FY2019 Report of Activities

Radiation Effect Research Foundation

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I. Report of Major Activities

Epidemiologic data on mortality and cancer incidence from the A-bomb survivors (the Life Span Study [LSS], the *in utero* study) and their children (the F_1 generation studies) have long been a primary basis for national and international estimates of the risks of cancer and other diseases from exposure to ionizing radiation. The unique importance of the LSS study stems from the combination of its large size, wide range of exposure levels, inclusion of all ages at exposure, and long, high-quality follow-up of mortality and cancer incidence. However, the LSS is only one facet of RERF's research activities. Clinical examinations and the collection of biosamples in the Adult Health Study (AHS, a subsample of the LSS) and the clinical, epidemiological and genetic studies of the children of A-bomb survivors provide more detailed information on health conditions of interest, including radiation-related non-cancer conditions, and the pathogenesis of those conditions in relation to radiation exposure, as well as the study of heritable mutations. Our basic science groups, in collaboration with the clinical studies and epidemiology departments, utilize the biosamples to further address the nature and extent of genetic (both heritable and somatic) effects, and molecular changes associated with health risks. These three components within the RERF research program provide an integrative approach into epidemiological, clinical, biological, and mechanistic aspects of human radiation risk. Such integrated opportunities are unique to RERF and demand the best possible science be conducted for the benefit of the survivors and the radiation research community. As we move forward, the primary focus of RERF studies will be on such integrated research programs through their development within the cancer, genetic and non-cancer research clusters. An additional and essential component of our research program development is the expansion of collaborations with institutions outside of RERF both in Japan and internationally.

1. Research Projects Examining A-bomb Survivors Health

1) Radiation and Cancer:

- We evaluated the modifying effects of chronic gastritis on radiation risk of noncardia gastric cancer by histological types by reanalyzing data from a nested case-control study conducted within AHS participants. The results indicated that radiation exposure is associated with increased risk of diffuse-type noncardia gastric cancer without chronic atrophic gastritis, and this association exists despite adjustment for H. Pylori infection and smoking habit.
- Periodic reporting on the radiation risks of cancer incidence is an important task for the epidemiology department. Papers on all solid cancer, lung cancer, breast cancer, and uterus cancer were published in 2018 while papers on colorectal cancer (Sugiyama H, et al. Int J Cancer 2019;146:635-645), liver cancer (Sadakane A, et al. Radiat Res 2019;192:299-310), and upper digestive cancer (Sakata R, et al. Radiat Res 2019; 192:331-44) were published in 2019. A paper on central nervous system tumors (Brenner A, et al.) was just accepted by Eur J Epidemiol and a paper on prostate cancer (Mabuchi K, et al.) is being reviewed by Radiat Res. Papers on ovarian cancer (Utada M, et al.) and comparison of cancer incidence and mortality (Brenner A, et al.) are being drafted. The series of recent papers focused on the shape of the dose-response curves, low-dose risk and risks among those young at exposure, while adjusting for relevant life-style factors. A paper

investigating the origin of curvature in the male dose-response for solid cancer incidence was published by Dr. Cologne of Dept. Statistics.

- A paper evaluating the influence of medical radiation exposure on the risk estimates of atomic bomb radiation in the LSS was published (Sadakane A, et al. Radiat Res 2019;191:507-17). There was no substantial impact of diagnostic radiation exposure on radiation risks from atomic bomb exposure.

2) Radiation and Non-Cancer Effects:

- *Cataract:* Ophthalmologic examinations for our cataract study were initiated in Hiroshima and Nagasaki in collaboration with ophthalmologists in Hiroshima and Nagasaki Universities in April 2016. Supervision for this study is made by a cataract specialist in Kanazawa Medical University. Ophthalmologic examinations among 891 AHS subjects who were <15 years of age at the time of bombings (except in- utero exposed subjects) were finished in March 2019 in Hiroshima and Nagasaki. Scoring of cataract severity using photographed images was also completed by an ophthalmologist and statistical analysis was started in collaboration with the Statistics Department. The same ophthalmological examinations among in-utero exposed subjects were initiated in April 2018 and was completed by March 2020.

3) Immunologic Effects of Radiation:

- Clonal hematopoiesis (CH), associated with radiation exposure and increased risks of inflammatory diseases, has not been evaluated in animal model studies. To develop strategies for assessments of CH potentially linking to radiation-associated noncancer diseases, specifically arteriosclerosis, we have proposed a research plan to establish one or more mouse models that can test the hypothesis that CH in irradiated mice is involved in pro-inflammatory phenotypes and can promote atherosclerosis formation. Mouse models to be developed in this research may be useful for assessing the effects of a variety of environmental factors on somatic mutagenesis and CH development. Preliminary experiments conducted in FY2019 indicated 1) that it is difficult to identify CH with viable mutant cells in the HPRT-dup-GFP model (Noda, PLos One 2015) since none of 42 irradiated mice had a large amount of mutant GFP-positive blood cells; 2) that longitudinal analyses of hematologic indicators are feasible since RDW (Red cell Distribution Width) and monocyte counts, which are known to be associated with CH in human, increased in some of the 3-Gy irradiated mice; and 3) that using digital-droplet RT-PCR and flow cytometry, CH-related pro-inflammatory phenotypes can be evaluated with expression levels of inflammatory genes in BM-derived macrophages. Based on these results, we decided to use whole-exome sequencing (WES) but not the HPRT-dup-GFP system for CH identification. Currently, BM DNA samples from 8 irradiated and 4 control mice are being assessed for WES to identify CH with recurrent somatic mutations, which we expect to investigate the feasibility of mouse BM WES for CH assessment. We have also planned clonality assessment of monocytes accumulating in atherosclerotic plaques that are formed in LDLR-KO mice irradiated and fed with a high-fat diet, which would be able to test the hypothesis that CH following radiation exposure promotes atherosclerosis formation through clonal accumulation of pro-inflammatory monocyte into atherosclerotic lesions. This proposal has been fully discussed and approved in the Noncancer Research Cluster. (Kusunoki, Yoshida, Taga, Hamasaki, Satoh, Uchimura, Misumi and Noda, a new RP in the Clonal Hematopoiesis Program Project).

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2. Research Projects on the Health of A-bomb Survivors Children (F_1)

- *F_1 cohort study (RPs 4-75, 18-61):* Long-term studies of the F_1 cohort provide a framework for studying germline effects of radiation exposure and contribute important data to the largest study of its kind. After a major paper on mortality risk assessment was published in 2015, routine collection of case information is continuing. The individual doses of F_1 cohort members are being updated to DS02R1. As residential information is essential for ascertainment of cancer incidence through the national cancer registry system, the information on participants in the F_1 Offspring Clinical Study (FOCS) has started to be used.

- *Genetic Effects:* The initial examination of the longitudinal F_1 clinical cohort from 2002 to 2006 (the first round examination) provided no evidence for an increased prevalence of adult-onset multifactorial diseases due to parental radiation exposure, but the study subjects were still quite young. Definitive human data can only be obtained if a high-quality clinical study is continued until the subjects become elderly, when many multifactorial diseases develop. The objective of this study is to elucidate the effects of parental exposure to A-bomb radiation on the development of polygenic, multifactorial diseases such as diabetes, hypertension, dyslipidemia, ischemic heart disease, and stroke, and subclinical conditions among the F_1 offspring. Self-selection bias also tends to be minimized when prospective longitudinal data are obtained, because such data allow estimates of disease incidence. Thus far we have:

  Almost completed the third round examination of the F1 offspring clinical study (FOCS) that was initiated in November 2014 on a four-year cycle. 9,750 subjects participated and participation rate during this cycle was 74.4%. Continued conducting the third round examination and started the fourth round in November 2018.

