so clearly in favour of the movement. For me, that would have an enormous impact in Japan, to put pressure on Japan, and give weight to what you are saying here today: if people of official status were to take up what has been said here today.

Wataru Iwata

I think it's important to approach the problem from a human rights perspective. Because the Forum today has mainly concentrated on health problems – we recognise they exist – but we need to bear in mind that following the accident at Fukushima, the 1 mSv limit, defined as the safety threshold in the case of an accident, was raised to 20 mSv in Japan. So, in fact, in Japan, when the accident happened, the Japanese government changed the law because that threshold was enshrined in Japanese law. The government has changed the rules in a totally illegal way because of the accident. I don't know if all the people living in the affected areas want to leave, but what is certain is that the human rights of those who do want to go are not being recognised at the moment. Just now, someone said that we need to make use of the social sciences in our approach, and I think that's really important in as much as, yes, people have got health problems, but we've only talked about health problems and I'm not questioning that, but approaching the problem from other angles could be an important part of our action.

Claude Proust

I just wanted to say that the regulations regarding recommended levels are defined at an international level by the ICRP: 1 mSv for the public, 20 mSv for nuclear workers. These are just the recommended levels under normal conditions. The international recommendations allow governments – in exceptional circumstances like accidents – to do what they like. The nuclear industry, when a disaster occurs becomes a great deal of things. And it's the government alone that has to take responsibility. And in order to change international law, the health consequences need to be taken into account before any norms can be established. At present radioprotection norms are defined in such a manner that there are not many health consequences. So, our role is to make the health consequences a priority because radioprotection is there to protect our health and not the health of the nuclear industry. New norms need to be established to make sure that there are the least possible consequences



on people's health. But to change the international regulations, we need scientific proof. We talked quite rightly about sciences other than physics such as the social sciences. We need all scientists to develop other radioprotection norms.

Wataru Iwata

As regards the 1 mSv per year, I just wanted to say that that I'm referring to Japanese law, not the ICRP. The situation in Japan at the moment is that the government is breaking its own laws.

Miwa Chiwaki

Up till now in Japan, and obviously just before the accident, no-one was interested in nuclear power; there were just a few people who understood clearly, as you do here, and who took an interest. But of course, since the accident, everyone knows now why they should be interested in nuclear power, and above all, mothers of young children. I myself became interested in the problem of nuclear power when I learned of the risks to children. I belong to an organisation to protect the children of Fukushima, and also an organisation of women for a nuclear free Japan. We are fighting of course, to expose the responsibilities of TEPCO and the government. Among other things we have just filed a court case against TEPCO and the government: It will come before the Fukushima regional court on 11th June. Among the many actions that we are involved in, obviously the first is to replace

the government that has given no help in the area, but also to put pressure at all levels. At the level of government, who are doing nothing to support the local population, but also at the level of representation, in other words the Japanese Parliament, we are putting pressure on all the local representatives who are not doing enough at the moment. There are very few of us and we are doing, dare I say it, everything. In other words, measuring radioactivity in food to give to children, bringing them together, trying to keep them in areas where there is little radiation, and keeping all this going from one day to the next. All the while, taking the authorities to court for not doing their work. And quite clearly it is a task that is way beyond our capabilities, and that's why we need your help in this area.

George Gordon-Lennox

I am very conscious of the strength represented by IndependentWHO, if you are part of IndependentWHO. There are some bureaucratic things we can do perhaps – contacting governments etc, but it's all our energies put together, with our friends in Japan, that may help to change things a little. That's all I wanted to say. IndependentWHO is Paul, Claude, Maryvonne, all the people who communicate by Email, sometimes expressing differences of opinion. But we're all there. And if this Forum is a success, it is because of this energy, this synergy of IndependentWHO. Thank you very much.



3. Final Synthesis of the Forum

Claude Proust reads the final synthesis

A – That WHO fulfil its mandate in the area of radiation and health:

1. Demand the revision of the agreement between WHO and the IAEA of the 28th May 1959 so that WHO can regain its independence and denounce the clean bill of health that it awards, in effect, to the nuclear industry.
2. Strengthen the action of the permanent vigil outside WHO headquarters as a continuing testimony to the suffering of the victims of radiation and contamination and extend the action to other places (other countries...) of symbolic significance (Ministries of Health, Local Health Authorities etc).
3. Organize a Scientific and Citizen Forum periodically to coincide with the World Health Assembly, with a collective made up of individuals and organizations who would like to be associated with IndependentWHO. This Forum would represent the annual focus for our permanent vigil.

B – That independent science should be the reference in all matters relating to radioprotection.

