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# **Malignant neoplasms in the offspring of female Mayak workers**

**Svetlana Sosnina, Pavel Okatenko, Mikhail Sokolnikov**

*Southern Urals Biophysics Institute  
Ozyorsk, Russia*

**RAD9-124**

**e-mail: [sosnina@subi.su](mailto:sosnina@subi.su)**

# Mayak Production Association



ПРОИЗВОДСТВЕННОЕ  
ОБЪЕДИНЕНИЕ  
**М А Я К**

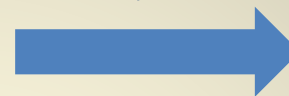
ПРЕДПРИЯТИЕ ГОСКОРПОРАЦИИ «РОСАТОМ»

The first nuclear complex in Russia, operating since 1948.

Noted for substantial radiation exposures from external gamma-radiation and  $\alpha$ -particles from incorporated  $^{239}\text{Pu}$  in 1948-58 (period of technology development)

## ***Objective:***

Preconceptional exposure  
to prolonged external  
 $\gamma$ -radiation of the  
Mayak PA female workers



Malignancies in  
their children

## ***Sources of information for the study:***

**Mayak Workers  
Cohort:**  
25% of female  
workers

**Cancer Registry**  
since 1948

**Children Registry**  
more than 90000  
persons

**N.B.** 70 years of follow-up period

# Methods:

- Retrospective epidemiological analysis
- Cohort of offspring born in 1949-1990: **2061** children from 1404 female Mayak workers

## Study group

Mothers of **1145** children had accumulated doses of preconception external gamma-exposure to the ovaries

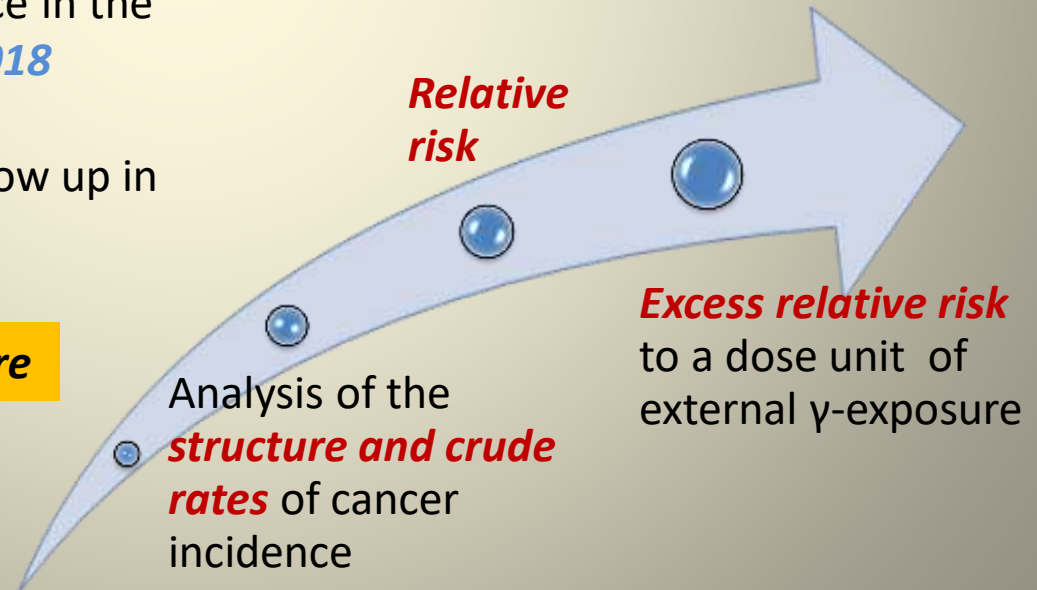
## Control group

**916** offspring of female Mayak workers that were not exposed to preconception irradiation of gonads

- The vital status and cancer incidence in the offspring were followed up to **31.12.2018**
- The number of person-years of follow up in the cohort made **67740 years**

**AMFIT module of the EPICURE software**

**95% confidence interval**



# Results: Part I

The range of maternal doses of preconception external  $\gamma$ -exposure to the ovaries :  
maximum dose in male offspring reached **2955** mGy and **4076** mGy in female offspring

A total of **92 cancer cases** were registered in 1949-2018 among offspring of female Mayak workers

**Significant increase of cancers** was indicated after the offspring had reached **the age of 50 years**

**Average age of the observed cohort** is 32 years for men and 33 years for women

The malignancies of **digestive organs and breast** were registered most often in the **Study group**

Among offspring of **Control group** we had indicated a significant increase of **brain tumors** in male offspring and of the malignancies of **corpus uteri** among female offspring

## *Results: Part II*

Calculation of RR of cancers in the offspring showed no significant difference for all malignancies, for solid cancers separately, and for other most frequent cancers

RR in dose categories below 25 mGy and 140-450 mGy was the highest but was not statistically significant

Assessment of ERR coefficients in relation to maternal accumulated absorbed dose of preconception external gamma radiation to the ovaries had revealed no statistically significant increase of cancer incidence

## ***Conclusions:***

- I. We had obtained no reliable evidence in our investigation of the relation between cancer in the offspring of Mayak PA female workers and accumulated doses of preconception external gamma-exposure to the gonads.
- II. Further research is needed taking into account relatively young average age of the observed cohort of the offspring...

