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2026 Fukushima Medical University International Symposium on the Fukushima Health Management Survey

March 12, 2026, Fukushima City

Session 2: The Future of Affected Communities — Toward Tomorrow

80 Years after the Atomic Bombings: The Survivors'
Messages and Their Legacy, and the Way Forward

Kenji Kamiya, M.D., Ph.D.

Chair, Radiation Effects Research Foundation (RERF)

A Japan–U.S. Joint Research Institution



Hiroshima Laboratory

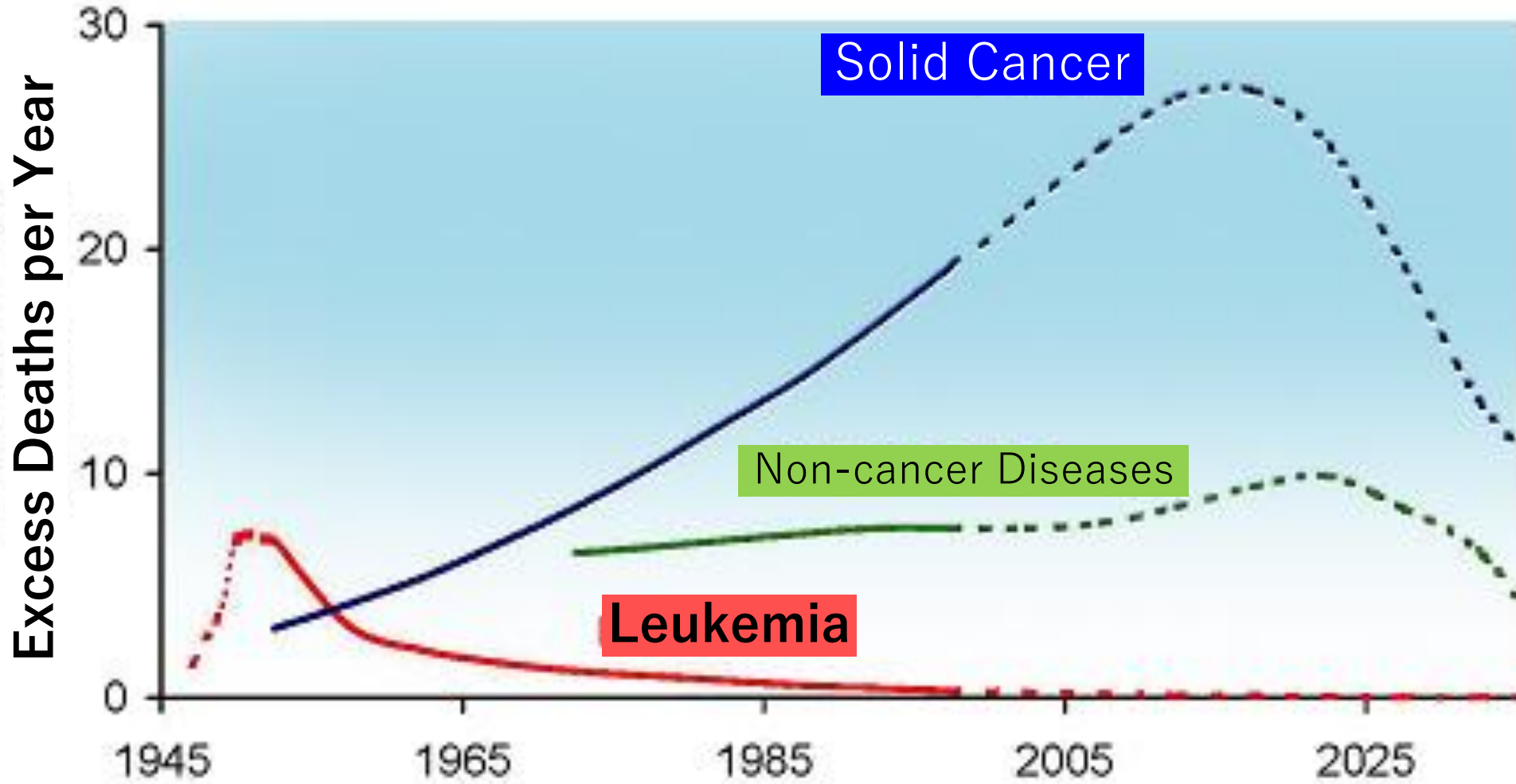
Radiation Effects Research Foundation (RERF)

Nagasaki Laboratory

A Japan-US
Cooperative Research Organization
For Peaceful Purposes



Patterns of Onset for Leukemia, Solid Cancers, and Non-Cancer Diseases



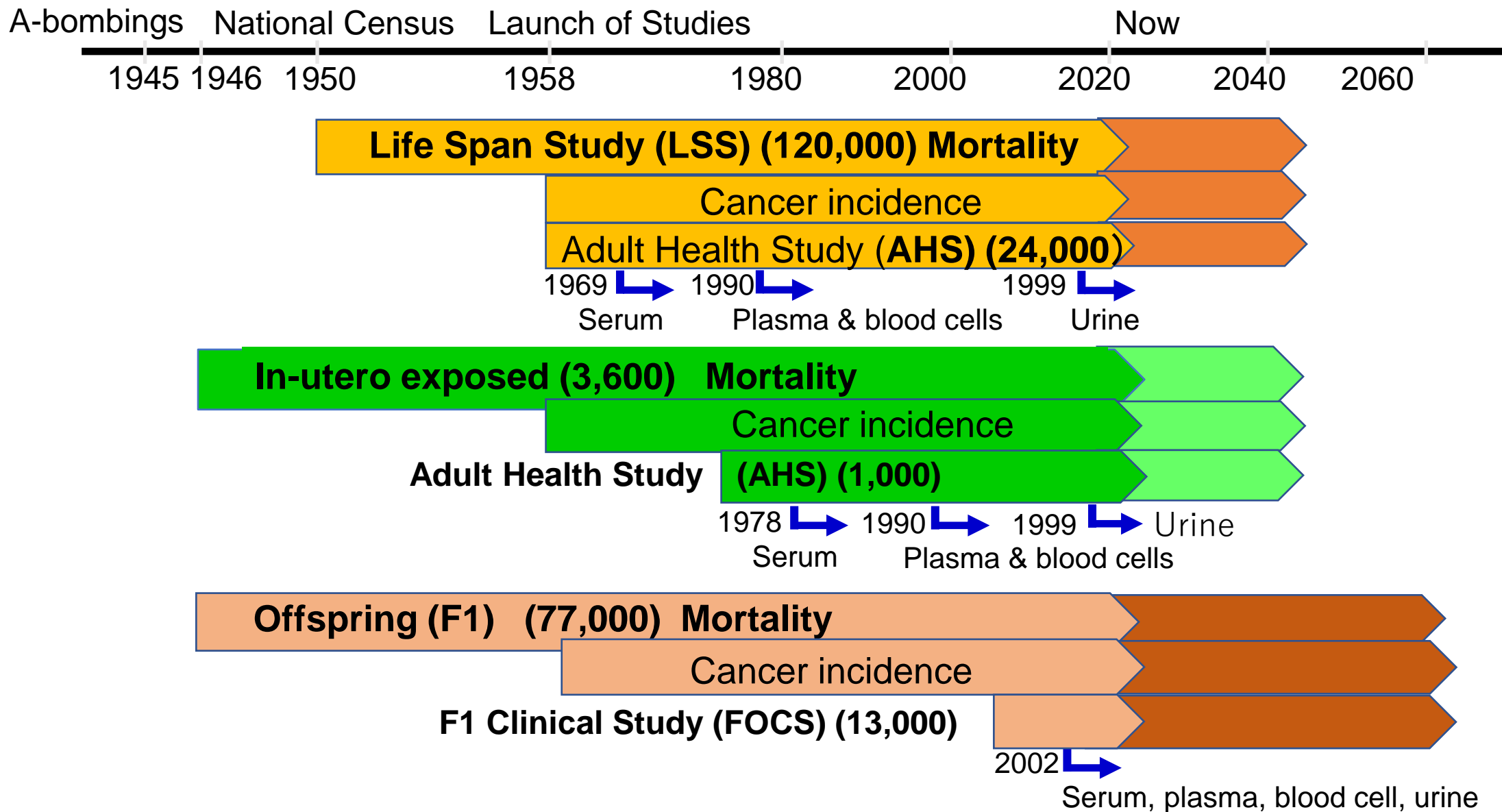
Radiation Effects Research Foundation HP : Life Span Study