1. Make known the health consequences of ionising radiation through epidemiological studies undertaken at the request of citizens,

financed by regions, governments and international institutions and undertaken by independent scientists.

2. Re-assess radioprotection norms in the light of these recognized health effects.
3. Put in place an international network of independent partners (scientists, elected politicians, associations) to share and disseminate scientific knowledge and information from reliable sources.
4. Organise a campaign of citizen petitions such as the one that has already been proposed, to ask the European Parliament to re-examine the Euratom treaty regarding the new information that has come to light about the health effects at Chernobyl and Fukushima.

These two objectives and the actions needed to achieve them were accepted by those who took part in the Discussion Meeting of 13th May 2012, Salle Gandhi in Geneva. Other actions have been proposed:

- Include studies from the social sciences
- Communicate information about radioprotection to health professionals and the public
- Make contact with dissidents within the nuclear industry
- Get an article published by independent scientists on the variation in radiation norms
- Disseminate information on actions undertaken on behalf of the victims of the Fukushima disaster.



Thanks

The Forum could not have taken place without the invaluable support of many people, organizations and entities, too numerous to name individually. We thank all the volunteers who gave their time and skills freely. These include the hosts, guides, and drivers who took care of our guest participants, many of whom came from afar; the moderators of the debates, volunteer interpreters and translators; those who served meals, offered coffee and staffed the documentation table. We also thank the professional interpreters, technicians and staff of the World Council of Churches and the Maison des Associations, the Swiss Press Club, and especially the generous donors whose logos are listed below: City of Geneva, Foundation for Human Earth, Greenpeace, City of Carouge City Vernier, SolidaritéS, Socialist Party Geneva, Geneva Greens, Liberal Ecology Association, Network for Nuclear Phaseout, ContrAtom, Brut de Béton Productions, Biocoop, Stop Fessenheim ACSIR – Association for Citizens and Scientists Concerned about internal radiation exposures (Japan), CRMS – Citizens’ Radioactivity Measuring Station (Japan), The Children of Chernobyl, Cafés Carasso Geneva



**Members and sympathizers of the Collective IndependentWHO
for the organisation of the Forum**

Emanuela Andreoli (Switzerland), video editor

Bruno Boussagol (France), committed theatrical producer-director

Maryvonne David-Jougneau (France), sociologist

Christophe Elain (France), militant environmentalist

Odile Gordon-Lennox (Switzerland), member of Women for Peace, Geneva

George Gordon-Lennox (Canada), retired international official and journalist

Alison Katz (Switzerland), member of People's Health Movement

Kolin Kobayashi (Japon) free-lance journalist

André Larivière (Canada), anti-nuclear militant

Marc Molitor (Belgium), journalist

Eric Peytremann (Switzerland), retired physicist, member of Contratom

Claude Proust (France), retired jurist

Thérèse Raitière (France) retired farmer

Véronique Ratel (France), teacher physical education and sports, member of the French association Enfants de Tchernobyl Belarus

Paul Roullaud (France), retired farmer

Hannelore Schmid (France), administrative assistant

Annick Steiner (Switzerland), socio-educational assistant

Wladimir Tchertkoff (Italy), retired documentary film-maker, Swiss television

The Hippocratic Vigils since 26 April 2007

Austria: Mair Ingrid – Olberg Hermann – Olberg Léonore – Stockinger Heinz

Belarus: Babenko Vladimir – Goncharova Rosa – Nesterenko Alexei – Nesterenko Vassili – Zaitsev Valéry