  Initiated efforts to develop an integrated program project in collaboration with Departments of Epidemiology, Molecular Biosciences, and Statistics. Organized as an umbrella program project for investigation of genetic effects of atomic bomb radiation to the Genetic Research Cluster.

- A study characterizing radiation-induced small-size deletions in F1 mice born to exposed spermatogonia or mature oocytes was conducted. This study aimed to clarify characteristics of radiation-induced indels identified in F1 mice born to exposed spermatogonia or mature oocytes. We also examined further details of neighboring sequences of de novo mutations. Also, we examined the number of de novo mutations of unexposed parental alleles to estimate the aging effect on de novo induction of SNVs. We found two types of remarkable characteristics of small deletions in exposed group; one is small deletions (mainly 1~12 nucleotides) in non-repeat sequences, many of which showed microhomology at the breakpoint junction, and the other is single-nucleotide deletions in mononucleotide repeat sequences. These data suggest that deletions having the above mentioned features as well as multisite mutations could be typical signatures of mutations induced by parental irradiation in mammals.

3. Research to Elucidate Individual Doses and Effects from the A-bomb

- The Department of Statistics coordinated and collaborated in the work of the binational working group that was tasked with developing an improved approach to organ dosimetry by using existing, DS02-calculated shielded radiation fields with new “leakage” tables calculated from new and improved computational phantoms. This work has resulted in a

series of papers comparing new sets of phantoms, designated as "J45," to DS86/02 phantoms, using idealized irradiation geometries, i.e., all neutrons and gamma-rays arriving from the same direction, e.g., antero-posterior, or at random from all directions (isotropic). The first paper (Griffin, Paulbeck, Bolch 2019) evaluated the dosimetric differences from using an updated and age-expanded J45 phantom series. The second (Paulbeck, Griffin, Lee 2019) extended this work by examining the atomic bomb photon and neutron field incident upon the adult pregnant female. The third paper, currently in review (Sato, Funamoto, Paulbeck 2019) investigated the potential impact of introducing not only the J45 series but also radiological physics methodological upgrades into the dosimetry system. A fourth paper, currently in development, (Paulbeck, Sato, Funamoto 2020) expands upon the initial study (Paulbeck, Griffin, Lee 2019) by performing survivor dose reconstructions with the J45 PF phantom series using DS02 specific particle fluences in terms of particle type, energy, and direction at both cities and for five localized shielding exposure scenarios.

- In order to investigate the effects of A-bomb radiation on humans, a cytogenetic biological dosimetry study was conducted for a subset of A-bomb survivors in the AHS cohort. A total of 1,868 survivors (1,179 in Hiroshima and 689 in Nagasaki) were examined using the 2-color-FISH method for detecting the frequency of stable translocations involving chromosomes 1, 2, and 4. An overview of some of the results are as follows: (1) the overall dose-response for translocation frequency was nonlinear, wherein the slope leveled off in the higher dose range (above around 1.25 Gy); (2) a wide scatter of individual translocation frequencies against DS02R1 dose was observed in both cities, as seen in the previous Giemsa staining study; (3) the Nagasaki factory workers had a significantly lower dose-response than those exposed in Japanese houses; (4) the city difference was no longer significant after excluding the Nagasaki factory workers; (5) observed dose responses were also significantly lower among survivors whose shielding categories were outside but shielded, in open without shielding, and in other house; (6) Such differences in dose response among different shielding categories suggests a systematic, shielding-related bias in physical dose estimates.

4. Projects to Release Research Results and to Collaborate with Other Scientific Organizations

Crucial to the mission of RERF is the dissemination of results of our studies to survivors and their children and to the international community. Toward that end we interact with local liaison councils representing the communities of Hiroshima and Nagasaki and provide information via public lectures and other activities. These will be described later in another section of this report. With respect to the international community there are a number of activities. These include seminars, workshops, participation at international scientific conferences, and international publication of results. This year 7 seminars were held at RERF presented by national and international visitors to RERF, and published more than 50 scientific papers.

Collaborative Research Projects

- Ongoing international collaborative research projects

In addition to the above activities the development of national and international collaborations is essential to help disseminate results and to enhance RERF research programs. A list of current collaborations is provided below:

a. Partnership with the University of Washington
b. Partnership with Kurume University
c. Collaborations with the US National Cancer Institute
d. Collaborations with the University of Florida
e. Collaborations with Outside Investigators:
   42 Japanese Institutions
   10 North American Institutions
    8 European Institutions
    1 Asian, Oceanian Institution

5. Training Programs for Domestic and Overseas Specialists

1) An "Epidemiological Training course for Radiation Biologists" was held to deepen biologists' understanding of RERF's epidemiological studies and to also promote exchanges among researchers working for radiation-related organizations (August 19–20, 2019; 77 participants in total—39 from outside and 38 from RERF).

2) RERF accepted overseas research trainees, in support of the activities of such organizations as the Hiroshima International Council for Health Care of the Radiation-exposed (HICARE), the Nagasaki Association for Hibakushas' Medical Care (NASHIM), the Japan International Cooperation Agency (JICA), and the Nagoya University Graduate School of Medicine (125 trainees in total). A trainee, who was accepted by HICARE, received lectures on research methods and the results of past studies and took part in experiments and analyses to deepen her understanding of the health effects of radiation at RERF for about four weeks.

3) RERF cooperated in the international training course jointly held by the International Atomic Energy Agency (IAEA) and HICARE (February 17–21, 2020; 21 participants in total), and provided lecturers and offered a venue for the training course on February 21, 2020.

4) RERF further reviewed future directions for its training activities, including an approach of publicly inviting overseas trainees in the International Exchange Research Program; in this regard, we posted a public invitation and the guidelines for application on the RERF website. In FY2019, RERF received seven applications and accepted two trainees.

6. Public Information Programs

1) RERF Open House events

   In fiscal year 2019, RERF held its 25th Open House August 5–6 at the Hiroshima Laboratory and its 23rd Open House August 8–9 in Nagasaki. The Open House event in Hiroshima on August 5 featured the lecture titled "School Visit Program: What's Radiation?" On the next day, August 6, in celebration of the Open House event's 25th anniversary, a lecture was held titled "Radiation around Us and RERF's Research."

   At the Nagasaki Laboratory on August 8, the Open House featured the special presentation "Is radiation visible? Let's watch radiation's movement in an experimental setting." In Hiroshima, several science corners were established—"Liquid nitrogen: What is the world of -196°C like?" and "Extract DNA," among others—at which science experiments were conducted, with hands-on learning opportunities also provided. As usual, a "Quiz stamp rally" was featured, in which children and young visitors moved throughout the facilities to complete the quiz. In Nagasaki, several science corners were

set up, including bone density testing, liquid nitrogen experiments, body fat measurement, and more.

The two-day Open House events attracted 688 and 416 visitors in Hiroshima and Nagasaki, respectively.

2) Enhanced RERF website

- The comprehensive overhaul of the RERF public website was completed in June 2018. During FY2019, the new homepage was regularly updated with revised information.
- Starting in the fall of 2018, when papers are published in scientific journals, new easy-to-follow synopses of papers were posted on the public website.
- The total number of RERF website hits, or page views, between April 1, 2019, and March 31, 2020, was 394,723, with the daily average being around 1,079. The total number of website visitors for the same period was 157,236, with the daily average about 430.*

*These numbers are the result of a new system of assessment called Google Analytics, the use of which was initiated in June 2018.