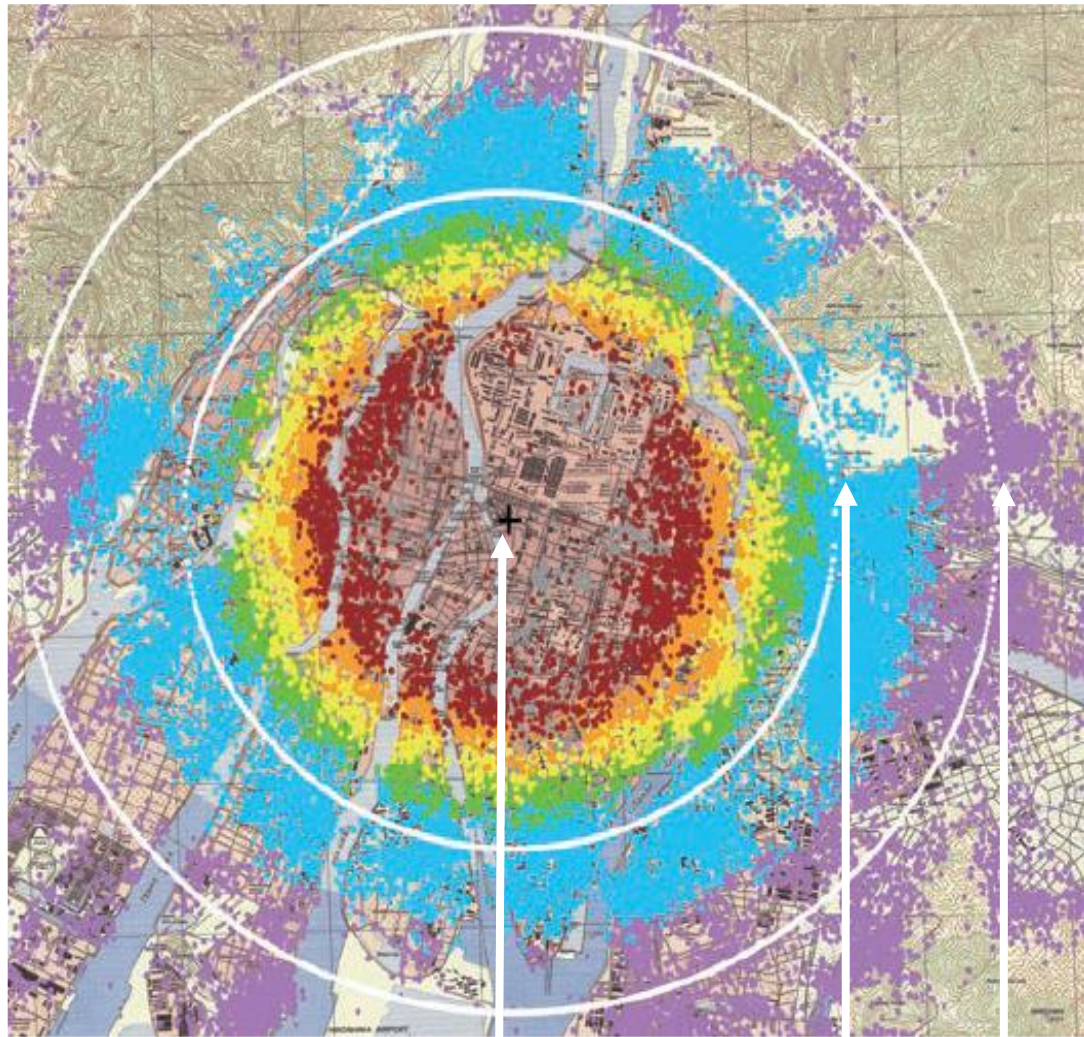
Major Findings by ABCC/RERF of A-bomb Survivors Summary

Late Health Effects Identified Among Atomic Bomb Survivors to Date

- Somatic effects of radiation on those survivors
 - Leukemia: mostly early onset after bombing
 - Solid cancer: mostly late onset at “cancer prone ages (elderly)”
 - Non-cancer diseases: mostly late onset among elderly
(Cataract, Thyroid diseases etc.)
- Among in utero survivors, increased risks of intellectual disability, growth impairment, and solid cancer (female) have been observed.
- Genetic effects among children of survivors
 - Cancer: so far, not detected
 - Non-cancer diseases: so far, not detected