Canada: Scramstad Juliana

France: Alazraki Liliane – André Liza – Andriot Gaëlle – Angrand Emmanuelle – Antonanzas Pascal – Arroui Jean Louis – Atrux Claude – Babchia Yacine – Baggietto Lorian – Baldens Anne – Baldens Pomme – Baldens Sylvie – Baloge André – Balthassat Raphaël – Barasinski Renée – Barbot Jocelyne – Bartélémi Pascale – Bazire Goulven – Bécamiel Maurice – Béconnier Bénédicte – Bénassi Gudrun – Berthaud Denis – Bézier Pascal – Bibard Catherine – Blanchard Dominique – Boccara Michel – Bodart Geneviève – Boehm Henri – Boehm Nathalie – Boissy Elisa – Bonnaire Eric – Bonnefond Nathalie – Bonnenfant Marie – Bonnet Jacques – Bony Cathy – Bouligand Aurélie – Boureau Sylvain – Bourland Rohalt – Boussagol Bruno – Boutonnet Alain – Bouvier Carole – Bouvier Françoise – Boyer Paul – Brégeon Nicole – Bretou Claire – Brisoux Gérard – Brodard Catherine – Bronkorst Maarten – Bruneau Annick – Budini Marie Noëlle – Caballé Claude – Caballé Jean Pierre – Cabille Mireille – Carlioz Pierre – Catin Julien – Chaffard Françoise – Chalmel Denis – Chaniel Françoise – Chantepie Marie – Chartier Bertrand – Chartier Ioané – Chartier Joëlle – Chas Henri – Chatelan Guy – Chedemois Dominique – Chedemois Odile – Cheminborie Lionel – Cherbonnier Gildas – Chiffaudel Arnaud – Christophe Marguerite – Ciernak Jérôme – Clavière Philippe – Cointe Philippe – Collard Christophe – Colombet Nathalie – Constans Philippe – Contant Michel – Copin François – Coquard Rolande – Cordoeiro Anne Sophie – Costa Anne Elisabeth – Crapiz Damien – Creskens Alice – Crevon Cyril – Dacosta Christine – Dalex Simone – David-Jougneau Maryvonne – De Brouhms Svetlana – Decker Hermien – Dehgane Khaled – Delacour François – Demenge Guy – Deniel Michel – Deplanque Christiane – Deroche Liliane – Derrien David – Désire Olivier – Dobrowolski Gisèle – Douart Pierre – Dubezak Patrick – Dubois Blanche – Ducloux Françoise – Ducloz Brigitte – Dumont Charly – Dupuis Anne Marie – Dupuis Christophe – Duquesnoy Françoise – Durand Séverine – Durgueil Sylvie – Duval Christophe – Duval Danielle – Dyon Jean Marie – Echeverria Josiane – Elain Christophe – Erens Anne – Erens Marc – Escallier André – Essayan Roland – Faivre Didier – Faivre Mireille – Fanton Franceline – Ferrandon Pierre – Fetet Fabienne – Fetet Pierre – Filliozat Vincent – Finot Brigitte – Forget Yann – Fratoni Marie Magdeleine – Fresneau François – Frissard Marie Christine – Frontini Jean Marie – Furukata Etsuko – Fusch Catherine – Fusch Marie – Garavelle Christina – Gaspard Gabrielle – Gasse Vincent – Gerolami Marie Noëlle – Gessert Olivier – Gillard François – Giraud Cyril – Giraud Sophie – Girouard Sandrine – Glorieux David – Godet Laurent – Gogris Annie – Gordon-Lennox Odile – Got Françoise – Grandsire Annick – Grasset Marie Françoise – Greaves Dave – Greaves Suzie – Griffon Annie – Grosjean Mireille – Grossiord Mathias – Grousselas Jocelyne – Grousselas Marcelin – Guérin Pierre – Guihard-Moutault Anne Marie – Guirkinger Gilbert – Guittenit Monique – Guyland Pierre Emile – Haberthur Patrick – Hacquard Mary – Hamon Jean François – Hanne Marie Elise – Harrouard Armelle – Hay Christine – Holley Gérard – Imbert Monique – Jacolino Lionel – Jeanneret Anne Marie – Jouffroy Thérèse – Journet Yvon – Jousseau Claude – Jubert Mireille – Jungo Fabienne – Kabalu Anne Marie – Keiszei Michèle – Kobayashi Kolin – Krintger Dominique – Ksouri Roland – L'Hénoret Michel – Labarthe Monique – Labourot Brigitte – Lariguet Patricia – Larivière André – Lauro Michèle – Le Fur Ronan – Le Guyader Laurent – Le Meur Martial – Le Meur Monique – Le Tallec Claudine – Lebrun Jean Pierre – Lebrun Marie Madeleine – Legland Jérémy – Legouguec Christiane – Lemery Barbara – Lemoine Philippe – Lepêtre Anne – Lereuil Frédérique – Lereuil Guy – Leroy Emilie – Lesouef Jakez – Liebert Catherine – Linck Pierre – Lluch Pascal – Lochmann Blandine – Logé Michel – Loquais Dominique – Louvet Dominique – Lucarelli Pierre – Lucas Bernard – Lucas Madeleine – Lucchini Jean Marie – Maddaléna Dominique – Madrange Alain – Mar Françoise – Marchand Eliane – Marcot Véronique – Marmottant Sonia – Martzloff Arno – Matagne Alain – Mativet François – Mauguet Rachel – Mayer Edith – Mérola Fabienne – Meuley Francis – Michel Florentine – Midori Amo – Millet Jeanne – Millot Laura – Mir

