FY2015 Report of Activities

Introduction

Epidemiologic data on mortality and cancer incidence among 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, long high-quality follow-up, and comprehensive data on 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. We are also staging 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 the health risks. These three components within the RERF research program provide a unique and important integrative approach into epidemiological, clinical, biological, and mechanistic aspects of human radiation risk. Such integrated opportunities are unique to RERF and make essential that the best science possible is conducted.

I. Report of Major Activities

1. Research Projects Examining A-Bomb Survivors Health

(1) Radiation research based on the LSS, *in utero*, and AHS cohorts

1) Radiation and Cancer Risks

An increased incidence of cancer is recognized as the primary risk. A summary of some of the activities that focus on providing information related to risks and characterization of potential mechanisms involved in radiation related cancer is provided below:

- *Updated cancer incidence:* Periodic reporting on the radiation risks of cancer incidence is an important task. A comprehensive analysis to update radiation risk estimates for cancer incidence through 2009 has been completed using updated individual doses and information of lifestyle factors such as smoking in collaboration with the US National Cancer Institute and a paper on all solid cancer was submitted for internal review. A number of papers on individual tumor sites will follow. All of these papers focus on the shape of the dose-response curves, low-dose risk, and risks as a function of age at exposure.
- *Site-specific cancer studies with histological reviews in the LSS cohort:* RERF has a long history of performing joint studies in collaboration with the US National Cancer Institute. These studies attempt to study specific cancers in detail. We currently have a number of studies active. Since breast cancer is one of the most radiosensitive tumor sites, we aim to learn more about its radiation pathogenesis. We identified 1,615 histologically confirmed female breast cancer cases. Among them, 1330 cases were available for immunohistochemical staining of 'intrinsic subtypes' with respect to estrogen and

progesterone receptors and HER2 and the diagnosis of subtypes has almost completed. In a nested case-control study of postmenopausal breast cancer, we have explored the joint effects of radiation exposure and endogenous hormone levels. Data are also being analyzed collaboratively in pooled studies of breast cancer and serum hormone biomarker levels at Oxford University and of premenopausal breast cancer and selected lifestyle factors at the Institute of Cancer Research, UK.

- *In utero cohort study:* Those exposed in utero comprise a small but important cohort for the effects of radiation exposure. These data are unique, as there is no other extant study of radiation risk in mid-to-late life after *in utero* exposure. An analysis of cancer as well as non-cancer mortality risks for 1950–2008 has recently been completed.
- *Hepatocellular Carcinoma:* Studies investigating the pathogenesis of radiation-associated HCC are also underway. Studies to date are identifying measured markers that form clusters of chronic inflammation, insulin resistance, and liver fibrosis, and by examining possible radiation-HCC mediation by HBV in collaboration with the Statistics Department.

2) Radiation and Risks of Circulatory Disease

While studies of cancer risks has been the main focus of studies at RERF it has been more recently recognized that significant risks for non-cancer effects may also exist. Risks of cardiovascular disease have been of particular interest and a few of the ongoing studies are described below:

- *Dose Response:* Partly because of our recent publication (Shimizu et al, 2010) on radiation dose and heart diseases through 2003, great interest is being shown in the radiation risk of cardiovascular diseases. A paper on detailed analysis of mortality risk and dose response of heart disease subtypes in separate observation periods from 1950 to 2008 was submitted to the internal review in collaboration with the Cardiovascular Disease Research Cluster and Department of Clinical Studies. A linear dose response was significant for valvular heart disease, hypertensive heart disease, and heart failure, but no models were significant for ischemic heart disease.
- *Pathogenesis of heart disease:* Although the LSS study and other studies in the literature have recently identified radiation risks for circulatory diseases at low-to-moderate doses, the etiological and pathogenic pathways are not well characterized. We have recently started data analysis examining physiological indices of arteriosclerosis and potential related biomarkers in the AHS. The LSS and certain other studies have suggested that heart failure and valvular disease, in addition to ischemic disease, are associated with radiation exposure. We are continuing our studies to obtain early indicators of these types of disease, using echocardiography and relevant biomarkers to confirm and elucidate these disease risks in the AHS. To help further understand the pathogenesis of radiation associated heart disease we have conducted studies on the significance of premature ventricular contractions by electrocardiography (*Ann Noninvasive Electrocardiol*, 2015 [Epub ahead of print]). New studies on radiation dose and atrial fibrillation (Af), which induces irregular heart rhythm have recently begun.
- *Diabetes and dyslipidemia:* Diabetes and dyslipidemia are major risk factors for cardiovascular disease (CVD) and Chronic Kidney Disease (CKD), but the effects of radiation on those conditions are unclear. In this regard recent large-scale cohort studies of

childhood cancer survivors revealed late effects on diabetes and dyslipidemia. Because of this we have initiated studies to examine the dose response for the development of diabetes in Hiroshima and Nagasaki and to evaluate whether the radiation dose response for diabetes is modified by city and age at the timing of A-bomb.

- *Co-morbidity and non-cancer diseases:* Influences of co-morbidity from cancer and various non-cancer diseases on risks of mortality after radiation exposure are being examined in collaboration with Kurume University. Radiation risk of mortality of circulatory disease increased with co-morbidity of cancer, but did not increase with other major disease classes.

3) Other Non-Cancer Risks

In addition to cardiovascular disease the risks of other non-cancer diseases are also being studied:

- *Ophthalmologic studies among AHS subjects:* 1) Cataracts: The risks for the development of cataracts following radiation exposure are well known, however risks at low doses need to be examined in more detail. As a result we have initiated a new study on the dose response for cataractogenesis. To date we have conducted a training session by cataract specialists on how to observe and record findings and how to take retro-illumination (RIL) images with a RIL type camera for ophthalmologists and staff of the Clinical Studies Department in Hiroshima and Nagasaki. We started ophthalmologic examinations preliminarily in Nagasaki in November 2015. 2) Macular degeneration: This year we published a paper demonstrating no association of radiation exposure with the prevalence of age-related macular degeneration (AMD) among AHS subjects (*Invest Ophth Vis Sci,* 2015; 56: 5401-6).
- *Thyroid function:* Analyses of radiation effects on thyroid dysfunction and autoimmune diseases in the AHS subjects exposed at younger ages has recently been completed and a publication is expected in 2016.
- *Cognitive function:* It is well known that in utero exposure can lead to effects on cognitive function in childhood. However, effects of radiation on late life cognitive function as a function of age following exposure during childhood or as adults has not been adequately studied. A program examining late life cognitive function has been underway at RERF over the last several years. In 2015 RERF scientists published two papers on the effects of demographic factors and radiation on the age trend of cognitive function between 1992 and 2011 among subjects exposed at ≥ 13 years of age (*J Neurol Sci*, 2015; 351: 115-9; *Am J Med*, 2015 [Epub ahead of print]).

4) Activities to Enhance Ongoing and Future Analysis:

Establishing a strong infrastructure is essential to conduct high quality studies. Some of the most significant activities are described below:

- *Mortality surveillance:* Mortality follow-up for all cohorts will continue and the data will be completed through 2012. Archiving early-time materials will be continued.
- *LSS mail survey:* The results of the new LSS mail survey will be summarized. A paper about whether medical radiation exposures are a confounding variable for LSS risk estimates will be published.