3) Public relations activities using social media

- RERF continues to convey information through its Facebook page. Currently, the page has 838 followers.
- RERF launched both English and Japanese versions of Twitter. Both accounts together currently have more than 420 followers in total.

4) Media gatherings

RERF held get-togethers with the media to improve and strengthen relations, given that job transfers in that work are regular occurrences, resulting in a high degree of turnover in reporters that cover RERF as part of their beat. In October 2019, RERF held in Hiroshima a guidance session for younger journalists not familiar with RERF's work (21 participants from 10 media concerns). Furthermore, in response to requests from media concerns in Hiroshima, RERF held a gathering with the local Chugoku Shimbun in October (eight media members), another with the Kyodo Tsushin wire service in December (six media members), and again, in January 2020, a New Year's gathering with all media (18 media members from 10 companies). From these efforts to improve communications, RERF received five requests for interviews.

5) Public lectures

In cooperation with the Public Awareness Campaign working group, which is designed to convey RERF's activities, RERF enhanced its communication with the Hiroshima Peace Memorial Museum by giving a presentation to about 200 peace museum volunteers and Peace Forum members. In cooperation with the Nagasaki Peace Promotion Association, RERF provided a lecture at the Nagasaki Atomic Bomb Museum for about 70 people, including peace volunteers and guides.

6) School Visit Program

In Hiroshima, the RERF School Visit Program, which is an attempt to teach radiation health effects to school children using readily understandable language, was involved in FY2019 in 21 lectures to 11 organizations, including junior high schools, groups visiting the Open House event, peace volunteer groups, and other visitor groups.

7) Updating of public relations materials

Subscribing to RERF's electronic subscriber list email magazine, initiated in April 2019, was made possible from our website. As of March 31, 2020, the email magazine generated close to around 300 subscribers, with 11 email magazine issues sent out to that point in time. Utilizing this new media format, RERF will continue sending RERF research results and other related information to interested citizens.

In addition, the Annual Report had previously been discontinued in its hard-copy format, with three years (FY2016–FY2018) of the new Report of Annual Activities posted exclusively online.

8) Other public relations activities

- As part of its public relations activities through the media, RERF held press conferences at the time of important functions and newsworthy events, as well as at publication of topical papers. RERF also responded to inquiries and requests for interviews from many domestic and overseas media organizations.
- In addition to the Open House events, visitors are welcome to tour RERF's facilities upon request. In FY2019, as of the end of March 2020, 805 individuals from Japan including students on school excursions, and 150 individuals from overseas toured the RERF facilities in Hiroshima and Nagasaki.

FY2019 RERF International Collaborative Activities

I. Participation in international collaborative activities by RERF directors and staff members		II. Acceptance of visitors from overseas for briefing and training	
WHO-related activity	1 person	(Hiroshima)	
UNSCEAR-related activity	7 people	Visitors related to HICARE	39 people
ICRP-related activity	2 people	Visitors related to RERF (International Exchange Research Program)	2 people
IAEA-related activity	1 person	Visitors related to MEXT	9 people
Medical checkup for A-bomb survivors residing in South Korea-related activity	1 person	Visitors related to JICA	8 people
Others	15 people	Visitors related to JAEA	45 people
		(Nagasaki)	
		Visitors related to NASHIM	24 people
Total: 27 people		Total: 127 people (Hiroshima 103 people, Nagasaki 24 people)	

I. Participation in international collaborative activities by RERF directors and staff members (excluding participation in international scientific meetings)

In italics: Funding Organization

1. World Health Organization (WHO)-related activity (1 person)

RERF (hereinafter, all titles represent those at time of participation)

Kazunori Kodama, Executive Director, attended the 3rd collaboration meeting for Japanese WHO Collaboration Center. (Tokyo, September 6, 2020)

2. United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)-related collaborative activity (7 people)

1) *National Institute of Radiological Sciences*

Kotaro Ozasa, Department Chief of Epidemiology, attended the UNSCEAR domestic committee meeting. (Tokyo, November 13, 2019)

2) *RERF*

(1) Kotaro Ozasa, Department Chief of Epidemiology, attended the 66th UNSCEAR meeting. (Vienna, Austria, June 10-14, 2019)

(2) Kazunori Kodama, Executive Director, and Kotaro Ozasa, Department Chief of Epidemiology, attended online meetings on June 25, September 24, December 12, 2019, February 5 and March 27, 2020 as a member of the Japanese Working Group of the Fukushima Follow-up Program.

(3) Kotaro Ozasa, Department Chief of Epidemiology, attended online meetings on October 21, December 16, 2019, February 13, and March 27, 2020 as a member of the Ad Hoc Working Group on Effects and Mechanisms.

(4) Alina Brenner, Senior Scientist, Department of Epidemiology, attended online meetings on October 14, 2019 and February 11, March 9, April 2, 2020 as a lead writer for UNSCEAR Epidemiological studies of Radiation and Cancer.

(5) Alina Brenner, Senior Scientist, Department of Epidemiology, attended an Expert Group meeting for the UNSCEAR Report at NCI. (Rockville, USA, December 3-5, 2019)

3. *ICRP (International Commission on Radiological Protection)*-related activity (2 people)

(1) Kotaro Ozasa, Department Chief of Epidemiology, attended online conferences on July 17-18, 2019 and March 31, 2020 as a member of ICRP Task Ggroup 115.

(2) Kotaro Ozasa, Department Chief of Epidemiology, participated as a member of the ICRP Committee 1 and Task Group 115 (Risk and Dose Assessment for Radiological Protection of Astronauts). (Adelaide, Australia, November 16-26, 2019)

4. *IAEA (International Atomic Energy Agency)*-related activity (1 person)

Kazunori Kodama, Executive Director gave a lecture at HICARE/IAEA Workshop on Biological and Internal Dosimetry: Recent advance and clinical application. (Hiroshima, February 21, 2020)

5. Medical checkup for A-bomb survivors residing in South Korea-related activity (1 person)

Nagasaki Prefectural Government's medical checkup project for A-bomb survivors residing in South Korea

Tomoki Nakamizo, Associate Senior Scientist, Department of Clinical Studies, Nagasaki, together with the physicians and others from Nagasaki University Hospital and the Nagasaki Genbaku Hospital participated in the medical checkup project for A-bomb survivors residing in South Korea sponsored by the Nagasaki Prefectural Government and provided health consultations for the A-bomb survivors in South Korea. (Masan, South Korea, June 6–13, 2019)

6. Others (15 people)

(1) Robert Ullrich, Vice Chairman, attended the 55th Annual Meeting of the National Council on Radiation Protection and Measurements (NCRP). (Bethesda, USA, April 1-2, 2019)

(2) Robert Ullrich, Vice Chairman, attended the Gilbert W. Beebe Symposium "The Future of Low-Dose Radiation Research in the United States." (Washington DC, USA, May 8-9, 2019)

(3) Robert Ullrich, Vice Chairman, attended the Research Meetings with the researchers at Oregon Health & Science University. (Portland, USA, June 9-10, 2019)

(4) Benjamin French, Acting Department Chief of Statistics, visited the University of Washington as a lecturer in a short course on joint modeling of longitudinal and survival data at the 2019 Summer Institute in Statistics for Clinical and Epidemiological Research. (Seattle, USA, July 26, 2019)

(5) Robert Ullrich, Vice Chairman, attended the Research Meetings with the researchers and gave a presentation at Oregon Health & Science University. (Portland, USA, August 8, 2019)

(6) Eric Grant, Associate Chief of Research, attended the first meeting of the "Scientific Committee 1-27" of the National Council on Radiation Protection and Measurements (NCRP) as a committee member. (Bethesda, USA, August 13-14, 2019)

(7) Robert Ullrich, Vice Chairman, attended for the 16th International Congress of Radiation Research (ICRR). (Manchester, UK, August 25-29, 2019)

(8) Kotaro Ozasa, Department Chief of Epidemiology, attended the 40th Anniversary Meeting of Korean Society of Epidemiology. (Seoul Korea, September 19-20, 2019)

(9) Robert Ullrich, Vice Chairman, attended the One Day Meeting "Discussion to Develop Recommendations for Congressional Legislation on a Revised US Research Program on the Health Effects on Low Dose Radiation, Including Those Associated with Civilian Nuclear Energy. (Washington DC, USA, September 25, 2019)

(10) Hiromi Sugiyama, Senior Scientist, Department of Epidemiology, conducted a cancer registration accuracy management training at Yangon General Hospital. (Yangon, Myanmar, October 9-11, 2019).