Large-Scale Cohort Surveys of RERF

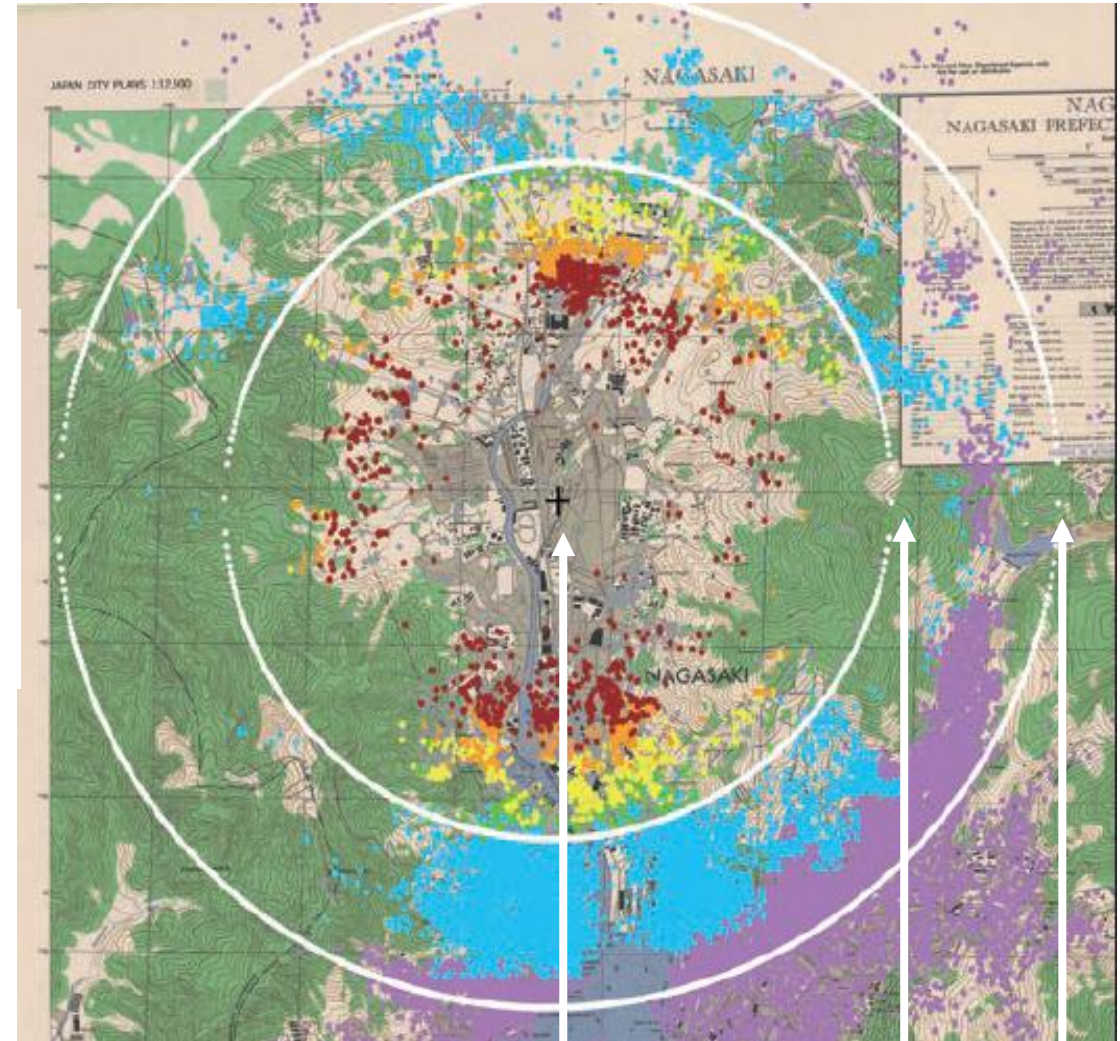




Hiroshima

Hypocenter 2 km 3 km

- <5 mGy
- 5–100 mGy
- 100–200 mGy
- 200–500 mGy
- 500–1,000 mGy
- 1,000+ mGy

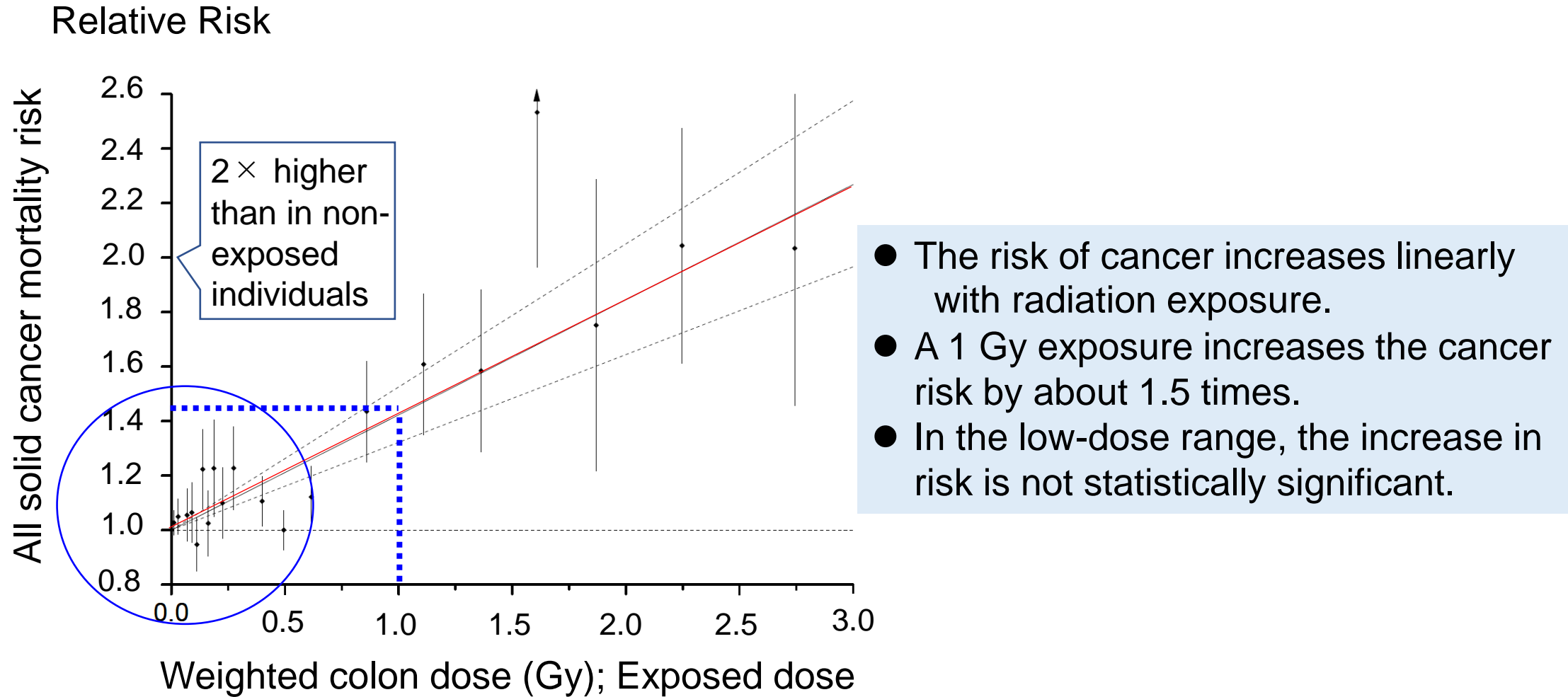


Nagasaki

Hypocenter 2 km 3 km

All solid cancer mortality dose responses for A-survivors

Report 14, LSS, 1950–2003

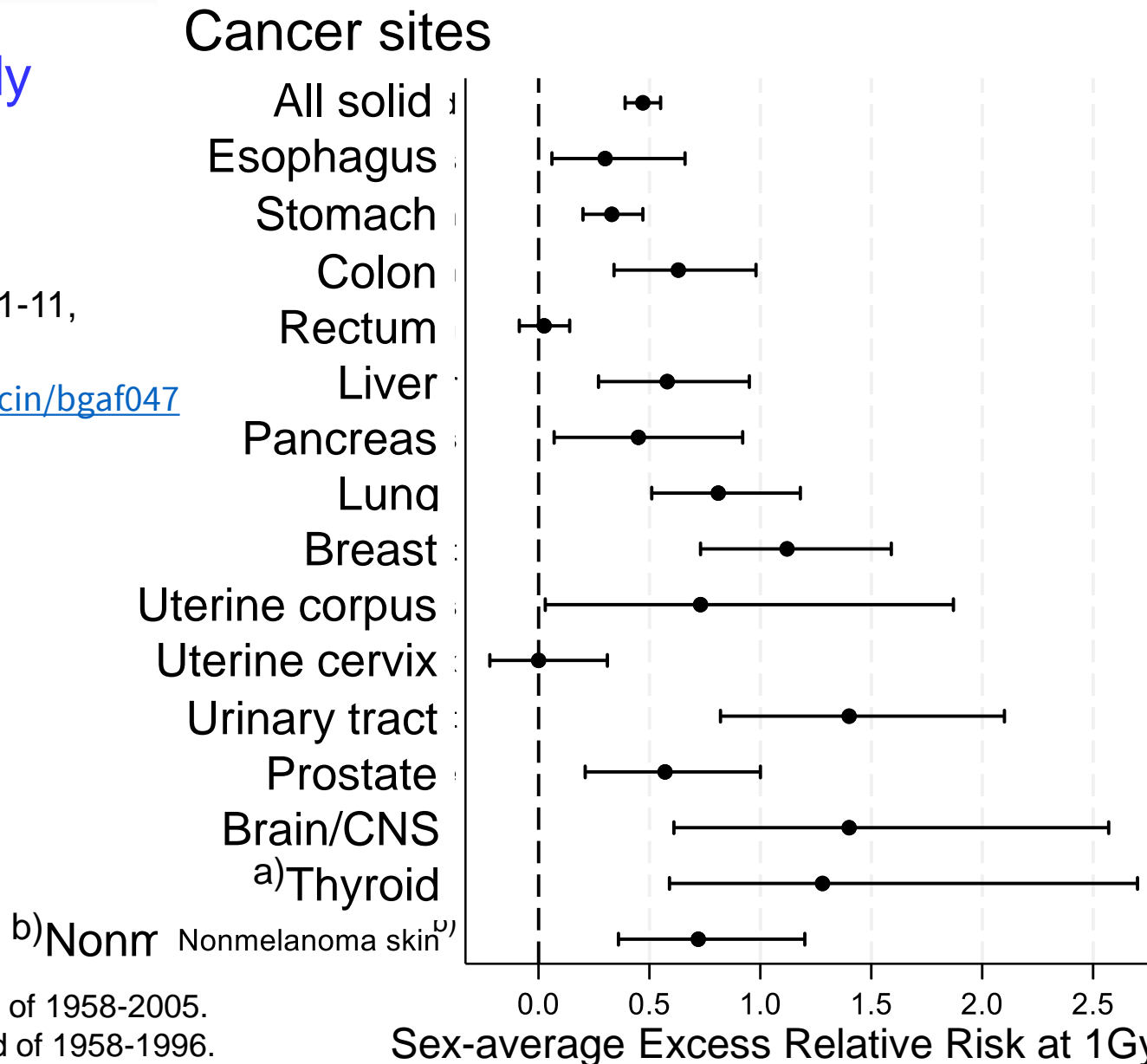


Radiation Risks for Incidence of Major Cancer Sites

Life Span Study 1958-2009

Kamiya K et al.
Carcinogenesis, 46,1-11,
2025

<https://doi.org/10.1093/carcin/bgaf047>



Increased Solid Cancer Incidence

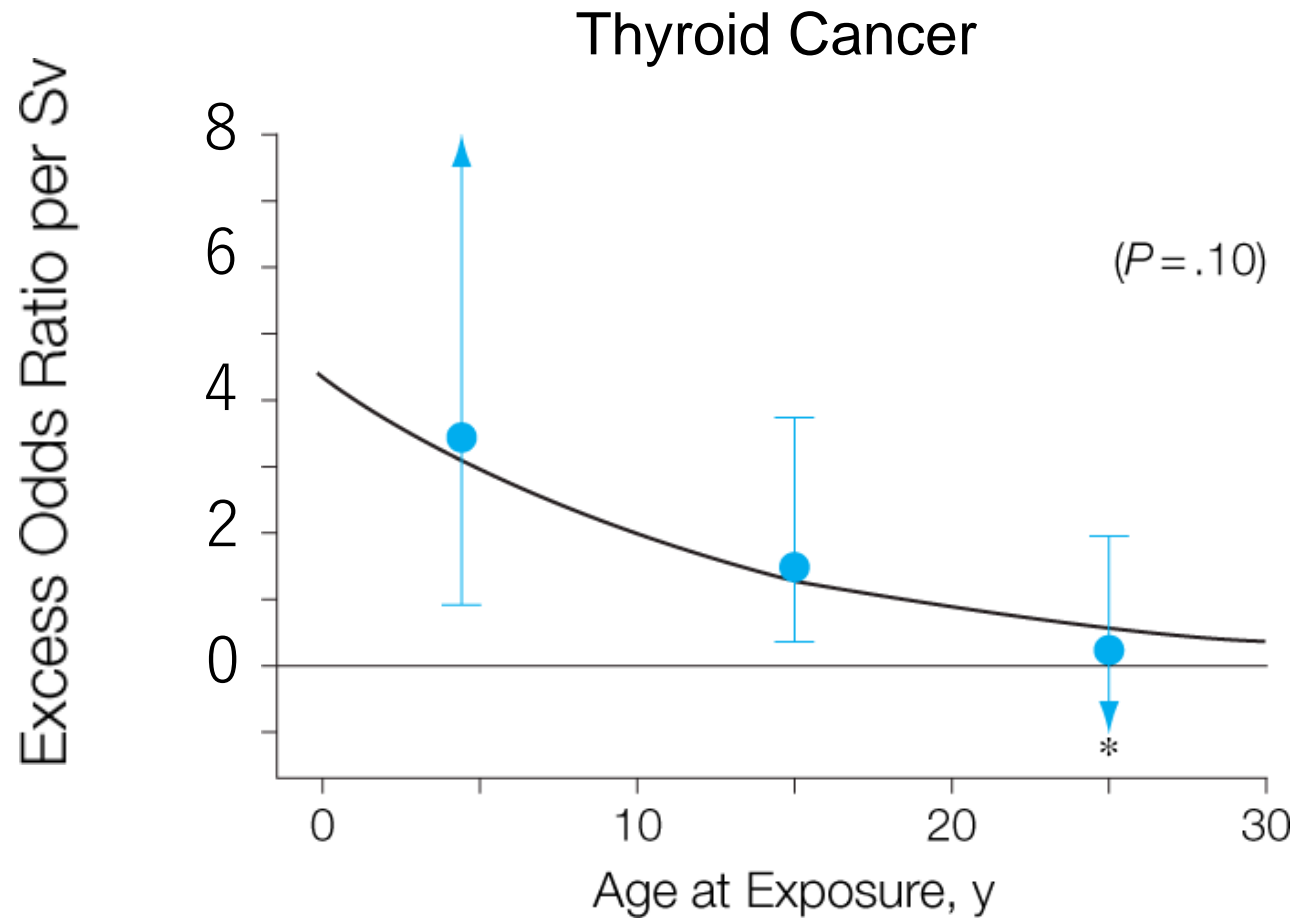
- Esophagus
- Stomach cancer
- Colon
- Liver
- Pancreas (F)
- Lung
- Breast
- Uterine corpus
- Urinary tract
- Prostate
- Brain tumor
- Thyroid
- Skin

a) Analysis for the period of 1958-2005.