- *Hiroshima and Nagasaki tumor/tissue registries:* Case collection on population-based cancer registries will be completed through 2014 in both Hiroshima and Nagasaki. The dataset of cancer incidence through 2011 will be biennially updated in 2016 on the LSS, *in utero*, and F_1 cohorts. The data will regularly be reported to the Monitoring of Cancer Incidence in Japan (MCIJ) and cooperative studies with the National Cancer Center of Japan are also being conducted. Analyses of the prefectural data of Hiroshima and Nagasaki will be conducted. RERF needs to adapt to the new national cancer registry system.
- *Pathology studies:* The indexing of specimens of formalin-fixed paraffin-embedded tissues within a new database is continuing. The system to preserve surgically resected materials from the A-bomb survivors will be organized with community hospitals in Hiroshima and Nagasaki. These activities will be performed in cooperation with the RERF Biosample Center of RERF.
- *Biosample Center (Research Resource Center):* Procedures for storing biosamples and managing biosample information at ABCC/RERF have, until now, been largely dependent on individual research departments. To preserve these precious biosamples, which include human blood, urine, pathological specimens, and teeth, in good condition over the long term, and to promote further research utilizing such samples, it was crucial to centralize their management and create a database for sample information. In April 2013, the Biosample Center (hereinafter referred to as "the Center") was established to undertake this work. With the goal of clarifying radiation effects on disease and on biological and molecular changes among A-bomb survivors and their children, the Center is centralizing sample management, arranging appropriate storage for quality control, and ensuring effective use of this invaluable material, donated by A-bomb survivors, their children, and spouses. To achieve these objectives, biosamples and sample data previously stored in various departments are being moved to the Center, and samples collected in the future will also be handled and stored there with newly manualized preparation methods. In addition, sample information will be stored in an RERF database for centralized management to take full advantage of these biosamples, the ultimate goal. This database is to link to clinical and epidemiologic databases. This linked system will constitute the Research Resource Center. The 60 deep freezers and 29 liquid nitrogen tanks used for storage of biosamples are currently installed in Unit G of the Hiroshima Laboratory. Because they had been filled to capacity, securing space for the biosamples became a task of the highest priority. To solve the space issue, in August of 2015, we introduced a robotic deep-freezer biorepository system in Hiroshima to accommodate and effectively manage future samples, in addition to the 780,000 existing samples. The robotic biorepository system became operational on a trial basis in January 2016. Introduction of a robotic biorepository at Nagasaki Laboratory is also planned in the future.

(2) Activities for promotion of the health and welfare of study participants

The Adult Health Study (AHS) and the F_1 clinical study contribute to the promotion of the health and welfare of the A-bomb survivors and their children through regular health examinations and health consultation via telephone contacts or home visits. At the health examinations, physicians provide guidance for disease prevention to study participants, report examination results to their attending physicians, or refer them to medical institutions when more detailed examination or treatment is necessary. Continued support activities provided on occasions other than such medical examinations include health consultation by public

health nurses, assistance for the elderly or physically challenged in their hospital visits, advice on application procedures involving government allowances for A-bomb survivors, and provision of information regarding governmental consultation services related to welfare benefits. In addition, educational brochures for health promotion are distributed to study participants on a regular basis.

(3) Research on biological mechanisms related to health effects from radiation among A-bomb survivors

Crucial to the understanding of risks and facilitate our focus on the health of A-Bomb Survivors are focused mechanistic studies.

- *In utero studies:* In addition to the study of the in utero cohort an experimental program has been examining effects in a mouse model to help elucidate mechanisms involved in cancer risks. Currently there is no evidence for an increased risk for leukemia and lymphoma following *in utero* exposure while a clear increased risk has been observed in childhood, but some data suggest an increased risk for some solid cancers. It is hypothesized that time of exposure post-conception is a major factor. These data indicate different translocation frequencies in adult mouse thyroid cells when compared between early and late post conception irradiation. Radiation results in a clear increase in aberration frequencies following irradiation of adult thyroid cells. However, there are no chromosome aberrations in thyroid cell in newborns following exposure at early times post-conception while irradiation at later times post-conception results in an increase. In hematopoietic cells, there is an increase in aberration frequency following irradiation of mice older than 6 weeks of age. However, there is no such increase observed following *in utero* irradiation or in mice exposed prior to 6 weeks of age. These data have important implications with respect to cancer risks following in utero exposure and studies are underway to determine the mechanisms and their relation to risks in humans.
- *Genomic study of thyroid cancer:* Somatic mutations/genetic alterations that increase susceptibility to radiation-induced thyroid cancer and improve our understanding of radiation-induced carcinogenesis are of great interest because thyroid cancer has been the key disease risk for both Chernobyl and Fukushima. Therefore, a genomic study of papillary adenocarcinoma of the thyroid is being planned in collaboration with the US National Cancer Institute and RIKEN of Japan. As DNA/RNA extracted from old formalin-fixed paraffin-embedded tissue samples creates challenges for sequencing due to fragmentation, we are currently investigating the most efficient methods to extract DNA/RNA.
- *Animal Models of cardiovascular disease:* The symptoms related to stroke in irradiated spontaneously hypertensive stroke prone rat (SHRSP), even at 0.25 Gy, were significantly earlier than that of the control, and lifespan was significantly shortened with increasing dose. Pathological findings such as fibrosis and inflammation in cardiac muscles, increased systolic blood pressure level, and retardation of body weight increase were significantly associated with radiation doses. (Takahashi, RP 1-11).
- *Immune function in A-bomb survivors:* Age- and radiation-related changes in different subtypes of circulating hematopoietic stem and progenitor cells (HSPCs) were evaluated in 231 Hiroshima A-bomb survivors. Many years after radiation exposure and with advancing age, the number and function of HSPCs in living survivors as a whole appear to have recovered to normal levels.

- *Radiation effects on metabolism:* Changes in metabolism can have significant impact on the pathogenesis of a number of disease processes. Interaction effects were found between radiation dose and metabolic indicators (hemoglobin A1c and fatty liver disease) on B-cell and NK-cell percentages among A-bomb survivors, supporting the hypothesis that the long-term effects of radiation exposure on lymphocyte subsets may be modified by metabolic status.

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

(1) F_1 mortality study and F_1 clinical study

An important question for understanding of risks following the atomic bombings, and exposure to radiation in general, is whether there are transgenerational effects that could result in an increased cancer or non-cancer risk in the children of survivors (F_1). Studies of these F_1 offspring include clinical studies, epidemiological studies, and basic science.

- *Clinical exams:* In 2015 we have almost completed the second round examination of the longitudinal F_1 offspring clinical study (FOCS) cohort that begun in November 2010 on a four-year cycle, and established a participation rate of 78.5% (10,377 subjects).
- *Analysis:* Using data available from earlier clinical examines we have conducted preliminary tabulation of the prevalence and incidence of individual multifactorial disease outcomes among participants during the first three years of the four-year second round, in preparation for future analysis plan

(2) Activities for promotion of health and welfare of F_1 study participants

These activities are similar to the ones outlined for AHS study participants in Section 1.(2).

(3) Research on biological mechanisms related to the health of A-bomb survivors' children

- *Epidemiological F_1 cohort study:* Long-term studies of the F_1 cohort provide a framework for studying germline effects of radiation exposure and provide unique data as the only study with such data. In this regard a paper on cancer and non-cancer mortality risks during 1946–2009 was published (Grant, et al. *Lancet Oncol* 2015; 16:1326-23). This study found no significant increase in risks for cancer or non-cancer diseases in the F1 population. An additional paper describing the results from the F_1 Mail Survey was recently submitted to an international journal.
- *Molecular studies in an experimental system:* To fully understand potential risks associated with transgenerational effects requires state-of-the-art molecular techniques to define effects in the genome. The first foray into such studies involved studies in experimental systems. We have recently completed mouse Comparative Genomic Hybridization studies (CGH) to identify potential genomic alterations and determine the parental origin of the mutations. The results indicated that the mean response to transgenerational effects of radiation is far lower than expected.
- *Analysis of F1 individuals:* Previous studies over several decades have found no increase in transgenerational mutations. However, the techniques used in the past were not sensitive enough to rule out potential effects. Newer molecular techniques are now available to be able to definitively examine the whole genome and once and for all determine whether or not there are effects of radiation on the rate of mutations in F1 individuals. Initial studies

used the CGH approach to examine 667 DNA samples from offspring of A-bomb survivors and their parents using high-density microarrays with 1.4 million probes. We have identified 6 *de novo* deletion mutations and 6 duplication mutations and determined the parental origin of 6 deletions and 4 duplications by haplotyping of each mutated chromosome. Additional haplotypings are currently underway on remaining duplication mutations. Additional studies are focusing on specific mechanistic pathways involved.

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

Fundamental to all of the RERF studies is well defined dosimetry. This is an ongoing process as new information is obtained and new techniques become available.