Françoise – Mirandola Claude – Mitterrand Danielle – Mizrahi Diana – Monier Jean Jacques – Monti Albert – Morel Sophie – Mounier Christophe – Mugnier Anne – Muller Jean Marc – Naudinet Jeannine – Nicolle Bernard – Niebergal Friedrich – Nodet Christine – Nodet Michel – Notalle Isabelle – Orly Hubert – Pasquet Jean Pierre – Peillard Jean Yves – Pellerin Huguette – Péringer Michèle – Perrey Isabelle – Perrey Liliane – Perthuis Michel – Peyroux Eliane – Pham Van Bernard – Picard Sarah – Pimolle Nicolas – Plantier Karine – Pleysier Marc – Porchy Marc – Pottier Thierry – Pouillon Marie Joëlle – Poussard Michel – Poussel Denise – Prieur Bernadette – Proust Claude – Puget Odile – Quiroga Lidia – Raitière Thérèse – Ramillien Stéphanie – Ratel Véronique – Raynaldy Françoise – Reculard Philippe – Reeb Annie – Reeb Georges – Renault Damien – Rialland Christophe – Rioche Michel – Rivault Pierre Jean – Rossignol Sylvain – Rotureau Damien – Roullaud Paul – Roussel Thomas – Rullon Philips Hélène – Sanchez Pascal – Sans Michèle – Sarbach Marie France – Sarbach Michel – Sarbach Xavier – Saulnier Isabelle – Sauvage Sylvie – Scalbert Dauphine – Schneider Loïc – Sébire Véronique – Sessa Daniel – Shemwell Hélène – Shipley David – Sierra Roselyne – Simonet François – Simonnet Denis – Soldevila Maguy – Sontag Georges – Szkudlareck Aurélie – Tellier Philippe – Tenailleau Marie – Tendron Henri – Thévenin Thierry – Thiébaud Jane – Tonnerieux Jean Luc – Toulotte Martine – Toupet Elisabeth – Trit Corinne – Trolong Cédric – Truchet Hélène – Ulmann Marc – Vandamme Bénédicte – Vandamme Vincent – Varagnat Eliane – Vassade Alain – Vautrin Benjamin – Vergote Marie Hélène – Vergote Philippe – Vidal Edwige – Vignaud Laurent – Vignoud Annie – Vincent Nelly – Von der Meden Monika

Germany: Drewanz Viola – Hemmer Jan – Kammer Heike – Kraft Marion – Röber Daniela – Von Stockar Sabine – Zauner Renate

Italy: Tchertkoff Wladimir

Japan: Chiwaki Miwa – Matsui Eisuke – Matsui Kasuko – Muta Orie

Latvia: Rietuma Dita

Norway: Kjelberg Christine

Poland: Szarek Janusz

Russia: Ozharovskiy Andrey – Sorhannus Tom – Yablokov Alexei

Spain: Embid Alfredo

Switzerland: Andréoli Emmanuela – Bertrand François – Bloch Françoise – Campiche Philippe – Cirrotti Sonja – Ciurlia Diane – Cuennet Martine – D'Abruzzio Angela – De Rougemont Philippe – Déthiollaz Fabienne – Fauchère Gabrielle – Fernex Michel – Gerber Vincent – Gobet Philippe – Katz Alison – Kozawa-Hofmann Miho – Kuhn Marianne – Lubrano Franchy – Marillier Michèle – Mégard Michel – Mercier Caroline – Mees Françoise – Mercz Véronique – Michaluszko Roch – Monod Michel – Morier-Genoud Philippe – Niklaus Mirose – Pagani Rémi – Parsons Robert – Perret Rita – Peytremann Eric – Porlezza Mauro – Rittmeyer François – Schmid Hannelore – Schwob Irène – Steiner Annick – Weiss Erwin – Wildberger Ueli – Ziegler Jean

United Kingdom: Busby Chris – Ross Judy – Webb Dave

USA: Tchertkoff Nicolai

IndependentWHO (IW) is a citizen movement set up by individuals and associations including: Brut de Béton Production; Contratom, Geneva; CRIIRAD (Commission for Independent Research and Information on Radiation) France; IPPNW (International Physicians for the Prevention of Nuclear War), Switzerland; Enfants de Tchernobyl Belarus, France; Sortir du Nucléaire Network, France; Sortir du Nucléaire Loire et Vilaine; and the People's Health Movement. IW is supported by a wide coalition of NGOs. The objective of IndependentWHO is the complete independence of the World Health Organization (WHO) from the nuclear lobby and in particular the International Atomic Energy Agency (IAEA) so that it may fulfill its constitutional mandate to “act as directing and coordinating authority” and “assist in developing an informed public opinion among all peoples” in the critically important area of radiation and health. IW calls on all citizens of the world to hold our public institutions to account and to act according to their founding principles.

ISBN 978 2 8399 1257 0



9 782839 912570 >