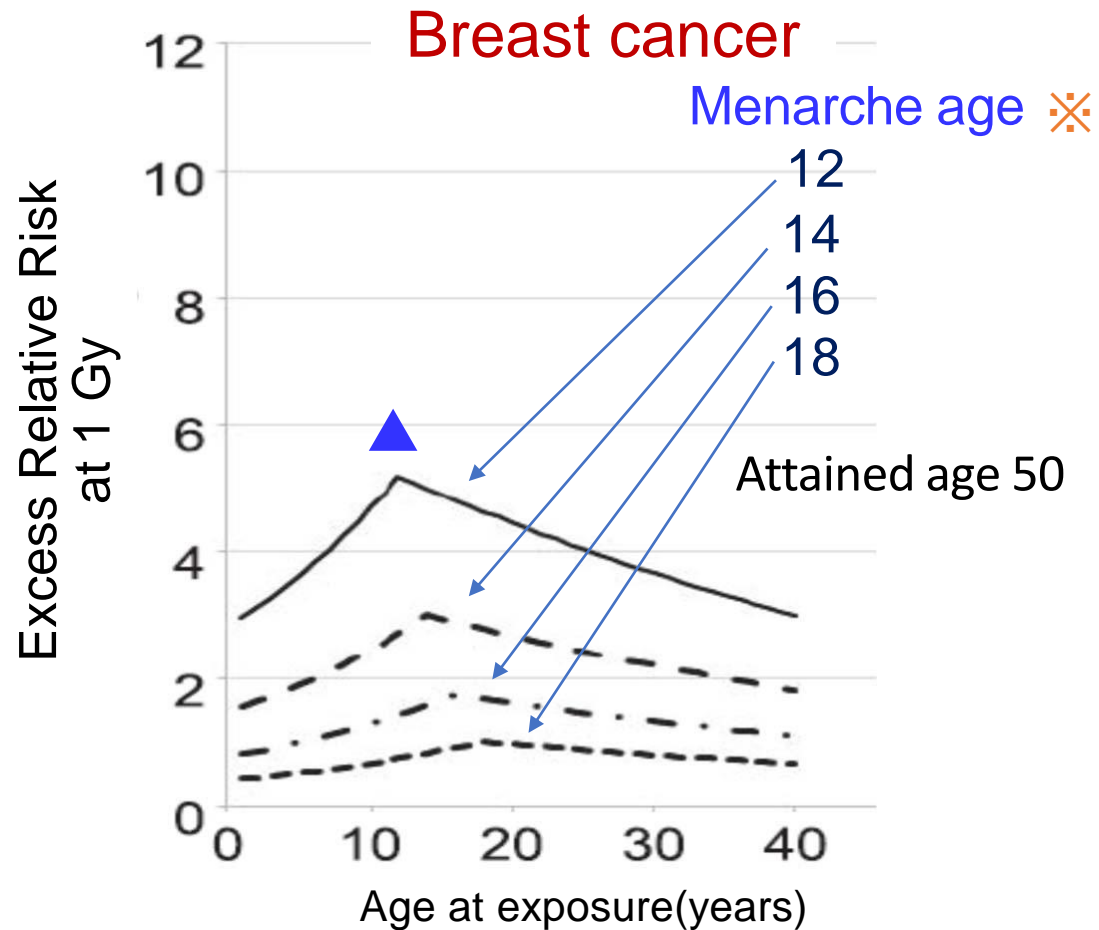
b) Analysis for the period of 1958-1996.

Sex-average Excess Relative Risk at 1Gy with 95% C.I.

Trend for Age at Exposure in Radiation Dose Response for Thyroid Cancer in Atomic Bomb Survivors



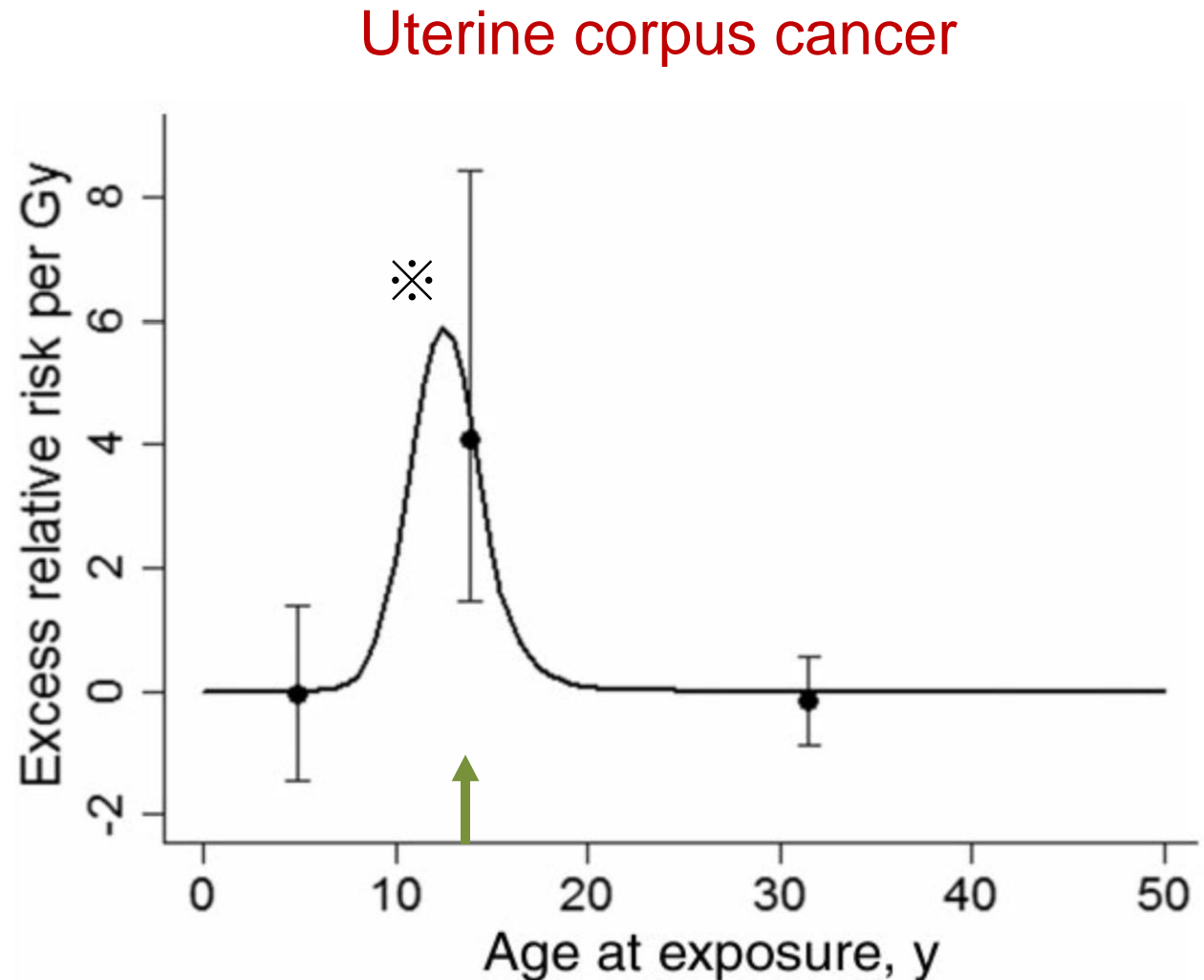
Participants: 4091 cohort members (mean age, 70 [SD, 9] years; 1352 men , 2739 women)
 Period: between March 2000 and February 2003.



The highest ERRs

- Exposure around menarche age (▲)
- Early menarche (✖)

Brenner AV, et al. Radiat Res, 2018

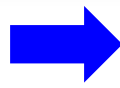


- ✖ The highest susceptibility to radiation is during the mid-pubertal period preceding menarche (↑ average)

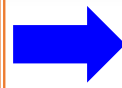
Utada M, et al. JNCI, 2019

RERF's Epidemiological Data Contribute to Global Radiation Protection Standards

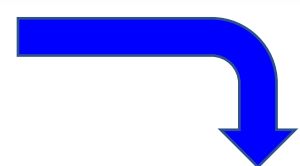
UNSCEAR



ICRP



IAEA

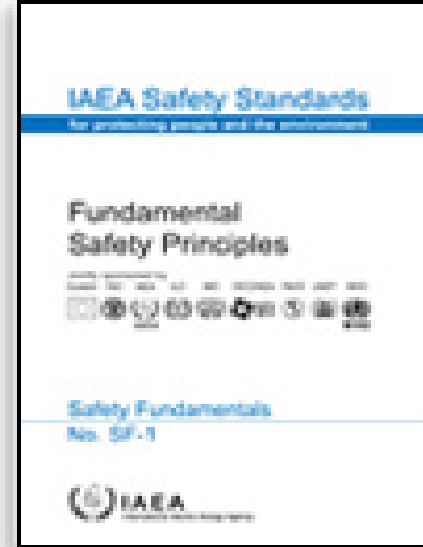
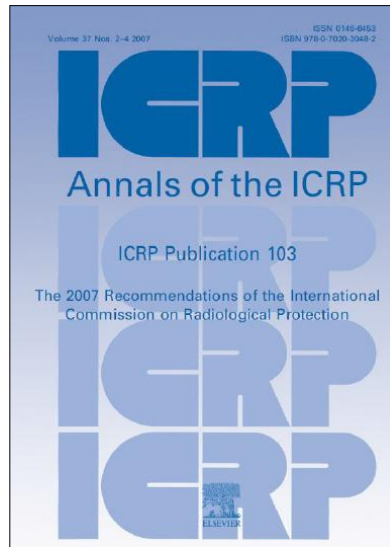
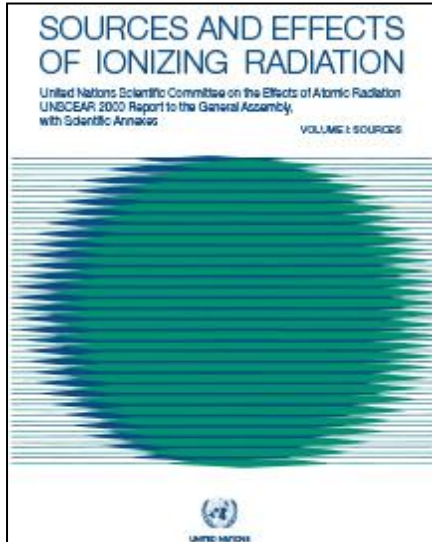