(1) Investigation of conditions required for dose estimates including survivor location, shielding effects and organ dosimetry

- *Mapping of survivor locations:* Members of the RERF Statistics and Epidemiology Department have revised location estimates for individual survivors resulting from recent map work by the Master File Section, revised and improved input data on terrain shielding at those new locations, and the resulting changes in survivors' DS02 dose estimates.
- *Rain exposure:* A paper was co-authored by members of the RERF Statistics and Epidemiology Department on the analysis of acute radiation effects data in relation to reported exposure to rain after the atomic bombings. These studies reported no significant effect of rain exposure with respect to acute radiation effects.
- *Residual radiation:* An important question with respect to risks is the contribution of residual radiation. In this regard, we have continued intramural work and extramural collaboration in dosimetry, including evaluating potential dose contamination from residual radiation.
- *Statistical errors in dose estimation:* This is an active and ongoing program. This year we have continued active collaboration with several teams of external investigators on statistical methods for dealing with errors in dose estimation, which resulted in a new manuscript.
- *Biological dosimetry;* Biological dosimetry examining chromosome aberrations and changes in teeth can potentially provide important data to enhance our current dose estimates. In this regard we have recently completed fluorescent in situ hybridization (FISH) analysis in A-bomb survivors. A wide scatter of individual translocation frequencies against physical dose was observed as seen in the previous solid Giemsa staining study. In addition, a total of 298 molars donated by 228 Hiroshima AHS participants and 26 molars donated by 25 Nagasaki A-bomb survivors have been measured by ESR. These combined data offer the opportunity to provide additional information that will facilitate analysis of dose effects.
- *Neutron doses:* The effect of neutrons on dosimetry remains an issue. We are currently doing a new study of the effect on model fit of varying the neutron multiplier in weighted doses, for risk of solid cancer incidence and mortality, as a measure of the information contained in RERF data on the relative biological effectiveness of neutrons.
- *Organ dosimetry:* Current organ dosimetry is out of date and not adequate to provide reliable estimate of organ doses over a wide range of ages of survivors including those

exposed in utero. To begin to approach this issue we held two binational workshops on developing plans for improved calculation of organ doses by dosimetry system DS02.

(2) Research support systems and statistical methodology needed for risk analyses of atomic-bomb radiation

- The Statistics Department continued its primary role of providing high-quality statistical consulting and oversight on the research projects conducted at RERF. That involved design and statistical power considerations and culminate with the analysis and interpretation of the data.
- In seeking methods for improved risk estimation, we are developing and evaluating a semi-parametric method of risk regression that more appropriately estimates the slope and standard errors of excess relative risk at low doses. We published a paper on non-parametric smoothing methods for dose-response estimation at low doses in 2015.
- We are continuing to gain expertise in adapting and developing analysis methods for bioinformatics and high-dimensional data, such as DNA or RNA sequence data, transcriptomics, epigenetic data and integral immune-function scores.

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 12 seminars were held at RERF presented by international visitors to RERF, 3 workshops (see below) which included both Japanese and international participants were also held, the scientists at RERF participated in more than 15 international conferences, and published more than 80 scientific papers.

(1) Collaborative research projects

i) Epidemiologic study on emergency workers at TEPCO Fukushima #1 Nuclear Power Plant

MHLW publicly invited a research plan for epidemiologic study on emergency workers at TEPCO Fukushima #1 Nuclear Power Plant in August 2014 and a proposed plan from RERF was officially adopted in October 2014. In FY2014, as a pilot study, an interview and health check-up study was conducted on about 500 subjects who are currently living in Fukushima Prefecture. In the four years starting with FY2015, a full scale study was launched and conducted to establish a life-long cohort group targeting the entire emergency workers of about 19000, who have already spread out throughout the entire country. We need to establish over 60 focal study points to keep touch with members of the cohort for life-long span and a coordination office in RERF Hiroshima Laboratory.

ii) Research project on radiation-related immunity and aging under contract with the U.S. National Institute of Allergy and Infectious Diseases (NIAID)

To define the effects of ionizing radiation on immunological function and aging and elucidate underlying mechanisms, RERF initiated in September 2009 a five-year collaborative study with four Japanese and five U.S. institutions under a research contract with NIAID. This study aims to provide a wealth of fundamental biologic information on the impact of radiation on immunosenescence and other health effects. The contract was extended so that during FY2015 (which encompasses portions of the sixth and seventh years of the contract) analyses and papers can be produced.

iii) Other 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 Kurume University
b. Collaborations with the US National Cancer Institute
c. Collaborations with Outside Investigators:
   45 Japanese Institutions
   22 North American Institutions
   12 European Institutions
   6 Asian Institutions

(2) Workshops

a. RERF Workshop: Storage and Use of Biosamples
b. RERF Working Group on Revised Organ Dosimetry
c. Joint U.S.-Japan Organ Dose Working Group

5. Training Programs for Domestic and Overseas Specialists

1) A "Training course for biologists: Let us learn more about epidemiology" was held to deepen biologists' understanding of RERF's epidemiological studies and to promote exchanges among researchers working for radiation-related organizations (August 24-25, 2015; 46 participants).

2) RERF accepted overseas research trainees, either on its own behalf or 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), and the Japan International Cooperation Agency (JICA) (127 trainees). Trainees who underwent RERF's long-term training (about 1 month) attended lectures on research methods and on the results of past studies, and took part in experiments and analyses to deepen their understanding of the health effects of radiation.

3) RERF accepted visits by students from schools and universities in Japan for tours that included research lectures (25 students).

4) RERF reviewed future directions for its training activities, including a public invitation for applications from overseas researchers, as part of the International Exchange Research Program; and to support this initiative, RERF has started inviting trainees by posting the

guidelines for application on the RERF official website. In FY2015, RERF received four applications, all of which were accepted.

6. Public Information Programs

1) RERF Open Houses

In fiscal 2015, RERF held its 21st Open House on August 5–6 in Hiroshima and its 19th Open House on August 8–9 in Nagasaki. The events this year were held under the theme "Learning about RERF 70 years after the atomic bombings." With a continued high level of public interest in radiation due to the Fukushima Daiichi nuclear power plant accident, the Open House events in 2015 featured a special exhibit titled "Considering the health effects of low-dose radiation exposure based on atomic-bomb radiation studies," in addition to a feature exhibit titled "History of the Radiation Effects Research Foundation over the course of 70 years since the A-bombings." The feature exhibit also presented RERF's public relations activities, including its public lecture series, facility tours, acceptance of visitors and trainees from overseas and dispatch of lecturers. In addition, several science corners were set up: "Liquid nitrogen show," "Extracting DNA from vegetables," and so on, at which science experiments were conducted, with hands-on learning opportunities also provided. The Open House events enjoyed many young visitors, thanks to the "Children's hospital," where the participants were able to experience simulated work in the medical field, and the "Quiz stamp rally," which saw young visitors moving throughout the facilities to participate in the quiz.

The Open House lectures, which have become part of the regular program in Hiroshima, were delivered on August 5 by Dr. Kyoji Furukawa (Associate Senior Scientist, Statistics Department) titled "From radiation risk to likelihood of the Carp's winning a championship" and on August 6 by Dr. Kazunori Kodama (Chief Scientist), who gave a lecture titled "Considering what we do and don't know at this juncture 70 years later." In Nagasaki, on August 9, Dr. Kodama provided the same lecture "Considering what we do and don't know at this juncture 70 years later." The lectures were attended by large enthusiastic audiences, who asked many questions even after the lectures had ended.

The two-day Open House events attracted 1,046 and 678 visitors in Hiroshima and Nagasaki, respectively.

2) Public lectures

RERF held public lectures for citizens, including A-bomb survivors, again in FY2015 in Nagasaki and Hiroshima, for outreach and better communication of its research activities.

In Nagasaki, the Radiation Effects Research Foundation (RERF) held its sixth public lecture event at the Nagasaki Atomic Bomb Museum Hall, on Saturday, November 28, 2015. The lecture series is designed to enhance communication by conveying information to the general public, including atomic bomb survivors and their children, about results from RERF's long-standing research on A-bomb radiation health effects.

This most recent public lecture event was designed to introduce to Nagasaki citizens RERF's research results, involvement with Fukushima, future outlook, and how its scientific findings are utilized throughout the world, as well as details about a radiation study conducted by high school students. The event was attended by more than 100 people.

In his opening greetings, RERF Chairman Ohtsura Niwa remarked, “This year, the 70th since the atomic bombings, is a milestone for passing down our knowledge gained from the experience of the atomic bombings to future generations. For this, we need debate from multiple perspectives. On this occasion of our public lecture event, I look forward to receiving candid opinions from people with different backgrounds, especially young people.”

