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The Role of the Russian Scientific Review Group in the 30-year Cooperation to Study Radiation Effects in the Southern Urals

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ICRP Workshop «30 Years of Scientific Achievements for International Radiological Protection: Summary of the Southern Urals Health Studies Program»
24-25 May 2024 | Virtual

Beginning of work

14.01. 1994 An agreement on cooperation in the study of radiation effects in the Southern Urals was signed

1997 First three research projects - URPC RM and SUBI

1998-1999 4 projects were added. Since 2003, the project with "Mayak" has been carried out during 10 years

1998 The research results have been periodically published in peer-reviewed Russian and foreign publications

Evidence of the importance and widespread interest in this study was published an article in «Science» highlighting the results of solid cancer and leukemia mortality in the Techa River Cohort

NEWS OF THE WEEK

EPIDEMIOLOGY

Russian Cancer Study Adds to the Indictment of Low-Dose Radiation

A Cold War environmental calamity appears to be the cause of a spate of cancers in the Russian heartland. A landmark study this month by U.S. and Russian scientists blames excess cancers in the Ural Mountains on chronic exposures to radioactivity leaked from a weapons plant a half-century ago.

The study is the latest blow to the notion that there is a threshold of exposure to radiation below which there is no health threat (and there might even be a benefit). The results add weight to last summer's report from the U.S. National Research Council, which backed the hypothesis that radiation is risky even at the smallest doses (*Science*, 8 July, p. 233). Although that conclusion had been inferred from Japanese atomic bomb survivors, the Russian study—along with a recent report revealing an elevated cancer risk in nuclear workers around the globe—provides the strongest direct evidence yet of chronic, low-dose health effects.

Both sets of findings indicate that workplace radiation standards are correct in erring on the safe side. In 1991, the International Commission on Radiological Protection (ICRP) set an annual workplace limit of 20 millisieverts (mSv) per year over 5 years, which assumes there is no safe level. "This is an endorsement of the precautionary approach as a tool for radiation protection," says Lars-Erik Holm, director general of the Swedish Radiation Protection Authority and ICRP chair.

The new data come from villagers downter for Radiation Medicine in Chelyabinsk to scrutinize the health of 25,000 people who lived in 41 villages along the Techa between 1950 and 1952, when radioactivity releases climaxed, and nearly 5000 people who moved to these communities between 1953 and 1960.

The biggest challenge has been getting a handle on individual radiation doses, which remain uncertain. The team has measured strontium-90, the most common down-stream radioisotope, in teeth from scores of subjects and conducted whole-body counts of strontium and cesium-137. They have at least one strontium measurement for more than a third of the villagers.

According to death certificates, 1842 villagers died from solid tumors other

now at the University of Utah, Salt Lake City, who helped with the study's dosimetry.

The figures, although alarming, are in line with the largest study of nuclear power workers ever carried out. A team led by Elisabeth Cardis of the International Agency for Research on Cancer in Lyon, France, pooled data on more than 400,000 plant workers in 15 countries. In this group, 6519 have died from solid cancers and 196 from non-CLL leukemias. The finding suggests that between 1% and 2% of the deaths may be due to radiation, the team concluded in the 29 June issue of the *British Medical Journal*.

It's an "impressive study," says Holm, although he and others flagged a shortcoming: Smoking may account for a large share of deaths attributed to radiation. In the study, the risk of smoking-related tumors—primarily lung cancers—is much higher than for other solid cancers. Cardis points out that the paper acknowledges smoking as a confounding factor. "Although smoking may play a role in the increased risk of all cancers excluding leukemia, it is unlikely to explain all of the increased risk observed," she says. Future publications will address concerns about the study's methods, she says.

Although the Cardis study has been challenged, exhibit B in the low-dose indictment, the Techa River study, provides corroborating evidence. The two studies come to "practically the same conclusion," says Peter Jacob of the Institute of Radiation Protection in Neuherberg, Germany. That means that the 20-mSv standard is unlikely to budge, despite arguments from industry that it is too stringent. The Russian results are "a setback for those who hope for a relaxation of the standards," says Anspaugh. The United States is one of the few nations that does not use the ICRP standard; it permits exposures up to 50 mSv per year.

In practice, most nuclear industry workers are exposed to far less radiation than the ICRP limit. That's a good thing: The average

Low-dose risks. A study of cancers in Muslyumovo (inset) and other villages near the radionuclide-laden Techa River points up the importance of limiting exposure to radiation in the workplace.

Statistics
1994-2024

380 scientific articles

9 thematic sections of scientific researches

25 international meetings

43 projects, including 5 not completed

10 regulatory documents

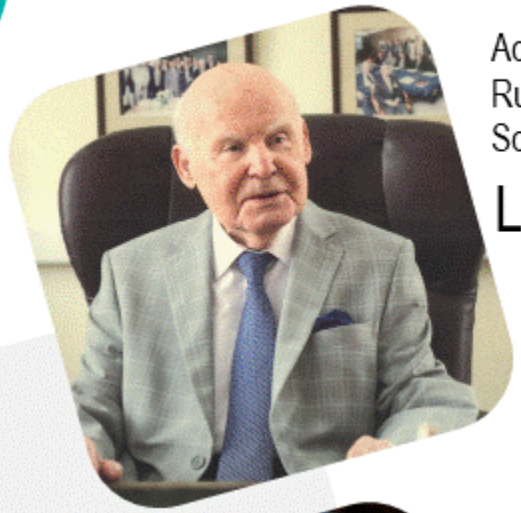
HPS

>10 workshops “Health Physics”

>100 young Russian scientists with their presentations

SRG

2008 Russian SRG was represented by FMBC's specialists



Academician of the Russian Academy of Science

Leonid Ilyin

Corresponding member of the RAS

Angelina Guskova

The main goal: to conduct thorough examination of the results obtained in each scientific project

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How reliable is

the system of radiological protection and risk assessment

The main task

of the scientific works under the Agreement on cooperation

- to obtain the most correct assessments of radiation risk due to man-made exposure

ICRP is developing a concept for the further development of the international radiation protection system in order to update the philosophy and standards of protection by

2030

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Features of work of the Russian SRG

Developed regulations for internal exposure in contact with plutonium

Ozersk, June 24-25, 2013

Chelyabinsk, June 26-27, 2013

Seversk , May 12-15, 2014

Saint Petersburg , September 8-9, 2013

- Development of recommendations for the practical implementation of the obtained scientific data in the practice of health care and RP regulation
- Coordinating research
- Conducting joint meetings of representatives of the American and Russian SRGs
- Popularization of research among a wide audience of specialists in other fields
- Cooperation with international organizations including ICRP, UNSCEAR, IAEA, OECD NEA

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Main scientific results

according to thematic sections

1.1 Techa River Population Dosimetry

New approaches to reconstruction of external doses and dose assessment from ^{90}Sr intake

1.2b Techa River Population Cancer Morbidity and Mortality

Increased risk of leukemia and solid cancer; dependence of cancer incidence at dose > 0.5 Gy

2.2 Mayak Worker Cancer Mortality

Pu dose-effect – lung, liver and bone cancer. Linear dependence of lung cancer risk at dose up to 0.2 Gy

2.4 Mayak Worker Dosimetry

Diagram of Plutonium transport communications from the alveolar section to the pulmonary lymph nodes

2.8 Mayak Worker Tissue Repository

Molecular and genetic studies to confirm late effects of radiation exposure

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Thanks to the
ICRP
for
raising this topic