(11) Benjamin French, Assistant Department Chief of Statistics, visited Korea University's study group on radiation epidemiology to give a research presentation on atomic bomb survivor studies and a training course on longitudinal data analysis methods. (Seoul, South Korea, October 28-29, 2019)

(12) Eric Grant, Associate Chief of Research, attended the DOE Workshop. (San Diego, USA, November 2, 2019)

(13) Robert Ullrich, Vice Chairman, chaired session for the 65th Annual Meeting of the Radiation Research Society. (San Diego, USA, November 3-6, 2019)

(14) Kazunori Kodama, Executive Director, participated in a dispatch program for training on health care of the A-bomb survivors in Los Angeles. (Los Angeles, USA, November 8-13, 2019)

(15) Eric Grant, Associate Chief of Research, attended the "Scientific Committee 1-27" of the National Council on Radiation Protection and Measurements (NCRP). (Bethesda, USA, January 15-16, 2020)

II. Acceptance of visitors from overseas for briefing and training (Total: 127 people)

[Hiroshima: 103 people] *In italics: Funding Organization*

1. Visitors related to *Hiroshima International Council for Health Care of the Radiation Exposed (HICARE)* (39 people)

1) South Korea (14 people)

Short-term training group of medical treatment for A-bomb survivors living in South Korea

(1) September 3, 2019: 7 trainees

(2) October 29, 2019: 7 trainees

2) United States (6 people)

(1) July 4, 2019: 3 trainees

(2) December 19, 2019: 3 trainees

3) Others (19 people)

(1) August 1, 2019: Hiroshima-ICAN Academy on Nuclear Weapons and Global Security, 15 trainees from China, USA, France, England, Russia, and others

(2) November 26–December 13, 2019: 1 trainee from Latvia

(3) January 22, 2020: 3 trainees from Brazil

2. Visitors related to *RERF (MHLW International Exchange Research Program)* (2 people)

Training period: November 26-December 6, 2019

(1) National Cancer Center, South Korea

(2) Bangladesh Atomic Energy Commission

3. Visitors related to *Ministry of Education, Culture, Sports, Science and Technology (MEXT)* (9 people)

November 14, 2019: Young Leaders' Program of Nagoya University Graduate School of Medicine, trainees from Mongolia, Malaysia, Myanmar, Cambodia, Afghanistan, and others

4. Visitors related to *International Cooperation Agency (JICA)* (8 people)

November 13, 2019: FY2019 JICA group training on "Tuberculosis control and drug resistance in UHC age" at the request of the Research Institute of Tuberculosis, trainees from Afghanistan, Congo, Philippines, Liberia, and Timor Leste and others

5. Visitors related to *Japan Atomic Energy Agency (JAEA)* (45 people)

(1) July 5, 2019: JAEA's Training Course on the Physical Protection of Nuclear Material and Facilities, 23 trainees from Australia, Bangladesh, China, India, Jordan, and others

(2) October 25, 2019: JAEA's Training Course on State Systems of Accounting for and control of Nuclear Material, 22 trainees form Australia, Bangladesh, India, Indonesia, Iran, and others

[Nagasaki: 24 people]

Visitors related to *the Nagasaki Association for Hibakushas' Medical Care (NASHIM)* (24 people)

1） Chernobyl and Kazakhstan

July 23, 2019: 6 trainees

2） Korea

(1) October 9, 2019: 8 trainees

(2) January 15, 2020: 8 trainees

3) Brazil

January 15, 2020: 2 trainees

FY2019 Joint programs between RERF and overseas researchers/research organizations

In italics: Funding Organization

1. Collaborative studies between *RERF and US National Cancer Institute (NCI)*

(1) Under the research contract entered into by and between RERF and the US National Cancer Institute (NCI), in which Kotaro Ozasa, Department Chief of Epidemiology, serves as a responsible person of the RERF side, he is working on analysis of solid cancer incidence risks in the LSS cohort, site-specific cancer studies based on histopathological diagnoses, and preliminary reviews for genomic analysis of thyroid cancer.

The following papers have been published (RERF authors underlined):

Cologne, JB, J. Kim, H. Sugiyama, B. French, H.M. Cullings, D.L. Preston, K. Mabuchi, and K. Ozasa, Effect of Heterogeneity in Background Incidence on Inference about the Solid-Cancer Radiation Dose Response in Atomic Bomb Survivors. Radiat Res, 2019, 192 (4)

Brenner AV, Sugiyama H, Preston DL, Sakata R, French B, Sadakane A, Cahoon EK, Utada M, Mabuchi K, Ozasa K. Radiation risk of central nervous system tumors in the Life Span Study of atomic bomb survivors, 1958-2009. *Eur J Epidemiol* 2020/01/25 [Epub]:1-10

Sadakane A, French B, Brenner AV, Preston DL, Sugiyama H, Grant EJ, Sakata R, Utada M, Cahoon EK, Mabuchi K, Ozasa K. Radiation and risk of liver, biliary tract, and pancreatic cancers among atomic bomb survivors in Hiroshima and Nagasaki: 1958-2009. *Radiat Res* 2019 (September); 192(3):299-310

Sakata R, Preston DL, Brenner AV, Sugiyama H, Grant EJ, Rajaraman P, Sadakane A, Utada M, French B, Cahoon EK, Mabuchi K, Ozasa K. Radiation-related risk of cancers of the upper digestive tract among Japanese atomic bomb survivors. *Radiat Res* 2019 (September); 192(3):331-44

Sugiyama H, Misumi M, Brenner AV, Grant EJ, Sakata R, Sadakane A, Utada M, Preston DL, Mabuchi K and Ozasa K, "Radiation risk of incident colorectal cancer by anatomical site among atomic bomb survivors: 1958–2009", *Int J Cancer* 2020 (February); 146(3):635-45

(2) Dr. Dale Preston, Principal Scientist from Hirosoft International Corporation, visited RERF to conduct collaborative studies including a solid cancer incidence risks study of A-bomb survivors. (May 18–30, 2019)

(3) Dr. Kiyohiko Mabuchi of Radiation Epidemiology Branch, NCI, visited RERF to conduct NCI-funded collaborative studies including a site-specific cancer study. (May 19–24, 2019)

(4) Ritsu Sakata, Assistant Chief, and Alina Brenner, Senior Scientist, Department of Epidemiology, are joining with the data of tumor of the central nervous system from RERF as a part of the pooled analysis conducted by the scientists of Radiation Epidemiology Branch, NCI.

(5) Ritsu Sakata, Assistant Department Chief of Epidemiology, is joining with the data of radiation-associated thyroid cancers from RERF as a part of the pooled analysis conducted by the scientists of Radiation Epidemiology Branch, NCI.