The event’s first speaker, Mr. Malcolm Crick, Secretary, United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), presented a lecture titled “The World and RERF.” He explained how RERF studies are crucially important to UNSCEAR and the international scientific community because data obtained from A-bomb survivors and their children serve as the “gold standard” for establishing radiation protection standards. He added that while the radiation exposures from the atomic bombings of Hiroshima and Nagasaki and the nuclear accident in Fukushima differ significantly in terms of physics, there are some similarities in terms of societal and psychological impacts as well as effects on the human body. He also emphasized the importance of not losing objectivity and maintaining a holistic perspective. Mr. Crick also expressed appreciation to the A-bomb survivors and their children for their support of the RERF studies.

The second talk, titled “RERF Research Results, Involvement with Fukushima, and Future Outlook,” was presented by Dr. Kazunori Kodama, RERF Chief Scientist. He outlined what has been learned from RERF studies on radiation health effects and what needs to be investigated further. He also introduced the activities in which RERF has engaged since the Fukushima nuclear plant accident, with special focus on a study involving about 20,000 Fukushima Daiichi nuclear plant emergency workers that RERF initiated approximately one year ago in collaboration with other organizations. Lastly, he explained the future outlook regarding remaining questions and issues.

The last presentation, titled “Project for Individual Dose Measurement of High School Students Inside and Outside of Fukushima,” was made by Miss Minori Saitoh and Miss Saki Anzai, students from Fukushima Prefectural High School, who were accompanied by their teacher, Mr. Takashi Hara. They presented their research project, which looked into when, where, and how much radiation individuals were exposed to on the basis of the collation of information on their daily activities along with a record of hourly radiation dose readings using a dosimeter called “D-Shuttle” and time and date information at the time of each reading. They also described the hardships Fukushima now faces and called for broad understanding of the actual situation in Fukushima based on scientific facts. This project was carried out in collaboration with high school students inside and outside of Fukushima as well as overseas. The results have been presented in not only Japan but also France and Italy. Mr. Hara added a supplementary explanation about the background of the dose measurement project, as well as a brief description of the actual situation in Fukushima prefecture today.

Following the lecture and presentations, there was a question-and-answer session with the audience chaired by Mr. Takanobu Teramoto, RERF Executive Director. As this year marked the 70th year since the atomic bombings and the 40th anniversary of the founding of RERF, remarks of gratitude to A-bomb survivors and their children for their participation in RERF’s studies were read aloud by an RERF staff member. In addition, a choir comprised of Nagasaki Junshin Girls High School students performed songs to

express heartfelt condolences to those who perished in the atomic bombings and their desire for the realization of a world free of nuclear weapons.

The event concluded with closing remarks by Vice Chairman Robert L. Ullrich, who expressed his gratitude to the audience in Japanese for their participation in the public lecture and the valuable opinions expressed therein.

In Hiroshima, RERF held its sixth public lecture event at the International Culture Hall on the first basement floor of the main building of the Hiroshima YMCA International Culture Center on Sunday, November 29, 2015. As this year marked the 70th since the atomic bombings and the 40th since the founding of RERF, this public lecture event, held under the theme "RERF: Its Place in the World and its Future," introduced RERF's research achievements, its involvement in Fukushima, and its future outlook. Despite the cold weather, the event was attended by 143 people.

Whereas a panel discussion was a feature of the previous public lecture, this year's event consisted of three presentations and a question-and-answer session. Before the presentations, guest greetings were provided by Mr. Sunao Tsuboi, Chairman, Hiroshima Prefectural Confederation of A-bomb Sufferers Organizations. His greetings were followed by an RERF staff member's reading of remarks of gratitude, in this year marking the 40th anniversary of RERF, to A-bomb survivors and their children for their participation in RERF studies.

The first presentation, titled "RERF Research Results, Involvement with Fukushima, and Future Outlook," was provided by Dr. Kazunori Kodama, RERF Chief Scientist. He outlined the health effects learned from long-standing research that has been carried out for about 70 years since its initiation in 1947 by the Atomic Bomb Casualty Commission (ABCC), RERF's predecessor organization, as well as questions and issues that need to be addressed in the future. He also introduced activities in which RERF has engaged since the Fukushima nuclear plant accident as well as a study involving about 20,000 Fukushima Daiichi nuclear plant emergency workers, which was initiated last year by RERF in collaboration with other organizations.

The second presentation was a study project regarding radiation following the Fukushima accident by Fukushima Prefectural High School's Super Science Club. The presentation, titled "Project for Individual Dose Measurement of High School Students Inside and Outside of Fukushima," was provided by Miss Saki Anzai and Miss Minori Saitoh, second year students at the high school. Their presentation was supplemented by their teacher, Mr. Takashi Hara, who explained the background to the dosimetry project, as well as a brief description of the actual situation in Fukushima prefecture today.

Between the presentations, students from Hiroshima Municipal Funairi High School performed songs to express their sincere condolences to those who died as a result of the atomic bombings. Their music seemed to touch the hearts of those in the audience, who listened in rapt silence.

The last presentation, titled "The World and RERF," was delivered by Mr. Malcolm Crick, Secretary, United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). UNSCEAR's risk estimates are used as a scientific basis for radiation risk assessment and protective measures by governments throughout the world. RERF's studies serve as the foundation for UNSCEAR's work. Mr. Crick explained how RERF's scientific achievements are used globally, as similarities in terms of societal and

psychological impacts as well as effects on the human body can be seen in the atomic bombings of Hiroshima and Nagasaki and the nuclear accident in Fukushima despite the fact that the radiation exposures differ significantly in terms of physics. He shared his impressions of the visit to Hiroshima and Nagasaki, his first, by remarking how meaningful it was for him to visit the hypocenters, for example, and listen to a testimony of the atomic bombing experience directly from an A-bomb survivor. He added that he would continue to observe the reality of the A-bombings with the objectivity of a scientist. Just as in Nagasaki, Mr. Crick expressed appreciation to the A-bomb survivors and their children for their support of RERF studies.

Following the presentations, there was a question-and-answer session with the audience chaired by Mr. Takanobu Teramoto, RERF Executive Director.

The event concluded with closing remarks by Vice Chairman Robert L. Ullrich, who expressed his gratitude to the audience in Japanese for their participation in the public lecture and the valuable opinions expressed therein.

Prior to the public lecture event, a gathering that featured an A-bomb survivor's testimony was held at a different venue in the same building. At the gathering, attended by the Fukushima High School students, their teacher Mr. Hara, and Mr. Crick, Mr. Tsuboi—who was exposed to the atomic bombing in Hiroshima at the age of 20 and has long engaged in peace activities while struggling with numerous health issues—talked about his extraordinary experiences.

3) Permanent exhibits

The Hiroshima Laboratory has established a permanent exhibit space showing the history of ABCC-RERF, the organization's international collaborative activities, and basic information on radiation. The RERF overview poster, which explains its research in a straightforward manner, was translated into six languages in addition to Japanese and English, with pamphlets made available in a total of eight languages at the permanent exhibit corner.

The Nagasaki Laboratory has established a permanent exhibition room, which exhibits general information about studies/research. The same pamphlets in eight languages are also made available there, as in the Hiroshima Laboratory.

4) Updating public relations materials

The RERF Update newsletter (2015 summer and winter editions) and the RERF Annual Report (FY2014) were published in Japanese and English.

5) Enhanced RERF website

- The RERF public website was updated, with a view to enhancing the provision of information on research results. It now promptly posts RERF news accompanied by related photos in the "What's New" section. It also posts the titles of recent scientific papers, with their abstracts in English (full text if possible) and Japanese, and summaries of approved research protocols (RPs).
- When papers were published in scientific journals, easy-to-follow short summary explanations were posted in the "What's New" section on the external website.

- The total number of RERF website hits between April 1, 2015 and March 31, 2016 was about 37.24 million (compared to about 34.46 million in the corresponding period of the previous year), with the daily average being about 100,000 (compared to about 94,000 in the previous year). The total number of website visitors for the same period was about 794,000 (compared to about 847,000 in the previous year), with the daily average about 2,179 (compared to about 2,320 in the previous year).
- An RERF Facebook page was established and RERF continues to convey information via the page. The Facebook page now has more than 500 followers.