**Member countries
(180)**

United Nations Scientific Committee on the Effects of Atomic Radiation

International Commission on Radiological Protection

International Atomic Energy Agency



- Data on A-bomb survivors (RERF)
- Data on radiotherapy patients
- Data on radiation workers
- Other data

Various principles of radiation protection

Safety standards


National laws/Regulations

- ◆ Public Exposure
- ◆ Occupational Exposure
- ◆ Medical Exposure

Radiation is safely used across a wide range of fields

- ◆ To ensure a safe working environment, annual occupational radiation dose limits are established by law
- ◆ Findings from studies conducted by the RERF are used in determining radiation dose limits

Agriculture:



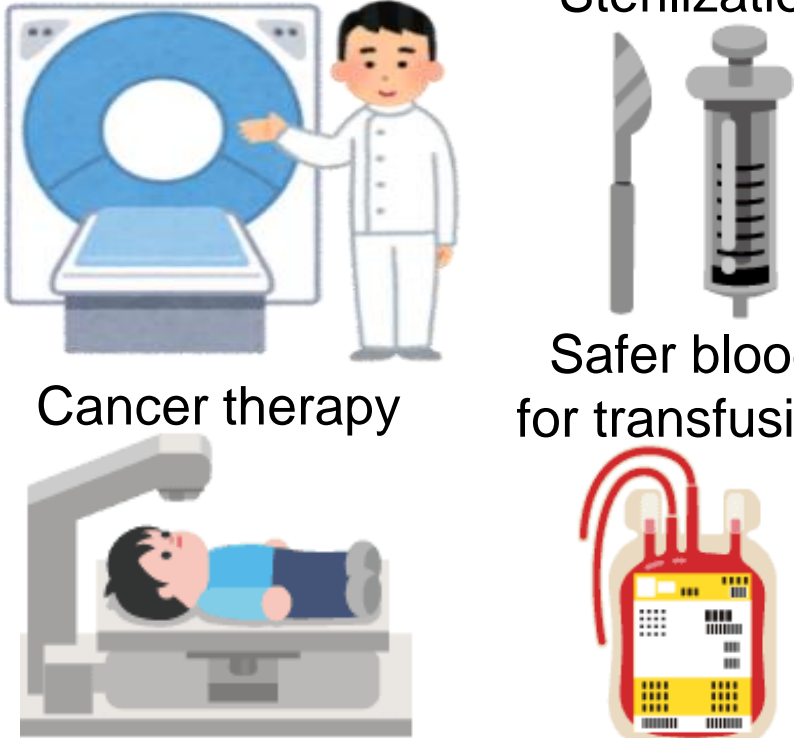
Mutation breeding

Pest control

Sprout inhibition in potatoes

Left for two months after irradiation

Medicine:



Diagnostic imaging (CT scans, X-rays)

Disinfection
Sterilization

Cancer therapy

Safer blood for transfusion



Universities
Laboratories



Manufacturing
facilities



Nuclear
power
plants

Achievements and Contributions Enabled by the Cooperation of Survivors and Their Children

◆ Through large-scale cohort epidemiological studies of survivors and their offspring, RERF has elucidated the long-term health effects of atomic bomb radiation.



- ◆ These findings form the scientific foundation for support programs for survivors and are used for health management, diagnosis, prevention.
- ◆ The findings constitute a core scientific evidence base for the international radiation protection framework developed by organizations such as UNSCEAR, ICRP, and the IAEA, helping to protect humanity from radiation-related harm.



◆ These findings provide a crucial evidence base for promoting accurate understanding of radiation effects worldwide and for risk communication in events such as the Fukushima accident.

Deep gratitude to atomic bomb survivors and their children

With deep gratitude to atomic bomb survivors and their children, RERF has conducted its research with trust as the foundation of our work.



RERF 50th Anniversary Commemorative Volume: "50 Years of Progress" Opening Article, June 2025



70th Anniversary Commemorative Project of ABCC-RERF, June 2017

Plaque of Appreciation



Certificates of Appreciation for Research Participants

~ Key Questions Facing Us Today~

How are findings from survivor and offspring studies shared with people nationally and internationally?

Fukushima Daiichi Nuclear Power Station

Great East Japan Earthquake

March 11, 2011

The height of the tsunami which attacked
Fukushima NPP was more than 14 m
(Max. 39 m at Taro town)



Source: TEPCO (Tokyo Electric
Power Company Holdings, Inc.)

Releases of Radioactive Materials by Hydrogen Explosions, etc.

Unit 1 Mar. 12

Unit 3 Mar. 14

Unit 2, 4 Mar. 15



Local newspapers reported the residents' fear and harmful rumors of radiation

「放射線うつる」
本県から避難児童いじめ

本県から千葉臨海輸送されたとする匿名の電話があった。市に避難した子どもが三月、同市教育委員「放射線うつる」をいじめたことが十四日、市教委への取材で明らかになった。市教委は「いじめは事実」と認め、いじめられっ子と避難児童との関係について調査している。市教委は「いじめは事実」と認め、いじめられっ子と避難児童との関係について調査している。

Is radiation infectious?

Source: Fkushima minpou April 15, 2011 (Kyodo News)

広がる風評被害
原賠法前提 県、記録化を通

福島県で原発事故の影響は、農林水産分野にとどまらず、本県の産業全体に広がりを見せ、県関係団体から被害を訴える声があふれている。県は、工業製品などへの理由のない取引停止などを「風評被害」と捉え、31日までに、原子力事業者による損害賠償を定めた「原子力損害賠償法（原賠法）」の適用を前提に、県約400の事業者に対し、賠償請求の際の資料となる取引動向や損害額などを正確に記録するよう通知した。

消費者から励ましの声も

県内産業の振興戦略として「風評被害」を受けると頭を抱える。水から放射性物質が検出された問題では、醸造業界などが風評被害を恐れている。県は、醸造業界などが風評被害を恐れている。県は、醸造業界などが風評被害を恐れている。

Spread of economical damage caused by the harmful rumors

Source: Fkushima minyu April 1, 2011

不安の声相次ぐ
13校、園の保護者 説明会始まる

県教委と文部科学省「啼いた同日午前」の説明会は三十分予定の質疑応答の時間が二時間半に延長された。福島三小に二名の子どもを避難させた。県教委は「安心できる材料はなかった。安全な地域に子どもを避難させることも考える」と述べた。

文科省の担当者と県教委の担当者との間で、放射線健康リスク管理アドバイザーの神谷研一氏らが基準値の概観や対応を解説した。二十二日は午前十時から放射線測定器を把握する

52校、園に検量計
 県教委文科省から送付受け

鈴木寛文部科学副大臣は二十一日の記者会見で、県外活動制限の層で、県外活動制限の対象となった小中学校など十三校・園を含む県内の五十二校・園で、児童生徒らの被ばく放射線測定器を把握する






ため、簡易式の携帯型放射線測定器を県に送付した。約五百台を県に送付した。約五百台を県に送付した。

Parents' anxieties

Source: Fkushima minpou April 22, 2011

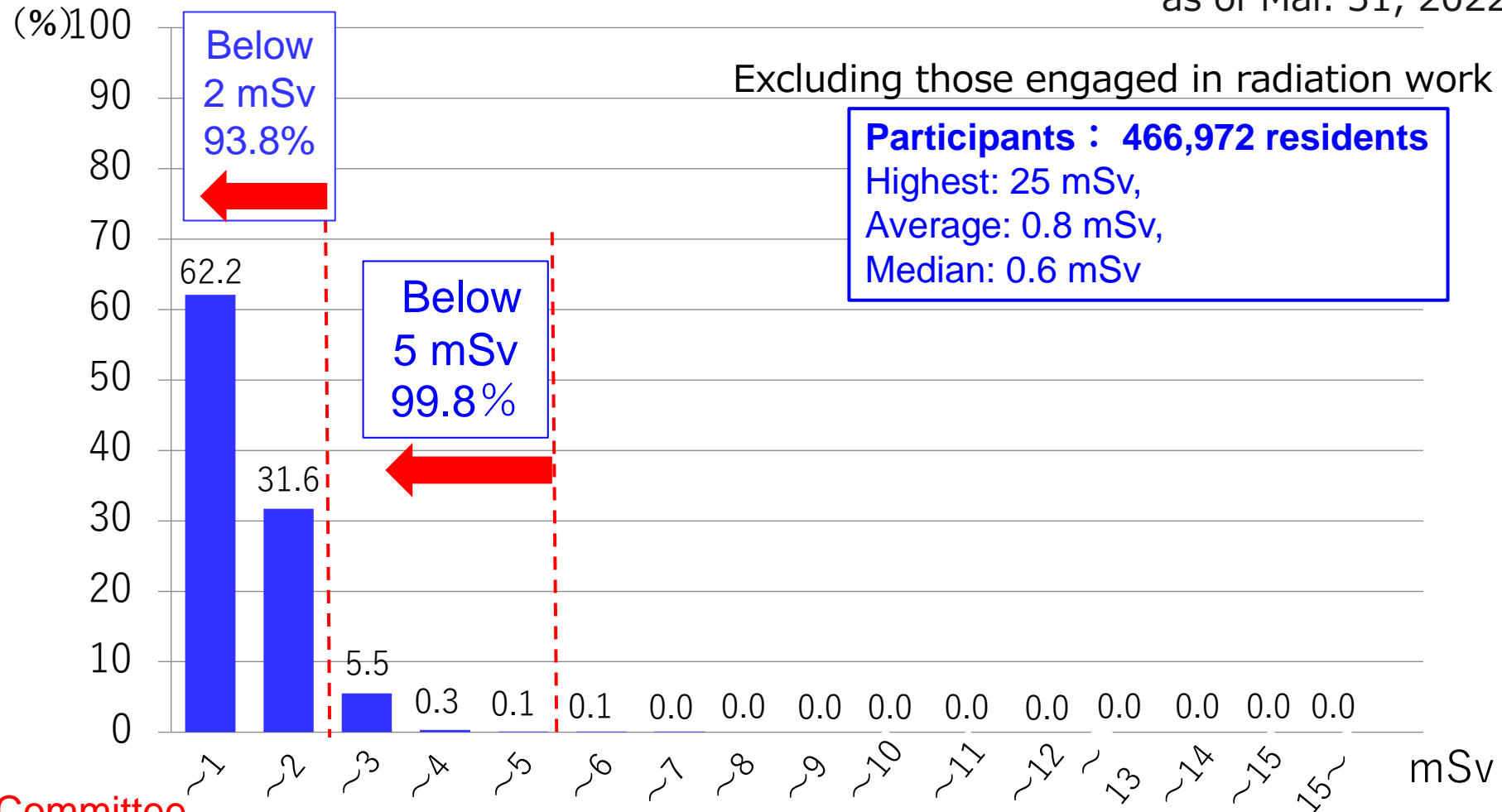
Outline of the Fukushima Health Management Survey (FHMS)