(6) Benjamin French, Assistant Chief, John Cologne, Senior Scientist, and Munechika Misumi, Associate Senior Scientist, Department of Statistics, collaborated with the RERF Department of Epidemiology and the US NCI in preparation of data and methods for a series of upcoming papers on improved analyses of solid cancer incidence and mortality. (Published papers listed in (1))

(7) John Cologne, Senior Scientist, Department of Statistics, collaborated with the RERF Department of Epidemiology and the US NCI in the preparation of a paper dealing with methodological aspects of Life Span Study cancer incidence risk analyses: "Effect of heterogeneity in background incidence on inference about the solid-cancer radiation dose response in atomic-bomb survivors" (Radiat Res, 2019, 192 (4).

2. Collaboration between *RERF and the/Asia Cohort Consortium (ACC)*

Ritsu Sakata, Assistant Department Chief of Epidemiology, is joining the collaborative project with the ACC entitled: *Tobacco smoking, alcohol drinking, body mass index and risk of rare cancers.* (Hanoi, Vietnam, November 3-6, 2019)

3. Collaboration between *RERF and Institute of Cancer Research, UK and US National Institute of Environmental*

Atsuko Sadakane, Senior Scientist, Department of Epidemiology, after she resigned and Alina Brenner, Senior Scientist, Department of Epidemiology, is joining with premenopausal breast cancer data from RERF as a part of the pooled analysis conducted by Dr. Anthony Swerdlow of Institute of Cancer Research, UK, and Dr. Hazel Nichols of US National Institute of Environmental.

The following paper has been published (RERF authors underlined):

Schoemaker MJ, Nichols HB, Wright LB, Brook MN, Jones ME, O'Brien KM, Adami HO, Baglietto L, Bernstein L, Bertrand KA, Boutron-Ruault MC, Chen Y, Connor AE, Dossus L, Eliassen AH, Giles GG, Gram IT, Hankinson SE, Kaaks R, Key TJ, Kirsh VA, Kitahara CM, Larsson SC, Linet M, Ma H, Milne RL, Ozasa K, Palmer JR, Riboli E, Rohan TE, Sacerdote C, Sadakane A, Sund M, Tamimi RM, Trichopoulou A, Ursin G, Visvanathan K, Weiderpass E, Willett WC, Wolk A, Zeleniuch-Jacquotte A, Sandler DP, Swerdlow AJ. Adult weight change and premenopausal breast cancer risk: A prospective pooled analysis of data from 628,463 women. Int J Cancer. 2020 Feb 3. doi: 10.1002/ijc.32892.

4. Collaboration between *RERF* and University of Washington

RERF entered into a research contract with the University of Washington (Department of Epidemiology and Department of Biostatistics), for which Benjamin French, Assistant Department Chief of Statistics serves as coordinator. Under this contract, RERF supports the training and education of MS and PhD students in epidemiology and biostatistics, and conducts collaborative research with students and their advisors. Research projects focus on analyses of cancer incidence and mortality outcomes in the LSS, as well as the development of new statistical methods for analyzing LSS cohort data. Research is ongoing and several papers are expected.

Visitors related to RERF and University of Washington partnership (5 people)

July 1-17, 2019: 1 visiting student (MS program in Epidemiology)
September 1-20, 2019: 1 visiting student (MS program in Epidemiology)
September 1-23, 2019: 1 visiting student (PhD program in Biostatistics)

November 5-8, 2019: 2 visiting students (MS and PhD program in Epidemiology)

5. *RERF* international collaborative studies on statistical analyses

(1) Munechika Misumi, Associate Senior Scientist, Department of Statistics, and Hiromi Sugiyama, Senior Scientist, Department of Epidemiology, visited the Institute of Radiation Protection at Helmholtz Zentrum in Germany. They shared RERF's latest research with Helmholtz Zentrum's researchers and performed mechanistic modeling of radiation-induced cancer. Moreover, they held a discussion on future collaborative research. (Munich, Germany, November 27–December 4, 2019)

(2) Benjamin French, Acting Department Chief of Statistics, collaborated with researchers at the University of Pennsylvania, Philadelphia, Pennsylvania, US, on statistical methods for conducting sensitivity analyses of multiple dependent comparisons in a single observational study. The following paper has been published:

Karmakar B, French B, Small DS. Integrating the Evidence from Evidence Factors in Observational Studies. Biometrika, 2019, 106(2):353-67.

6. *RERF* international collaborative studies on thyroid

Misa Imaizumi, Assistant Department Chief of Clinical Studies (Nagasaki), Waka Ohishi, Department Chief of Clinical studies and Michiko Yamada, Division Chief of Radiology of Department of Clinical Studies are joining with Adult Health Study data from RERF as a part of the pooled analysis of thyroid conducted by Dr. Rodondi of University of Bern, Switzerland (Thyroid Studies Collaboration).

令和元年度 外部資金研究一覧表
FY2019 External Research Funds

外部機関名称 Name of Outside Organization	件数 Number of Grants	研究資金 （資金拠出機関からの入金額） Research funds (amount of funds from funding organizations)
厚生労働省 Ministry of Health, Labour and Welfare (MHLW)	2	¥2,270,000
独立行政法人 日本学術振興会（文部科学省所管の独立行政法人） Japan Society for the Promotion of Science (JSPS) [Independent administrative entity under the jurisdiction of the Ministry of Education, Culture, Sports, Science and Technology (MEXT)]	7	¥8,830,000
国立研究開発法人 国立がん研究センター National Cancer Center	1	¥0 ＊
総合計　Grand total	10	¥11,100,000

注）
・間接費を含む。
・研究分担者への配分額を含む。
＊研究協力者として研究参画のため、配分資金の配分なし。

Notes)
・These amounts include indirect cost.
・These amounts include subsidies allocated to collaborators.
＊No research funds are allocated, because the RERF researcher takes part in the research as a cooperative investigator.

令和元年度　外部資金研究一覧表
FY2019 External Research Funds

研究のタイトル Title of Research	委託組織の名前と場所及び研究 グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization Chief of research group or principal investigator in charge	放影研における研究者の名前 Investigator(s) at RERF	研究資金（資金拠出機関からの入金額） Research funds (amount of funds from funding organizations)	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
疫学部 Department of Epidemiology							
1　都道府県がん登録の全国集計データと診療情報等との併用・突合によるがん統計整備及び活用促進の研究 Study to promote the usage and the maintenance of the cancer statistics by merging data of prefecture-based cancer registries and national cancer registry	厚生労働省・厚生労働科学研究費補助金 「がん対策推進総合研究事業」 研究代表者　松田　智大 国立研究開発法人国立がん研究センター がん対策情報センターがん登録センター 全国がん登録室長 Health and Labour Sciences Research Grants (MHLW) Promotion of Comprehensive Research Project for Cancer Control Tomohiro Matsuda Section Head, Registry Section, National Cancer Registry, Center for Cancer Registries, Center for Cancer Control and Information Services, National Cancer Center	**研究分担者** (Collaborator) 杉山　裕美 Hiromi Sugiyama	¥650,000	April 1, 2019	March 31, 2020	RP 18-61	被爆者のがん罹患調査 Study of cancer incidence among A-bomb survivors
2　国内外研究連携基盤の積極的活用によるがんリスク評価及び予防ガイドライン提言に関する研究 Study of evaluation of carcinogenetic effects based on active utilization of domestic and international research consortia and proposal of cancer prevention guidelines	国立がん研究センター・国立がん研究センター研究開発費 研究代表者　井上　真奈美 国立研究開発法人国立がん研究センター 社会と健康研究センター 予防研究部 部長 National Cancer Center Funds for Cancer Research and Related Technology Development Manami Inoue Chief, Division of Cohort Consortium Research, Epidemiology and Prevention Group, Center for Public Health Sciences, National Cancer Center	**研究協力者** (Cooperative Investigator) 歌田　真依 Mai Utada	研究協力者のため、研究資金の配分なし Since this person is a cooperative investigator, research funds were not allocated to her.	April 1, 2019	March 31, 2020	RP-A2-15	日本人のがんの疫学研究 Epidemiological study of cancer in Japanese population