6) 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 publication of topical papers. RERF also responded to inquiries and requests for interviews from many domestic and overseas media organizations.
- In Hiroshima, a forum for media representatives, which has become a regular event, was held on April 24 in Hiroshima, with Chairman Toshiteru Okubo speaking on the topic of "Epidemiological Studies Targeting Emergency Workers at the TEPCO Fukushima Daiichi Nuclear Power Plant" and Executive Director Takanobu Teramoto reporting on RERF's events and project plans for FY2015. A total of six media representatives attended the forum, actively engaging in the question-and-answer session. Another forum was also held in Nagasaki on April 22, with the same speakers, Chairman Okubo and Executive Director Teramoto, speaking on the same topics. The seven media representatives who attended the forum engaged in an active question-and-answer session.
- One RERF scientist gave a lecture in at a high school in Hiroshima this year to accommodate a request for the dispatch of lecturers to venues outside of RERF.
- In addition to the Open House events, visitors are welcome to tour RERF's facilities upon request. Last fiscal year, as of the end of March 2016, 1,354 individuals from Japan, including students on school excursions, and 192 individuals from overseas toured the RERF facilities.

（Attachment）

FY2015 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	2 people	(Hiroshima)	
UNSCEAR-related activity	6 people	Visitors related to HICARE	28 people
ICRP-related activity	2 people	Visitors related to JICA	7 people
IAEA-related activity	3 people	Visitors related to RERF (International Exchange Research Program)	4 people
IAEA-HICARE collaborative activities-related activity	1 person	Visitors related to MEXT	12 people
International Agency for Research on Cancer-related activity	4 people	Visitors related to JAEA	55 people
Semipalatinsk -related activity	2 people	Visitors related to NIRS	1 person
A-bomb survivors residing overseas-related activity	3 people	Others	5 people
Others	5 people	(Nagasaki)	
		Visitors related to NASHIM	15 people
Total: 28 people		**Total: 127 people (Hiroshima 112 people, Nagasaki 15 people)**	

In italics: Funding Organization

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

1. *World Health Organization (WHO)*-related activity (2 people)

RERF (MHLW International Exchange Research Program)

Kazunori Kodama, Chief Scientist and Hiroaki Katayama, Chief, ITD, visited WHO headquarters to discuss collaboration between RERF and WHO. (Geneva, Switzerland, February 18–19, 2016)

2. United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)-related collaborative activity (6 people)

1) *UNSCEAR*

Kyoji Furukawa, Associate Senior Scientist, attended a meeting on the project "Selected evaluations of health effects and inferred risk from radiation exposure." (Vienna, Austria, March 29–April 1, 2016)

2) *RERF*

(1) Kazunori Kodama, Chief Scientist, attended the 62nd UNSCEAR meeting. (Vienna, Austria, May 29–June 7, 2015)

(2) Kazunori Kodama, Chief Scientist, attended the meeting with UNSCEAR members and Japanese government on UNSCEAR Fukushima assessment. (Tokyo, Japan, October 30, 2015)

(3) Kazunori Kodama, Chief Scientist, attended the UNSCEAR domestic committee meeting. (Tokyo, Japan, December 8, 2015 and March 23, 2016)

3) *Nuclear Regulation Authority*

Kotaro Ozasa, Chief of Epidemiology, attended the UNSCEAR domestic committee meeting. (Tokyo, Japan, March 23, 2016)

4) *RERF (MHLW International Exchange Research Program)*

Kazunori Kodama, Chief Scientist, visited UNSCEAR headquarters to discuss collaboration between RERF and UNSCEAR. (Vienna, Austria, February 15–17, 2016)

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

(1) Roy E. Shore, Vice Chairman and Chief of Research, participated in ICRP Task Group 91 meetings. (Heidelberg, Germany, April 22, 2015, and Kyoto, Japan, May 22 and 25, 2015)

(2) Ohtsura Niwa, Chairman, participated as a member of the ICRP Main Commission in its October meeting. (Seoul, South Korea, October 16–22, 2015)

4. International Atomic Energy Agency (IAEA)-related activity (3 people)

1) *IAEA*

Ohtsura Niwa, Chairman, engaged in the preparation of IAEA's report on Fukushima as a member of the International Advisory Committee Working Group 4. The report was published in 2015.

2) *RERF (MHLW International Exchange Research Program)*

Kazunori Kodama, Chief Scientist, visited IAEA headquarters to discuss collaboration between RERF and IAEA. (Vienna, Austria, February 15–17, 2016)

3) *RERF*

Hiroaki Katayama, Chief, ITD, attended the International Conference on Global Emergency Preparedness and Response. (Vienna, Austria, October 18–22, 2015)

5. International Atomic Energy Agency (IAEA) and *Hiroshima International Council for the Radiation-exposed (HICARE)* collaborative activities-related activity (1 person)

Yoshiaki Kodama, Director, Biosample Center, attended the Third Research Coordination Meeting on Strengthening of Biological Dosimetry in IAEA Member States. (Vienna, Austria, March 5–11, 2016)

6. *International Agency for Research on Cancer*-related activity (4 people)

(1) Hiroaki Katayama, Chief, ITD, attended the SEMI-NUC EAB meeting. (Lyon, France, May 11–12, 2015)

(2) Hiroaki Katayama, Chief, ITD, attended the MELODI 2015 Workshop. (Munich, Germany, November 9–11, 2015)

(3) Ohtsura Niwa, Chairman, participated in a meeting of the Chernobyl Tissue Bank based in London, as a member of the steering committee. (London, UK, November 15–20, 2015)

(4) Hiroaki Katayama, Chief, ITD, attended the SEMI-NUC meeting. (Oslo, Norway, March 14–15, 2016)

7. Semipalatinsk (Kazakhstan) related activity (2 people)

JSPS/MEXT Grant-in-Aid for Scientific Research

(1) Hiroaki Katayama, Chief, ITD, had a meeting with Dr. Grosche at the Federal Office for Radiation Protection, Germany. (Munich, Germany, September 15, 2015)

(2) Hiroaki Katayama, Chief, ITD, had a meeting with Dr. Simon at the National Cancer Institute. (Washington, USA, January 18, 2016)

8. A-bomb survivors residing overseas-related activity (3 people)

1) *Hiroshima Prefectural Government*

Daisuke Haruta, Research Scientist, Clinical Studies, Nagasaki, participated in 20th A-bomb survivors' medical checkup in North America. (San Francisco and Seattle, USA, September 10–

22, 2015)

2) *Nagasaki Prefectural Government*

(1) Daisuke Haruta, Research Scientist, Clinical Studies, Nagasaki, participated in 23rd A-bomb survivors' medical checkup in South Korea. (Hapcheon, Korea, November 8–13, 2015)

(2) Ayumi Hida, Acting Department Chief, Department of Clinical Studies, Nagasaki, participated in the 24th A-bomb survivors' medical checkup in South Korea. (Busan, Korea, December 6–11, 2015)

9. Others (5 people)

(1) Hiroaki Katayama, Chief, ITD, attended the Conference of Archiving Memories of the Nuclear Age. (Houston, USA, November 18, 2015)

(2) Ohtsura Niwa, Chairman, visited Beijing, Nanjing, and Shanghai as a member of a Hiroshima citizens' group that traveled to China to promote friendship and peace between China and Japan. (China, November 22–27, 2015)

(3) Ohtsura Niwa, Chairman, participated in a workshop to assess the Network of Excellence of Low-Dose Research towards a Multidisciplinary Integration (DoReMi) project performed under the supervision of the Multidisciplinary European Low-Dose Initiative (MELODI), a leading organization in the field of radiation effects research in Europe; he served as an external member of the MELODI evaluation committee. (Budapest, Hungary, December 6–12, 2015)

(4) Ohtsura Niwa, Chairman, participated in a wrap-up workshop for dialogue seminars with residents of Fukushima conducted by the ICRP beginning in 2011. (Daté, Fukushima, Japan, December 12–13, 2015)

(5) Harry M. Cullings, Chief, Department of Statistics, gave a lecture on dosimetry for the atomic-bomb survivors at the EURADOS (European Radiation Dosimetry Group) Winter school. (Milano, Italy, February 11, 2016)

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

[Hiroshima: 112 people]

1. Visitors related to *Hiroshima International Council for Health Care of the Radiation Exposed (HICARE)* (28 people)

1) South Korea (18 people)

(1) June 10, 2015: 3 trainees from South Korea for the "A-bomb survivors residing in South Korea."
(2) September 17, 2015: 10 trainees from South Korea for the "A-bomb survivors residing in South Korea."
(3) October 22, 2015: 5 trainees from South Korea for the "A-bomb survivors residing in South Korea."