- Surveys (Basic Survey to estimate individual external exposure dose for four months after the accident and Detailed Survey to understand individual health conditions)

Type	Participants	Number	Method of survey & response
Basic Survey	Residents of and visitors to Fukushima during the disaster	Approx. 2.06 million	 Self-report questionnaire to be submitted by post
Detailed Surveys	<p>Preliminary Baseline Survey: All residents aged 18 or younger at the time of the disaster</p> <p>Full-Scale Surveys: In addition to those mentioned above, people who were born from April 2, 2011 to April 1, 2012</p>	<p>Approx. 368,000</p> <p>Approx. 381,000</p>	<p> Thyroid examinations are performed at schools, medical facilities, and public facilities.</p>
Comprehensive Health Check (CHC)	Residents of 13 municipalities designated as evacuation zones (Other municipalities are covered by the prefectural health check program)	Approx. 210,000	 Health checks are provided at medical facilities, municipal health check venues, etc.
Mental Health and Lifestyle Survey (MHLS)	Residents of 13 municipals designated as evacuation zones	Approx. 210,000	 Self-report questionnaire to be submitted by post or online
Pregnancy and Birth Survey (PBS)	<p>Main Survey: Those who received a Maternal and Child Handbook in Fukushima Those who give birth in Fukushima</p> <p>Follow-up Survey: Respondents to the Main Survey</p>	<p>12,000 - 16,000/year</p> <p>5,000 - 7,000/year</p>	<p> Self-report questionnaire to be submitted by post or online</p>

Summary of External Exposure Effective Dose during the First 4 Months after the Accident

as of Mar. 31, 2022

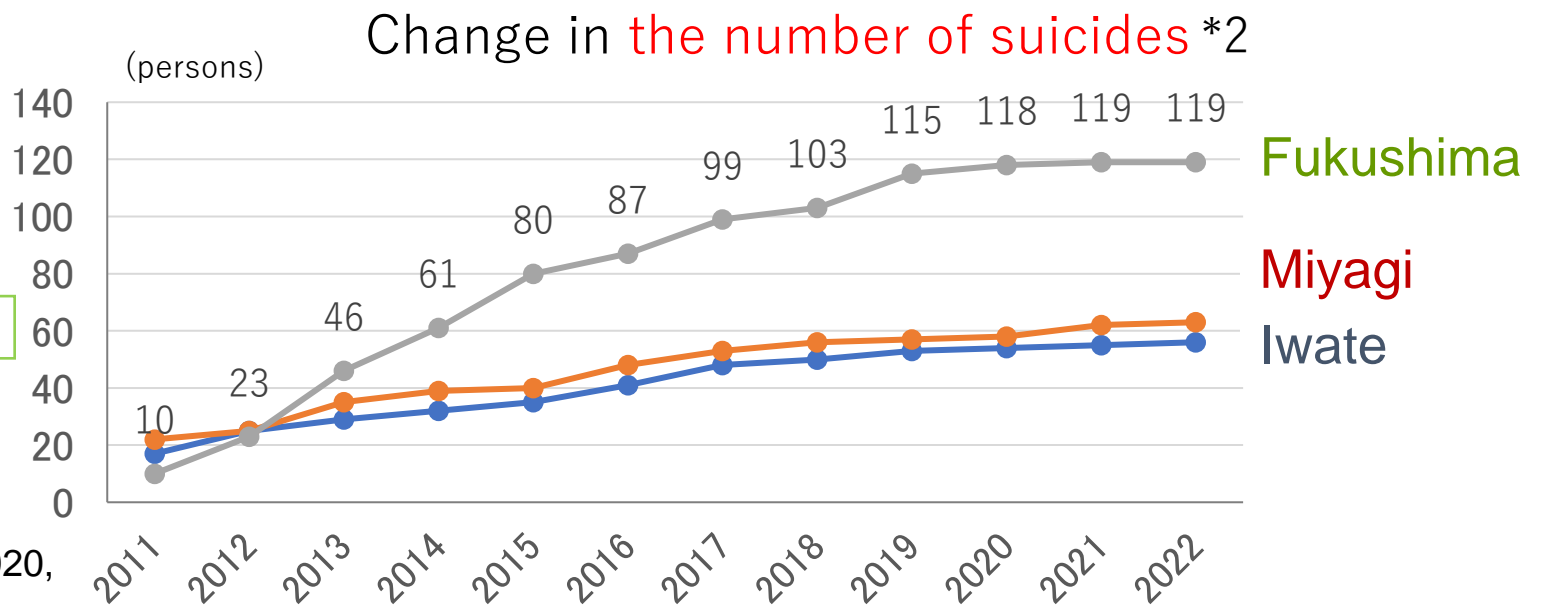
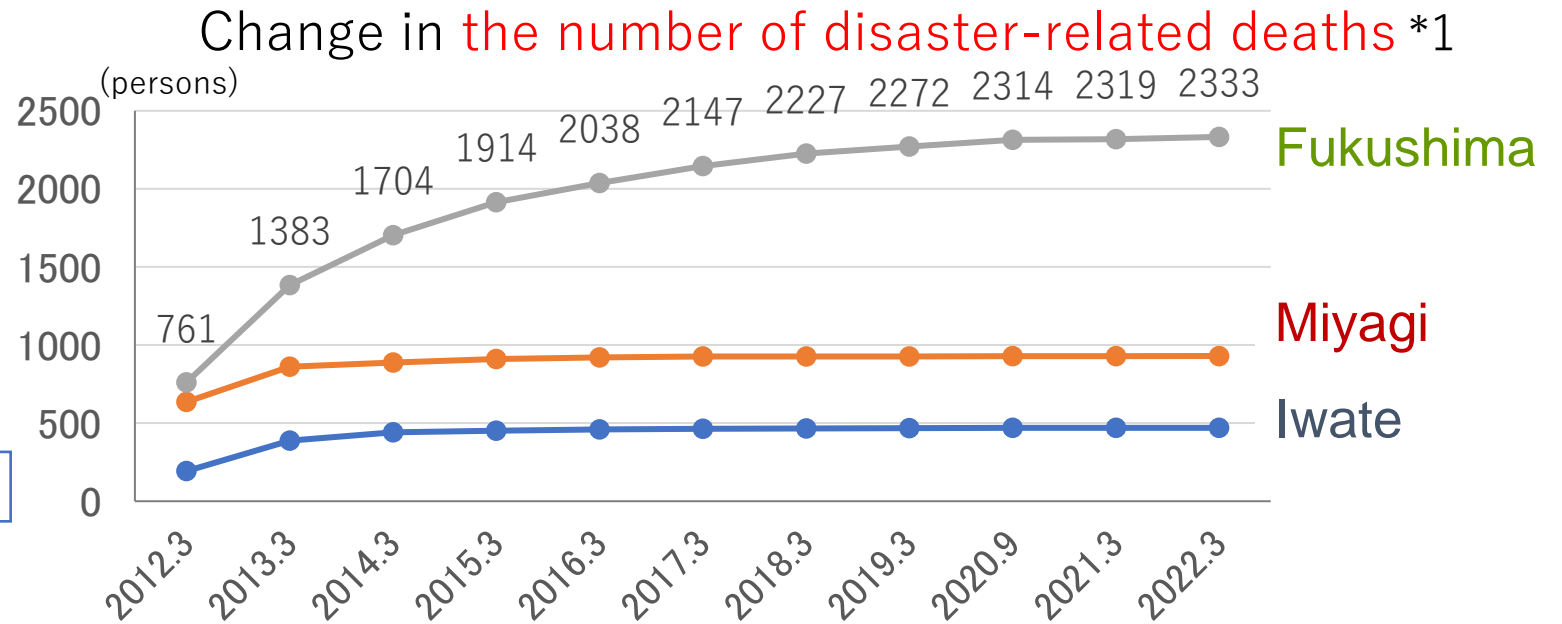
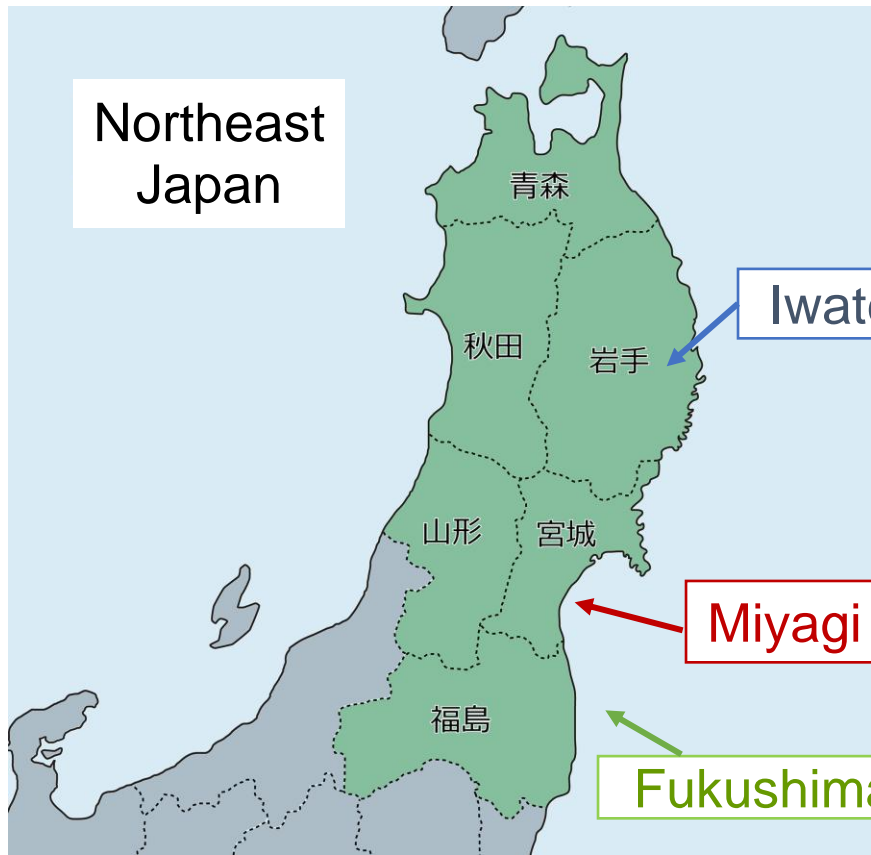