令和元年度 外部資金研究一覧表
FY2019 External Research Funds

研究のタイトル Title of Research	委託組織の名前と場所及び研究 グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization Chief of research group or principal investigator in charge	放影研における研究者の名前 Investigator(s) at RERF	研究資金（資金拠出機関からの入金額） Research funds (amount of funds from funding organizations)	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
臨床研究部 Department of Clinical Studies							
1 生涯にわたる循環器疾患の個人リスクおよび集団のリスク評価ツールの開発を目的とした大規模コホート統合研究 A large-scale integrated cohort study to develop tools to assess life-long individual/group risk of circulatory diseases	厚生労働省・厚生労働科学研究費補助金 「循環器疾患・糖尿病等生活習慣病対策総合研究事業」 研究代表者　岡村　智教 慶應義塾大学医学部　教授 Health and Labour Sciences Research Grants (MHLW) Comprehensive Research on Life-Style Related Diseases including Cardiovascular Diseases and Diabetes Mellitus Tomonori Okamura Professor, School of Medicine, Keio University	**研究分担者** (Collaborator) 山田　美智子 Michiko Yamada	¥1,620,000	April 1, 2019	March 31, 2020	RP 2-75	広範囲な医学的調査 （生活習慣病） Broad-based medical research (Lifestyle disease)
2 被爆による造血器腫瘍発症に関与する分子機構の解明と今後への展望 Identification of molecular mechanisms related to development of hematological malignancies by atomic-bomb	日本学術振興会・科学研究費助成事業 「若手研究 」 研究代表者　吉田　稚明 JSPS Grant-in-Aid for Scientific Research Early-Career Scientists Noriaki Yoshida	**研究代表者** (P.I.) 吉田　稚明 Noriaki Yoshida	直接経費 (Direct cost) ¥1,200,000 間接経費 (Indirect cost) ¥360,000	April 1, 2019	March 31, 2020	RP 6-70 RP 5-90 RP-S2-15 RP 5-02 RP-P2-19	がん研究 （被爆者がん研究への応用） Cancer research (Application to cancer research among A-bomb survivors)

令和元年度 外部資金研究一覧表
FY2019 External Research Funds

研究のタイトル Title of Research	委託組織の名前と場所及び研究 グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization Chief of research group or principal investigator in charge	放影研における研究者の名前 Investigator(s) at RERF	研究資金（資金拠出機関からの入金額） Research funds (amount of funds from funding organizations)	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
統計部 Department of Statistics							
1 測定誤差を考慮した低線量被曝影響の統計的評価 Project to investigate effects of measurement errors in low dose range	日本学術振興会・科学研究費助成事業 「若手研究 」 研究代表者　三角　宗近 JSPS Grant-in-Aid for Scientific Research Early-Career Scientists Munechika Misumi	**研究代表者 (P.I.)** 三角　宗近 Munechika Misumi	直接経費 (Direct cost) ¥1,100,000 間接経費 (Indirect cost) ¥330,000	April 1, 2019	March 31, 2020	RP 1-75 RP 18-59	LSS、遮蔽調査、線量調査 LSS, Shielding survey and dosimetry study
2 変化係数モデルの多変量化と北東大西洋のミンククジラの身体状況データへの適用 Multivariate varying coefficient model and its application to physical state data of minke whale in the northeast Atlantic Ocean	日本学術振興会・科学研究費助成事業 「基盤研究（C）」 研究代表者　山村　麻理子 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Mariko Yamamura	**研究代表者 (P.I.)** 山村　麻理子 Mariko Yamamura	直接経費 (Direct cost) ¥900,000 間接経費 (Indirect cost) ¥270,000 広島大学の研究分担者への配分額は、上記の研究資金に含まれている。 The above amount includes funds allocated to the collaborator at Hiroshima University.	April 1, 2019	March 31, 2020	No RP	放射線の人に及ぼす影響及びこれによる疾病に関する調査研究事業 Research project on radiation effects on humans and associated diseases

令和元年度 外部資金研究一覧表
FY2019 External Research Funds

研究のタイトル Title of Research	委託組織の名前と場所及び研究 グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization Chief of research group or principal investigator in charge	放影研における研究者の名前 Investigator(s) at RERF	研究資金（資金拠出機関からの入金額） Research funds (amount of funds from funding organizations)	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
分子生物科学部 **Department of Molecular Biosciences**							
1 胚発生期の自然発生変異に注目した高解像度な細胞系譜の解析 High resolution analysis of cell lineage by using post-zygotic spontaneous mutations	日本学術振興会・科学研究費助成事業 「挑戦的研究（萌芽）」 研究代表者　内村　有邦 JSPS Grant-in-Aid for Scientific Research Grant-in-Aid for Challenging Research (Exploratory) Arikuni Uchimura	**研究代表者 (P.I.)** 内村　有邦 Arikuni Uchimura	直接経費 (Direct cost) ¥2,200,000 間接経費 (Indirect cost) ¥0 大阪大学の招へい教員の立場で研究代表者として研究全体に従事。当該科研費の管理および係る交付申請、実績報告書等の提出事務はすべて大阪大学が行う。 Engage whole work as PI and perform in Osaka University, and all management of this funds and submission of reports, etc. are done by Osaka University.	April 1, 2019	March 31, 2020	RP 2-13	放射線被曝の遺伝的影響 Genetic effects of radiation exposure
2 微量変異原評価を可能とする全ゲノム解読に基づく網羅的自然発生突然変異検出系の開発 Development of comprehensive identification of spontaneous mutations based on whole genome sequencing applicable for the assessment of low-dose mutagens	日本学術振興会・科学研究費助成事業 「基盤研究（A）」 研究代表者　権藤　洋一 東海大学 医学部基礎医学系 分子生命科学 教授 JSPS Grant-in-Aid for Scientific Research Scientific Research (A) Yoichi Gondo Professor, Department of Molecular Life Sciences, Tokai University School of Medicine	**研究協力者** (Cooperative Investigator) 内村　有邦 Arikuni Uchimura	研究協力者のため、研究資金の配分なし Since this person is a cooperative investigator, research funds were not allocated to him.	April 1, 2019	March 31, 2020	No RP	放射線被曝の遺伝的影響 Genetic effects of radiation exposure
3 放射線発癌と体細胞変異に対する抗酸化ストレス転写因子NRF2による防御作用の検討 Possible Roles of Oxidative Stress Response in Protection against Radiation-induced Mutagenesis and Oncogenesis	日本学術振興会・科学研究費助成事業 「基盤研究（C）」 研究代表者　田邉　修 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Osamu Tanabe	**研究代表者 (P.I.)** 田邉　修 Osamu Tanabe **研究分担者 (Collaborator)** 吉田　稚明（臨床研究部） Noriaki Yoshida （Dept. Clinical Studies）	直接経費 (Direct cost) ¥900,000 間接経費 (Indirect cost) ¥270,000	April 1, 2019	March 31, 2020	RP-P3-19	放射線による発がんメカニズムの解明とその予防法の開発に貢献 Contribution to the elucidation of mechanisms of radiation oncogenesis and to the development of methods to prevent it