2) United States (5 people)

(1) July 16, 2015: 3 trainees from United States
(2) November 12, 2015: 2 trainees from United States.

3) Others (5 people)

(1) November 2–30, 2015: 1 trainee from Latvia
(2) February 18, 2016: 3 trainees from Brazil
(3) February 18, 2016: 1 trainee from Iran

2. Visitors related to *International Cooperation Agency (JICA)* (7 people)

Japan Anti-Tuberculosis Association (7 people)

November 19, 2015: 6 trainees from Kenya, DR Congo, Afghanistan, Bangladesh, Cambodia, and Philippines for the "Group Training Course in Tuberculosis Laboratory Management for Achievement of MDGs Targets, FY 2015"

3. *RERF (MHLW International Exchange Research Program)* (4 people)

(1) November 13–December 11, 2015: 1 trainee, Waste Diversion Ontario, Canada
(2) November 24– December 4, 2015: 1 trainee, National Cancer Center, South Korea
(3) November 24–December 11, 2015: 1 trainee, National Cancer Center, South Korea
(4) January 12–22, 2016: 1 trainee, Radiation Medicine and Ecology, Kazakhstan

4. *Ministry of Education, Culture, Sports, Science and Technology, MEXT* (12 people)

Nagoya University Graduate School of Medicine (12 people)

January 26, 2016: 12 trainees from Mongolia, Malaysia, Myanmar, Afghanistan, Laos, Kazakhstan, Bangladesh, Uzbekistan, and Kyrgyz for Nagoya University Graduate School of Medicine, Young Leaders' Program FY2015–2016

5. *Japan Atomic Energy Agency (JAEA)* (55 people)

(1) October 23, 2014, 26 trainees from Bangladesh, Cambodia, Laos, Lithuania, Malaysia, Mongolia, Myanmar, Philippines, Thailand, Republic of Turkey, Ukraine, Viet Nam, and United States for "JAEA's Training Couse on the Physical Protection of Nuclear Material and Facilities"

(2) December 4, 2015: 29 trainees from Australia, Azerbaijan, Bangladesh, Bosnia-Herzegovina, Cambodia, Indonesia, Iran, Laos, Lithuania, Malaysia, Mongolia, Myanmar, Pakistan, Philippines, Saudi Arabia, Serbia, Thailand, Republic of Turkey, UAE, Viet Nam, Italy, and Austria for "JAEA's Training Course on State Systems of Accounting for and Control of Nuclear Material"

6. *National Institute of Radiological Sciences* (1 person)

August 28, 2015: 1 trainee (medical doctor) from Malaysia Ministry of Health

7. Other (5 people)

April 15, 2015: 5 trainees from breast cancer specialists from Cambodia

[Nagasaki: 15 people]

Visitors related to *the Nagasaki Association for Hibakushas' Medical Care (NASHIM)* (15 people)

(1) July 23, 2015: 6 trainees from Russia, Ukraine, Belarus, and Kazakhstan for the "FY2015 NASHIM Training Course"

(2) October 5, 2015: 9 trainees from South Korea for the "FY2015 NASHIM Training Course"

III. Joint programs between RERF and overseas researchers/research organizations

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

(1) Eric Grant, Assistant Chief of Epidemiology, Hiroshima, participated in a collaborative research project on cancer incidence in the Life Span Study at NCI. (Rockville, Maryland, U.S., November 30–December 9, 2015)

(2) Dr. Dale Preston, Principal Scientist from Hirosoft International Corporation, visited Hiroshima RERF to conduct collaborative studies including a solid cancer incidence study of A-bomb survivors. (May 28–June 6, 2015, October 16–31, 2015)

(3) Dr. Kiyohiko Mabuchi of Radiation Epidemiology Branch, NCI, visited Hiroshima RERF to conduct NCI-funded collaborative studies including a site-specific cancer study. (May 28–June 5, 2015)

(4) Dr. Stephen Chanock, Director of Division of Cancer Epidemiology and Genetics, and Amy Berrington de González, Chief of Radiation Epidemiology Branch, NCI, visited Hiroshima RERF to attend the meeting for NCI-funded thyroid cancer genome research. (May 28, 2015)

(5) RERF representatives met with Dr. Stephen Chanock, Director, NCI Division of Cancer Epidemiology & Genetics, to discuss DNA analyses for second-generation A-bomb survivors (Hiroshima, Japan, October 28, 2015).

(6) Eric J. Grant, Assistant Chief of Epidemiology, Hiroshima, share biliary cancer incidence data and body mass index, smoking, and diabetes mellitus data from RERF as part of a pooled analysis conducted by Dr. Jill Koshiol of Infections and Immunoepidemiology Branch, NCI.

(7) Ritsu Sakata, Senior Scientist of Epidemiology, Hiroshima, share the data of tumor of the central nervous system from RERF as a part of a pooled analysis conducted by Dr. Alina Brenner of Radiation Epidemiology Branch, NCI.

(8) Harry M. Cullings, Chief, Department of Statistics, collaborated with the RERF Department of Epidemiology and the U.S. NCI in preparation of data and methods for a series of upcoming papers on improved analyses of solid cancer incidence and mortality.

2. Collaborative studies with research grants from *U.S. National Institute of Allergy and Infectious Diseases (NIAID)*

1) In 2009 RERF initiated a research program funded by the U.S. National Institute of Aging and Infections Disease with the aim of examining possible effects of radiation on the immune system in survivors of the atomic bombings. This study entitled “Immunosenescence and Other Late Effects of Acute Ionizing Radiation Exposure in Atomic Bomb Survivors”, which was funded by a contract to RERF, was a collaborative study with eight other institutions including: Memorial Sloan-Kettering Cancer Center; University of Georgia; University of Arizona; Duke University; University of Tokushima; Chiba University; National Institute of Health Sciences (Japan); and The National Institute on Aging (USA).

These studies were funded as a contract with RERF with five-year funding for four projects on 1) hematopoietic stem cells, 2) dendritic cells, 3) influenza vaccination response, and 4) scoring system for immune competence; and an additional project referred to as 5) thymus architecture and function was initiated in 2014. In 2014, measurements using A-bomb survivors’ blood samples have been completed and a one-year extension of funding through September 2015 was approved to conduct data analyses and manuscript preparation. Further, non-cost extension of the project for one year has been contracted in September 2015 for completion of manuscripts.

FY 2015 activities are as follows:

(1) RERF scientists, NIAID-project collaborators and the NIAID program manager had a plenary meeting at NIH in September 2015 to discuss publication achievements and prospects of NIAID-contract renewal. However, renewal of the contract with funding was unsuccessful.

(2) Ad hoc interactive teleconferences on statistical analyses and data transfer in particular NIAID projects have been held several times between RERF scientists and U.S. collaborators.

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

1. Kyoizumi S, Kubo Y, Misumi M, Kajimura J, Yoshida K, Hayashi T, Imai K, Ohishi

W, Nakachi K, Young LF, Shieh JH, Moore MA, van den Brink MRM, Kusunoki Y. Circulating hematopoietic stem and progenitor cells in aging atomic bomb survivors. *Radiat Res* 2016; 185: 69–76.