Oversight Committee

The dose estimation results obtained from this survey were considered as "not being at a level where health effects can be confirmed with a statistical significance in light of the scientific knowledge obtained to date."

Disaster-related Deaths and Suicides in the Great East Japan Earthquake

*1 Note: Created based on data from "Number of Disaster-Related Deaths in Great East Japan Earthquake" (the Reconstruction Agency)



*2 Note: Created based on data from "FY2018 White Paper on Preventive Measures against Suicide" (Ministry of Health, Labour, & Welfare)

*1,2: Report of the Fukushima Health Survey 2011–2020, pp. 7–8

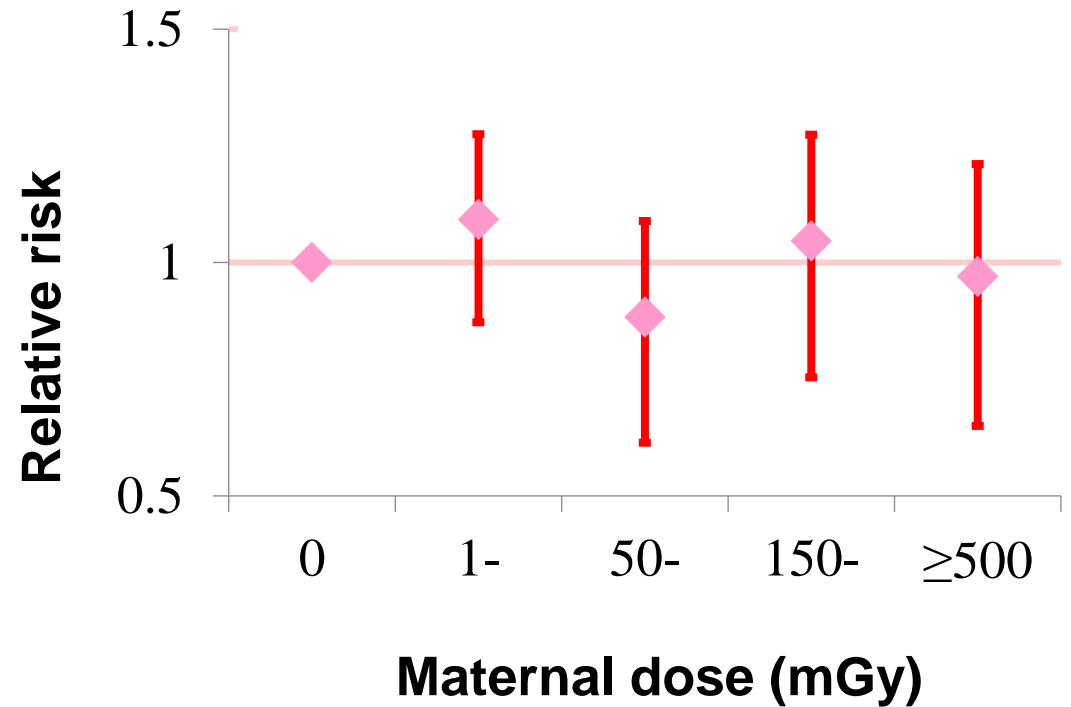
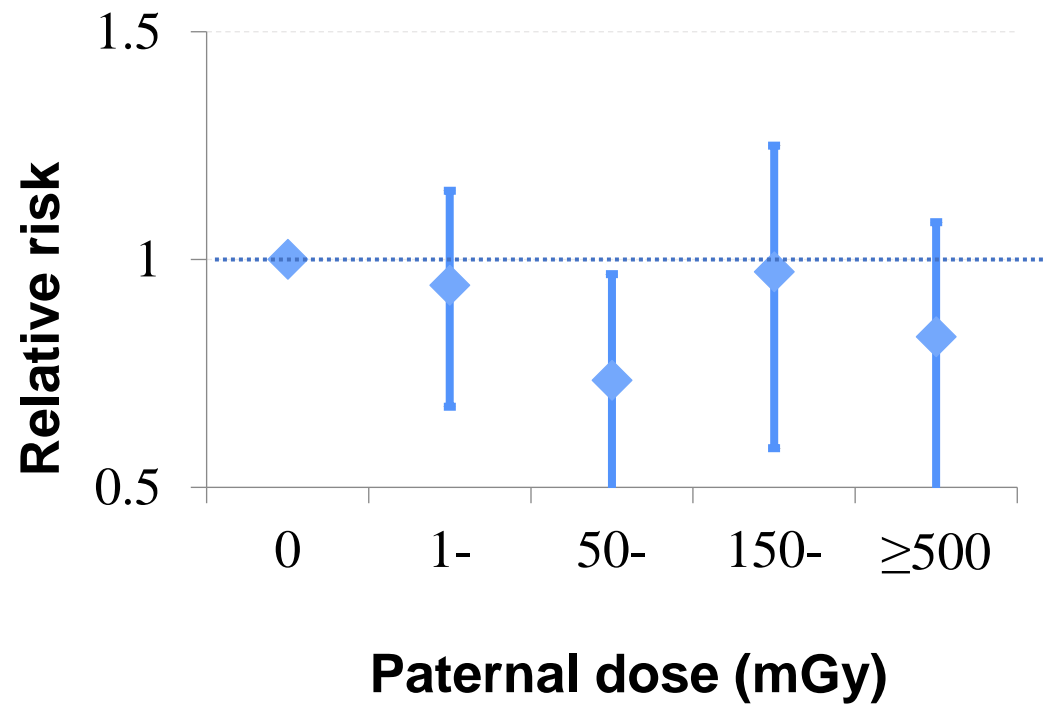
How Do People Perceive the Health Effects of Radiation?

~ Example: Perceptions of Genetic Effects ~

ABCC-RERE Study: Genetic effects on F1s

Study period	Study
① 1948-1954	Untoward pregnancy outcomes of 77,000 F1s
② 1948-1962	Sex ratio of children of the survivors
③ 1967-1985	Chromosome analyses on F1s
④ 1975-1985	Analyses of mutated serum proteins among F1s
⑤ 1985- today	DNA analysis
⑥ 2021	Project ① revisited and reanalyzed
⑦ 1948- today	Mortality and incidence of cancer, lifestyle diseases among F1 born to the survivors

Cancer mortality study among the children of A-bomb survivors: 1958–2009 (published in 2015)

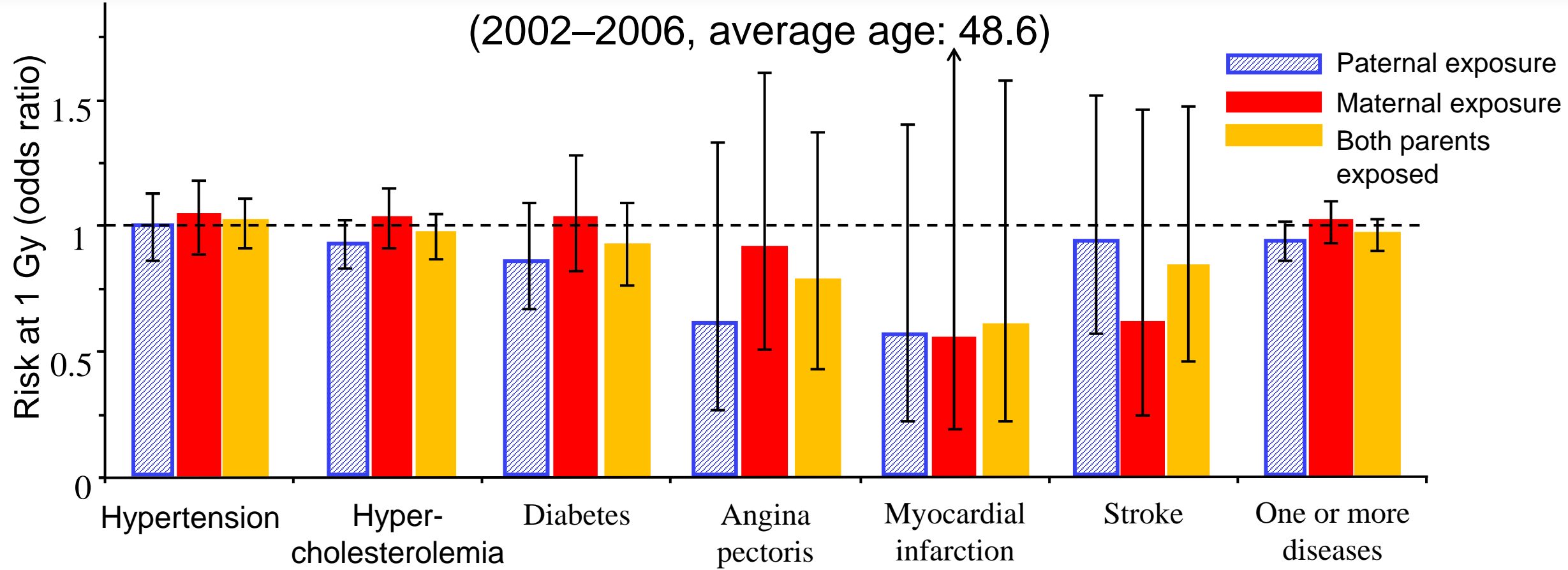


Some 70,000 children of A-bomb survivors (F_1) born between 1946 and 1984 were followed from 1958 to 2009.