令和元年度　外部資金研究一覧表
FY2019 External Research Funds

研究のタイトル Title of Research	委託組織の名前と場所及び研究 グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization Chief of research group or principal investigator in charge	放影研における研究者の名前 Investigator(s) at RERF	研究資金（資金拠出機関からの入金額） Research funds (amount of funds from funding organizations)	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
分子生物科学部 Department of Molecular Biosciences							
4 脊髄小脳変性症モデルマウスを用いたCRISPR/Cas13による新しい核酸医療 New oligonucleotide therapy using CRISPR/Cas13 in spinocerebellar ataxia model mice	日本学術振興会・科学研究費助成事業 「基盤研究（C)」 研究代表者　松田　由喜子 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Yukiko Matsuda	**研究代表者 (P.I.)** 松田　由喜子 Yukiko Matsuda	直接経費 (Direct cost) ¥1,300,000 間接経費 (Indirect cost) ¥0 広島大学原爆放射線医科学研究所の研究員（非常勤）の立場で研究代表者として当研究所の就業時間外に広島大学において行われる。当該科研費の管理および係る交付申請、実績報告書等の提出事務はすべて広島大学が行う。 As the part-time researcher of RIRBM in Hiroshima University, this project is performed at Hiroshima University outside working hours. All management of this funds and submission of reprots, etc. are done by Hiroshima University.	April 1, 2019	March 31, 2020	No RP	なし None

令和元年度 特別会計一覧表
FY2019 Special Funds

資金拠出機関名称 Name of Funding Agency	件数 Number of Funds	資金合計 Amount of Funding Total
厚生労働省 Ministry of Health, Labour and Welfare (MHLW)	3	¥52,256,410
米国国立がん研究所(NCI)契約 U.S. National Cancer Institute (NCI) Contract	1	¥11,818,439
広島県 Hiroshima Prefecture	1	¥14,557,628
長崎県 Nagasaki Prefecture	1	¥8,685,926
国立大学法人 京都大学(国立研究開発法人 日本医療研究開発機構委託事業の受託機関) Kyoto University [Contract project organization commissioned by the Japan Agency for Medical Research and Development (AMED)]	1	¥950,000
総合計 Grand total	7	¥88,268,403

注)
・間接費を含む。
・研究分担者の配分額を含む。

Notes)
・These amounts include indirect cost.
・These amounts may include subsidies allocated to collaborators.

令和元年度　特別会計一覧表
FY2019 Special Funds

	研究のタイトル Title of Research	委託組織の名前と場所及び研究グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization/Chief of research group or principal investigator in charge	放影研における契約者/研究者の名前 Investigator(s) at RERF	資金拠出機関からの入金額 Amount of Funds from Funding Agencies	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
1	放射線業務従事者の健康影響に関する疫学研究 Epidemiological Study of Health Effects in Fukushima Emergency Workers	厚生労働省・労災疾病臨床研究事業費補助金 研究代表者　大久保　利晃 独立行政法人労働者健康安全機構 労働安全衛生総合研究所 特任統括研究員 Industrial Disease Clinical Research Grants (MHLW) Toshiteru Okubo Specially appointed chief researcher National Institute of Occupational Safety and Health, Japan Organization of Occupational Health and Safety	研究分担者 (Collaborative Investigators) 大石　和佳 Waka Ohishi 喜多村　紘子 Hiroko Kitamura 小笹　晃太郎 Kotaro Ozasa 研究協力者 (Cooperative Investigators) 山田　美智子 Michiko Yamada 飛田　あゆみ Ayumi Hida 今泉　美彩 Misa Imaizumi	¥49,255,000	June 4, 2019	March 31, 2020	RP 6-15 RP 1-19 RP 1-20 RP 2-20	放射線被曝の健康影響 Health effects of radiation exposure
2	原爆放射線による健康影響に関する国際交流調査研究業務 International Exchange Program on Health Effects of the Atomic Bomb Radiation	厚生労働省・委託事業 丹羽　太貫 MHLW Entrustment Ohtsura Niwa	受託者 (Contractor) 丹羽　太貫 Ohtsura Niwa	¥1,127,410	July 18, 2019	March 31, 2020		放射線の人に及ぼす影響及びこれによる疾病に関する調査研究の成果の管理、報告及び公表並びに研修を行うこと To report and publicize the results of research and studies, and to provide training on the effects of radiation and associated diseases in humans
3	原爆被爆者の生物試料の保管及び活用に関する研究事業 Research Program on preservation and use of the A-bomb survivors' biosamples	厚生労働省・委託事業 丹羽　太貫 MHLW Entrustment Ohtsura Niwa	受託者 (Contractor) 丹羽　太貫 Ohtsura Niwa	¥1,874,000	October 9, 2019	March 31, 2020		原爆被爆者の生物試料の保管及び活用 Preservation and use of the A-bomb survivors' biosamples
4	原爆被爆者のがん罹患データの更新 Updated cancer incidence data in the atomic-bomb survivors.	米国国立がん研究所（NCI）契約 米国メリーランド州ベセスダ、 米国国立がん研究所 NCI契約　75N91019P00167 主任研究者　小笹　晃太郎 U.S. National Cancer Institute (NCI) Contract National Cancer Institute, Bethesda, Maryland, USA NCI Contract 75N91019P00167 Kotaro Ozasa	主任研究者 (Program Director) 小笹　晃太郎 Kotaro Ozasa 研究管理者 (Project Managers) エリック グラント Eric J. Grant リチャード スポスト Richard Sposto	直接経費 (Direct cost) ¥7,878,961 間接経費 (Indirect cost) ¥3,939,478	August 1, 2019	July 31, 2021	RP 1-75 RP 18-61 RP 3-94 RP 6-02 RP 1-06 RP 4-07 RP 5-08 RP 6-10 RP-S2-15 RP-S2-16 RP-P1-16	がんの疫学研究、 LSS、胎内被爆者、 F_1集団 Epidemiological study of cancer, LSS, *in utero*, and F_1 populations

令和元年度　特別会計一覧表
FY2019 Special Funds

	研究のタイトル Title of Research	委託組織の名前と場所及び研究グループのチーフ又は担当の主任研究者 Name and location of entrusting outside organization/Chief of research group or principal investigator in charge	放影研における契約者/研究者の名前 Investigator(s) at RERF	資金拠出機関からの入金額 Amount of Funds from Funding Agencies	開始日 Initiation Date	終了日 Termination Date	関連RP Related RPs	関連性 Relationship to RERF's mission
5	がん登録推進事業 Cancer Registry Promotional Project	広島県・委託事業 丹羽　太貫 Hiroshima Prefecture Ohtsura Niwa	受託者 (Contractor) 丹羽　太貫 Ohtsura Niwa	¥14,557,628	April 1, 2019	March 31, 2020	RP18-61 RP29-60 RPs18-61& 29-60附属書	がんの疫学研究、 LSS、胎内被爆者、 F1集団 Epidemiological study of cancer, LSS, in utero, and F1 populations
6	長崎県がん登録・評価事業 Nagasaki Prefecture Cancer Registry Program	長崎県・委託事業 丹羽　太貫 Nagasaki Prefecture Ohtsura Niwa	受託者 (Contractor) 丹羽　太貫 Ohtsura Niwa	¥8,685,926	April 1, 2019	March 31, 2020	RP18-61 RP29-60 RPs18-61& 29-60附属書	がんの疫学研究、 LSS、胎内被爆者、 F1集団 Epidemiological study of cancer, LSS, in utero, and F1 populations
7	骨髄異形成症候群（MDS）のオミックス解析による治療反応性および病型進展の新たなバイオマーカーの同定とその実用化に関する研究 Study for identification of new biomarkers for predicting therapeutic responsiveness and disease type progression of myelodysplastic syndrome (MDS) by omics analyses and the practical use	日本医療研究開発機構（AMED）研究費 「革新的がん医療実用化研究事業」 研究代表者 小川　誠司 京都大学大学院医学研究科　教授 Japan Agency for Medical Research and Development (AMED) Grants Practical Research for Innovative Cancer Control Seishi Ogawa Professor, Kyoto University Graduate School of Medicine	研究分担者 (Collaborator) 今泉　美彩 Misa Imaizumi 研究開発協力者 (Cooperative Investigators) 飛田　あゆみ Ayumi Hida ベンジャミン フレンチ Benjamin French 三角　宗近 Munechika Misumi 大石　和佳 Waka Ohishi 吉田　稚明 Noriaki Yoshida 副島　幹男 Mikio Soejima	直接経費 (Direct cost) ¥730,770 間接経費 (Indirect cost) ¥219,230	April 1, 2019	March 31, 2020	RP 1-17	被爆者のがん研究 Cancer research in atomic bomb survivors