2. Kajimura J, Ito R, Manley NR, Hale LP. Optimization of single and dual color immunofluorescence protocols for formalin-fixed, paraffin-embedded archival tissue. *J Histochem & Cytochem* 2016; 64: 112–124.
3. Seed TM, Xiao S, Manley NR, Nikolich-Zugich J, Pugh J, van den Brink MRM, Hirabayashi Y, Yasutomo K, Iwama A, Koyasu S, Shterev I, Sempowski G, Macchiarini F, Nakachi K, Kunugi KC, Hammer CG, Dewerd LA. An interlaboratory comparison of dosimetry for a multi-institutional radiobiological research project: Observations, problems, solutions, and lessons learned. *Int J Radiat Biol* 2016; 92: 59–70.
4. Wang C, Oshima M, Sashida G, Tomioka T, Hasegawa N, Mochizuki-Kashio M, Nakajima-Takagi Y, Kusunoki Y, Kyoizumi S, Imai K, Nakachi K, Iwama A. Non-lethal ionizing radiation promotes aging-like phenotypic changes of human hematopoietic stem and progenitor cells in humanized mice. *PLoS One* 2015; 10: e0132041.
5. Hirabayashi Y, Tsuboi I, Kuramoto K, Kusunoki Y, Inoue T. Cell-cycle of primitive hematopoietic progenitors decelerated in senescent mice is reactively accelerated after 2-Gy whole-body irradiation. *Exp Biol Med* 2016; 241:485–92.

2) Munechika Misumi, Research Scientist, Department of Statistics, provided statistical analysis and supports for the manuscript on the effects of radiation and aging of hematopoietic stem cells in atomic bomb survivors by RERF Department of Molecular Biosciences under the NIAID program.

3. Research exchange between RERF and ICRP

Mr. Jacques Lochard, Vice-chair of the ICRP Main Commission, and Mr. Christopher Clement, ICRP Scientific Secretary, visited Hiroshima RERF to exchange opinions with RERF representatives to promote research exchange between the ICRP and RERF. (December 15–17, 2015)

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

Atsuko Sadakane, Associate Senior Scientist of Epidemiology, Hiroshima, attended the ACC Meeting 2015. (Tokyo, Japan, November 9–10, 2015)

The following paper has been published.

Fowke JH et al. (RERF: Ozasa K, Ohishi W, Grant EJ). Association of body mass index, smoking, and alcohol consumption with prostate cancer mortality in the Asia Cohort Consortium. *Am J Epidemiol* 2015; 182(5):381–9.

5. Collaboration between *RERF and Maastricht University*

Eric J. Grant, Assistant Department Chief of Epidemiology, Hiroshima, share bladder cancer incidence data and dietary intake data from RERF as part of a pooled analysis conducted by Dr. Maurice Zeegers of Maastricht University, Netherlands. (formerly of the University of Birmingham, UK)

6. Collaboration between *RERF and London School of Hygiene & Tropical Medicine*

Hiromi Sugiyama, Associate Senior Scientist, and Mai Utada, Research Scientist of Epidemiology, Hiroshima, are joining the working group of CONCORD-2, world-wide

research of cancer survival rate (279 registries, 67 countries), conducted by Dr. Michel Coleman of London School of Hygiene & Tropical Medicine.

7. Collaboration between *RERF and Institute of Cancer Research, U.K. and U.S. National Institute of Environmental*

   Atsuko Sadakane, Associate Senior Scientist of Epidemiology, Hiroshima, share premenopausal breast cancer data from RERF as part of a pooled analysis conducted by Dr. Anthony Swerdlow of Insitute of Cancer Research, UK, and Dr. Hazel Nichols of US National Institute of Environmental.

8. Semipalatinsk (Kazakhstan) related activity
   JSPS/MEXT Grant-in-Aid for Scientific Research

   Dr. Grosche, Head Division, Federal Office for Radiation Protection, Germany, visited Hiroshima RERF to discuss with Dr. Katayama about the data analysis of research project and had a lecture at Hiroshima RERF. (February 8–10, 2016)

9. *RERF* international collaborative studies on statistical analysis

   (1) A researcher from Oregon Health and Science University, U.S., visited Hiroshima RERF to conduct a collaborative study, “Issues related to correction of RERF dose-response analysis for the effect of errors in dose,” with Department of Statistics. (October 22–November 21, 2015)

   (2) A researcher from University of Southern California, U.S., visited Hiroshima RERF to discuss a proposed joint analysis of chromosomal aberrations, radiation dose, and cancer. (October 24–November 1, 2015)

   (3) Harry M. Cullings, Chief, Department of Statistics, collaborated with a researcher from the Fred Hutchinson Cancer Research Center, Seattle, Washington, U.S., on preparation of a manuscript on semiparametric methods for using biodosimeter results in evaluating dosimetric uncertainty in RERF studies, which has been submitted to a journal.

   (4) Kyoji Furukawa, Associate Senior Scientist, initiated a collaborated project with researchers at Institute of Radiation Protection, Helmholtz Zentrum in Germany, on mechanistic modelling of radiation-induced cancer.

10. Thyroid Studies Collaboration

    Misa Imaizumi, Associate Senior Scientist, Department of Clinical Studies, Nagasaki, is currently working on a multinational collaborative project called the Thyroid Studies Collaboration, which is investigating 17 cohorts in Europe, America, Australia, and Asia, under the leadership of Professor Nicolas Rodondi, University of Bern in Switzerland.

平成27年度 外部資金研究一覧表
FY2015 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)	4	¥2,270,000
文部科学省 Ministry of Education, Culture, Spots, Science and Technology (MEXT)	1	¥300,000
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)]	13	¥59,930,000
公益財団法人 原子力安全研究協会（環境省委託事業の受託機関） Nuclear Safety Research Association (NSRA) [Contract project organization commissioned by the Ministry of the Environment (MOE)]	1	¥4,701,687
公益財団法人 喫煙科学研究財団 Smoking Research Foundation	1	¥2,000,000
国立遺伝学研究所 National Institute of Genetics	1	¥194,000
国立研究開発法人国立がん研究センター National Cancer Center	1	¥0 *
米国国立がん研究所（NCI）契約 U.S. National Cancer Institute (NCI) Contract	1	¥20,290,000
米国国立アレルギー感染症研究所 U.S. National Institute of Allergy and Infectious Diseases	1	¥101,007,000
総合計　Grand total	24	¥190,692,687

注）
・間接費を含む。
・研究分担者の配分額を含む。
＊連携研究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 may include subsidies allocated to collaborators.
＊No research fund is allocated because the RERF researcher takes part in the research as an associate investigator.

平成27年度 外部資金研究一覧表
FY2015 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	原爆被爆者におけるがんの疫学的研究支援 Support for Epidemiological studies of cancer among 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　HHSN261201400009C 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 HHSN261201400009C Kotaro Ozasa	**主任研究者** (Program Director) 小笹 晃太郎 Kotaro Ozasa **研究管理者** (Project Managers) Eric J. Grant Harry M. Cullings （統計部） (Dept. Statistics)	直接経費 (Direct cost) ¥13,870,000 間接経費 (Indirect cost) ¥6,420,000	April 1, 2014	July 31, 2019	RP 1-75 RP 18-61 RP 3-94 RP 6-02 RP 1-06 RP 4-07 RP 5-08 RP 6-10	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
2	ワクチンの有効性・安全性評価とVPD（vaccine preventable diseases）対策への適用に関する分析疫学研究 Analytical epidemiologic study of evaluation of effectiveness and safety, and application for countermeasure against vaccine preventable diseases (VPD)	厚生労働省・厚生労働行政推進調査事業費補助金 「新興・再興感染症及び予防接種政策推進研究事業」 研究代表者　廣田　良夫 医療法人相生会 臨床疫学研究センター長 Health and Labour Sciences Research Grants (MHLW) Research on Emerging and Re-emerging Infectious Diseases and Promotion of Vaccination Policy Yoshio Hirota Director, Clinical Epidemiology Research Center, Medical Co. LTA	**研究分担者** (Collaborator) 小笹　晃太郎 Kotaro Ozasa	¥200,000	April 1, 2015	March 31, 2016	No RP	慢性疾患、免疫疾患等宿主におけるインフルエンザおよびその他の予防接種の免疫原性および有効性の評価 Evaluation of effectiveness of vaccination of influenza and other respiratory diseases on immuno-compromised host
3	全国がん登録、院内がん登録および既存がん統計情報の活用によるがん及びがん診療動向把握に関する包括的研究 Study to grasp trends of cancer and medical care for cancer by using materials on national cancer registry, hospital based cancer registry and existing cancer statistics	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　西本　寛 国立研究開発法人国立がん研究センター がん登録センターセンター長 Health and Labour Sciences Research Grants (MHLW) Comprehensive research project for cancer control Hiroshi Nishimoto Chief, Division of Surveillance, Center for Cancer Control and Information Services, National Cancer Center	**研究分担者** (Collaborator) 歌田　真依 Mai Utada	¥300,000	April 1, 2015	March 31, 2016	RP 18-61	被爆者のがん罹患調査 Study of cancer incidence among A-bomb survivors
4	科学的根拠に基づく発がん性・がん予防効果の評価とがん予防ガイドライン提言に関する研究 Study for proposal of cancer prevention guidelines and evaluation of carcinogenetic and cancer preventing effects based on scientific evidences	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　笹月　静 国立研究開発法人国立がん研究センター がん予防・検診研究センター 予防研究部長 National Cancer Center Funds for cancer research and related technology development Shizuka Sasazuki Chief, Division of Prevention, Research Center for Cancer Prevention and Screening, National Cancer Center	**連携研究者** (Associate Investigator) 定金　敦子 Atsuko Sadakane	連携研究者のため、研究資金の配分なし Since this person is an associate investigator, research funds were not allocated to her.	April 1, 2015	March 31, 2016	RP-A2-15	日本人のがんの疫学研究 Epidemiological study of cancer in Japanese population