The average member of the F_1 population is in their 60s, so further investigation is needed. (Mortality: about 5%)

Relations between parental radiation exposure and prevalence of lifestyle diseases among F₁

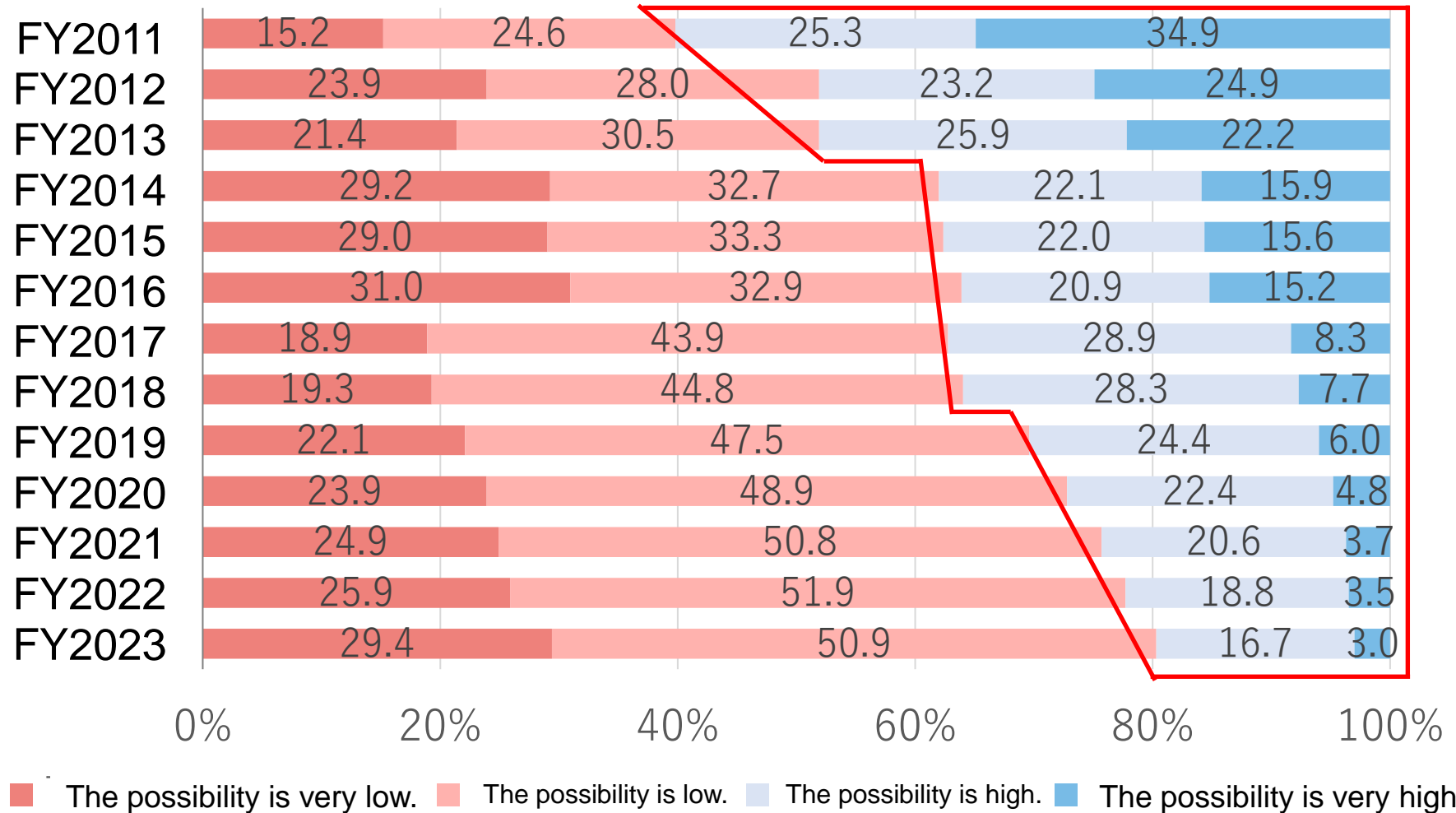
(2002–2006, average age: 48.6)



No increase in disease prevalence in children related to parental exposure has been observed to date.

FHMS: Mental Health and Lifestyle Survey – Results

Changes in radiation risk perception on hereditary effects (Adults: 16 or older)





MOE Japan Website
<https://www.env.go.jp/chemi/rhm/portal/communicate/>

「GuGuRu Project」

Why is it necessary?

To reduce public anxiety about the health and hereditary effects of radiation, we believe it is essential to share scientifically established knowledge and foster broader public understanding.

(Tokyo, July 15, 2021)

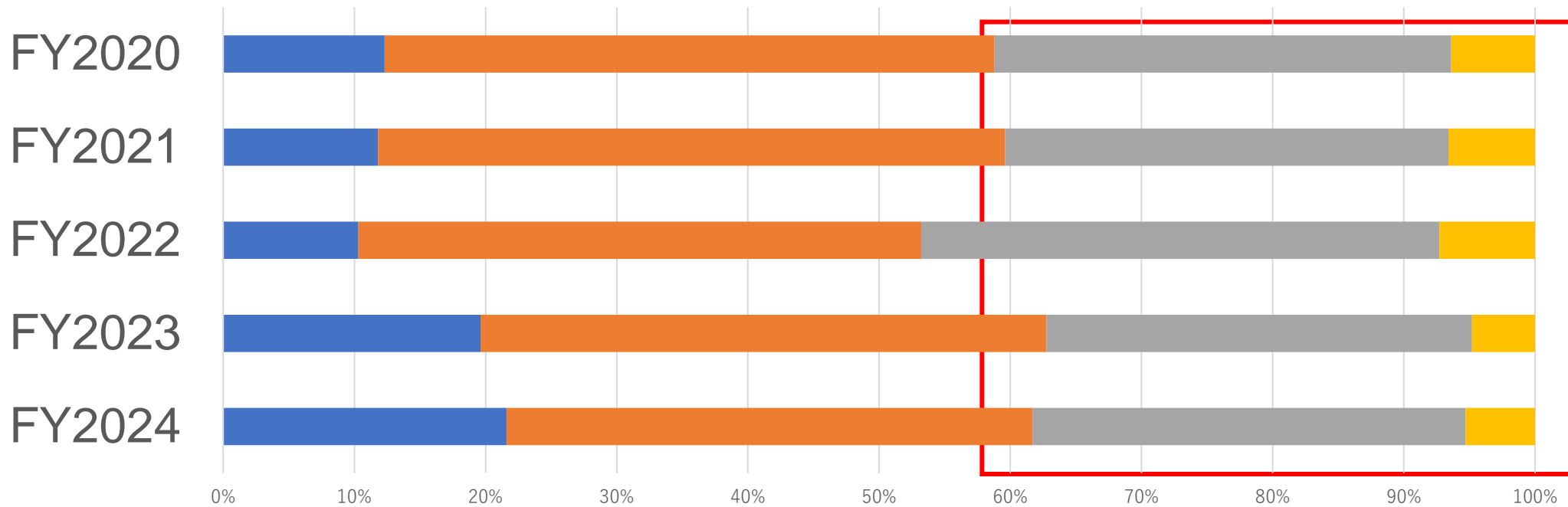
**Toward a Society Free from
Misunderstanding, Stigma, and
Discrimination Related to Radiation
Health Effects**



For Safety and Smiles in Fukushima



“GuGuRu Project”



- The possibility is very low
- The possibility is low
- The possibility is high
- Highly likely



A Japan-US Cooperative Research Organization
Radiation Effects Research Foundation

What We Have Learned from Atomic Bomb Survivors

Chair Okubo, RERF

**President Tsuboi,
Nihon Hidankyo**



**The Second-Generation
“Aogiri (Chinese parasol tree)”
20 Years Later**



RERF 30th Anniversary Ceremony

**Planting Ceremony of the
Second-Generation “Aogiri
(Chinese parasol tree)”**

Two Messages and Legacies from Survivors

◆ ~ Abolition of Nuclear Weapons ~

◆ ~ No More Radiation Victims ~

- By sharing their experiences with the world, the survivors have played a leading role in the global movement for nuclear disarmament.
- By calling for a complete ban on atomic weapons and entrusting the study of their health effects to science, survivors helped create knowledge that underpins radiation protection and now stands as a legacy for humanity..

Thank You for Your Kind Attention



Hiroshima Peace Memorial Park



Nagasaki Peace Park

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