II. Operation and management of RERF

1. Research Resource Center

The Research Resource Center (RRC) is a core RERF infrastructure to store, document, and index all RERF resources and to integrate research data with biosample data to promote research.

Seen broadly, there are three main areas of development.

1. A data/biosample integration project
2. An archiving/preservation project
3. Development of the Office of Collaborative Research and Grant Support

Dr. Robert Grossman (University of Chicago) made a visit to RERF to discuss the "Gen3" Data Commons software that has been developed by his group; at the end of his visit, the initiation of a pilot project was agreed upon. Dr. Christy Henshaw (Wellcome Trust, UK) visited to discuss Wellcome's online digital presence and technical details of their operations. On the advice of the Gen3 technical team, the technical specifications of servers were determined and after an open bidding process, the servers were purchased and installed. Three persons from the Gen3 team came to RERF for a one-week visit to teach RERF personnel how to install and use the Gen3 software. A number of scanning vendors were invited to RERF to view our paper materials and gain an understanding of RERF's long-term vision of scanning all paper materials. Two secure computing rooms with video surveillance and biometric entry doors were constructed on RERF's premises to facilitate human genome research using off-site super computers (that require security and audit trails for use). The "Preparatory Committee for Establishment of the Research Resource Center" was officially instantiated. The committee reviewed and accepted the "RRC White Paper" and requested four subcommittees be created to help with early RRC decisions and tasks. Two persons were recruited to ITD's technology team. These persons are recent computer science graduates from local universities and should begin working for RERF in 2020. A number of ITD staff attended conferences on Open Library Services, Open Data Initiatives, and other relevant topics.

In addition, the RERF Data Management/Documentation Committee established a "Policy on Submitting Human Genome Data to a Public Database." This forward-looking policy will allow genome data developed by RERF to be deposited into public databases after adhering to a number of strict, yet reasonable, rules and procedures.

2. Introduction of an attendance and work management system

With the enforcement of a work-style reform law enacted in June 2018, we started procedures for introducing an attendance and work management system in April 2019. The aim of doing so is to monitor employee work hours in an objective way, improving the work efficiency of attendance management duties by creating workflows for the various leave applications and the overtime report, as well as streamlining salary calculations by linking attendance information to the payroll system. It will be challenging to select a model simply by comparing prices as this system requires special features, such as Japanese-English support and effort management by RERF. For this reason, a comprehensive evaluation method that covers both performance and price was adopted for the bidding. After announcing a public notice of a request for submission of materials, preparing specifications, and examining eligible vendors for open competitive bidding, a

public announcement of the tender was made. However, there were no bidders by the tender deadline of February 4, 2020, and the bid was unsuccessful.

3. Facility upgrades

(1) Facility upgrades to the Hiroshima Laboratory

The rooftop waterproofing of Units I and J, which are not Quonset-style buildings, was done more than 20 years ago. If leaks had occurred, the paper materials stored at the Master File Section of the Epidemiology Department and the Library and Archive Section of the Information Technology Department might have been damaged. The air conditioners installed at Units B, Da, F, G, and J have been remarkably deteriorated and had failed repeatedly. In addition, maintenance in the event of failure was expected to be difficult, as global warming prevention led to the end of R22 refrigerant's production at the end of December 2019. R22 is a widely used air conditioner refrigerant in Japan. Therefore, it was necessary to carry out replacement work. RERF received a government subsidy from the Ministry of Health, Labor and Welfare for the maintenance of facilities for health and hygiene facilities for FY2019 (52.759 million yen), and undertook the rooftop renovation work of Units I and J, and the replacement of air conditioners at Units B, Da, F, G, and J.

(2) Facility upgrades to the Nagasaki Laboratory

More than 16 years have passed since the exterior walls of the building of the Nagasaki Laboratory were painted. The exterior wall renovation work is underway to prevent water leakage due to deterioration and to prevent tiles from falling and water leakages due to cracks in the exterior wall tiles. The durability of the sealant is about 10 years. The renovation work was completed. The construction cost is 35.651 million yen, but RERF and the Nagasaki Prefectural Education Association will split the cost, as the association shares the Nagasaki Laboratory building. Therefore, RERF will pay 17.825 million yen.

4. Revision of the rules and regulations

The following regulations were revised to enhance this public interest incorporated foundation's operational framework:

- Employee Administrative Procedures for Using Taxis and Administrative Procedures for Reimbursing the Travel Expenses of Study Participants [Effective date: April 1, 2019]
  RERF established new procedures concerning employees' taxi use and reimbursement of the travel expenses of study participants.
- Internal Regulations Concerning Formal Meals at Meetings [Effective date: April 1, 2019]
  RERF established new internal regulations to clarify how to handle and process formal meal expenses for meetings attended by external stakeholders.
- Regulations for Protection of Personal Information [Effective date: June 4, 2019]
  Revisions made to the Act on the Protection of Personal Information in May 2017 necessitated the revision of these internal regulations.
- Rules of Procedure of the Board of Councilors [Effective date: June 21, 2019]
  Articles were added to clarify the roles played by the Councilors.
- Operational Procedures of RERF Institutional Review Board [Effective date: July 1, 2019]
  To respond to revisions made to the Ethical Guidelines for Medical and Health Research Involving Human Subjects and the Guidelines for Human Genome/Gene Analysis

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Involving Human Subjects and the Guidelines for Human Genome/Gene Analysis Research (effective 2017), necessary items were added.

- Regulations related to radioisotopes (RI) including the Regulations for Prevention of Radiation Hazards [Effective date: August 2, 2019]
  Pursuant to the amendments to the Act on Restrictions of Radioisotopes, which was promulgated in April 2017, the regulations related to RI were comprehensively revised to match the intent of the amended law.
- Work-Related Ethics Regulations for Employees [Effective date: December 1, 2019]
  RERF established new regulations to maintain relevant workplace ethics.
- Guidelines on Procedures for Administering Employees' Outside Activities [Effective date: January 1, 2020]
  These guidelines were established to clarify time management and procedures for receiving remuneration when the RERF employees conduct outside activities.
- Guidelines for the Entrustment of Research and Development [Effective date: February 1, 2020]
  RERF developed guidelines to clarify all procedures for conducting entrusted research.

5. Investigation on the relocation of Hiroshima Laboratory

We reviewed the requirements of post-relocation research facilities in terms of function, floor space, and relocation costs, based on a report on Hiroshima Laboratory's relocation investigation conducted in FY2018.

Appended documents to FY2019 report of activities

There were no items considered to be important matters for supplementing the contents of the FY2019 report of activities.