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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							
5 博士課程教育リーディングプログラム「放射線災害復興を推進するフェニックスリーダー育成プログラム」 Leading Programs in Doctoral Education "Phoenix leader education program (Hiroshima Initiative) for renaissance from radiation disaster"	文部科学省「博士課程教育リーディングプログラム」 国立大学法人広島大学 学長　越智 光夫 Ministry of Education、Culture、Sports、Science and Technology Graduate School Leader Education Program Mitsuo Ochi President, Hiroshima University	**研究者** (Investigator) 小笹　晃太郎 Kotaro Ozasa	¥300,000	February 1, 2012	March 31, 2018		広島大学との放射線影響教育活動の一環（特に福島原発事故対策として放射線被曝による健康影響の評価と健康管理） Activity of education on radiation effects with Hiroshima University, especially the evaluation of radiation effects on health and health administration due to the Fukushima nuclear power plant accident.

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臨床研究部 Department of Clinical Studies							
1 循環器疾患における集団間の健康格差の実態把握とその対策を目的とした大規模コホート共同研究 Understanding of health status disparity of circulatory diseases among cohorts and a large-scale collaborative cohort study to address the disparity	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, 2015	March 31, 2016	RP 2-75	広範囲な医学的調査 （生活習慣病） Broad-based medical research (Lifestyle disease)

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分子生物科学部 Department of Molecular Biosciences							
1 原爆被爆者における免疫老化とその他の放射線被ばく後影響の調査 Studies of immunosenescence and other late effects of acute ionizing radiation exposure in atomic bomb survivors	米国国立アレルギー感染症研究所 主任研究者　中地　敬 放射線影響研究所顧問および プロジェクト代表研究者 U.S. National Institute of Allergy and Infectious Diseases Kei Nakachi, RERF Consultant and Project Principal Scientist 共同主任研究者　楠　洋一郎 Yoichiro Kusunoki (Co-P.I.) 共同主任研究者　林　奉権 Tomonori Hayashi (Co-P.I.)	**主任研究者 (P.I.)** 中地　敬 Kei Nakachi **共同主任研究者（Co-P.I.)** 楠　洋一郎 Yoichiro Kusunoki 林　奉権 Tomonori Hayashi **研究分担者 (Collaborators)** ロバート L. ウーリック （副理事長兼業務執行理事） 京泉　誠之、 伊藤　玲子、梶村　順子 吉田　健吾 大石　和佳 （臨床研究部） 小笹　晃太郎（疫学部） 古川　恭治、三角　宗近 （統計部） Robert L. Ullrich (Vice Chairman & Executive Director) Seishi Kyoizumi Reiko Ito Junko Kajimura Kengo Yoshida Waka Ohishi (Dept. Clinical Studies) Kotaro Ozasa (Dept. Epidemiology) Kyoji Furukawa Munechika Misumi (Dept. Statistics)	直接経費 (Direct cost) ¥90,361,000 間接経費 (Indirect cost) ¥10,646,000	October 1, 2009	September 29, 2015	RP 3-09 RP 4-09 RP 5-09 RP 2-15	放射線影響研究所 免疫学研究 分子疫学研究 RERF Immunology and Molecular Epidemiology Study

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分子生物科学部 Department of Molecular Biosciences							
2 原爆被爆者集団における放射線関連がん発生の分子疫学研究 Molecular epidemiology study of inflammation-associated disease development on the basis of long-term follow-up of atomic-bomb survivors	日本学術振興会・科学研究費助成事業 「基盤研究(B)」 研究代表者　林　奉権 JSPS Grant-in-Aid for Scientific Research Scientific Research (B) Tomonori Hayashi	**研究代表者 (P.I.)** 林　奉権 Tomonori Hayashi **連携研究者** (Associate Investigators) 中地　敬 Kei Nakachi 吉田　健吾 Kengo Yoshida John B. Cologne （統計部　Dept. Statistics)	直接経費 (Direct cost) ¥4,300,000 間接経費 (Indirect cost) ¥1,290,000 東京大学と長崎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 the University of Tokyo and Nagasaki University.	April 1, 2015	March 31, 2016	RP 4-02 RP 4-04	放射線影響研究所 免疫学研究 免疫ゲノム研究 RERF Immunology and Immunogenome Study
3 喫煙の免疫および炎症関連生体指標と生活習慣病発生に及ぼす影響の分子疫学研究 Molecular epidemiology study of cigarette smoking effects on immunity- and inflammation-related biomarkers and lifestyle-related disease development	公益財団法人 喫煙科学研究財団 研究代表者　林　奉権 Smoking Research Foundation Tomonori Hayashi	**研究代表者 (P.I.)** 林　奉権 Tomonori Hayashi	¥2,000,000	April 1, 2015	March 31, 2016	RP 5-04	放射線影響研究所 免疫学研究 分子疫学研究 RERF Immunology and Molecular Epidemiology Study
4 低線量放射線は心血管疾患発症の原因と成りうるか？－動物実験による検証－ Can lower-dose radiation cause the cardiovascular disease? -Assessment using animal models-	公益財団法人 日本原子力安全研究協会 環境省「平成27年度原子力災害影響調査等事業（放射線の健康影響に係る研究調査事業）」 研究代表者　丹羽　保晴 Nuclear Safety Research Association MOE Research Project for Nuclear-Power Disaster Influence in FY2015 （Research to Affect the Health Effect of the Radiation) Yasuharu Niwa	**主任研究者 (P.I.)** 丹羽　保晴 Yasuharu Niwa **研究協力者** (Cooperative Investigators) 高橋　規郎（顧問） 大石　和佳（臨床研究部） 三角　宗近（統計部） Norio Takahashi (Consultant) Waka Ohishi (Dept. Clinical Studies) Munechika Misumi (Dept. Statistics) **研究参加者** (Research Participant) 村上　秀子 Hideko Murakami	¥4,701,687	April 1, 2015	March 10, 2016	RP 1-11 RP 2-12	放射線影響研究所 循環器疾患研究 RERF Circulatory Disease Study

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分子生物科学部 Department of Molecular Biosciences							
5 放射線甲状腺発がんにおけるEML4-ALK融合遺伝子の生物学的役割に関する研究 Biological significance of EML4-ALK fusion gene in radiation thyroid carcinogenesis	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　濱谷　清裕 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Kiyohiro Hamatani	**研究代表者** (P.I.) 濱谷　清裕 Kiyohiro Hamatani **研究分担者** (Collaborator) 伊藤　玲子 Reiko Ito	直接経費 (Direct cost) ¥1,200,000 間接経費 (Indirect cost) ¥360,000	April 1, 2015	March 31, 2016	RP 1-14	放射線影響研究所 分子腫瘍学研究 RERF Molecular Oncology Study
6 韓国と日本の婦人科がん発生および放射線治療成果との関連の分子疫学研究 Molecular epidemiological study on gynecologic cancer and its correlation with radiotherapy outcome in Korean and Japanese populations	日本学術振興会　二国間交流事業 韓国との共同研究（NRF） 研究代表者　林　奉権 JSPS Bilateral Programs Japan-Korea Joint Research Project (NRF) Tomonori Hayashi	**研究代表者** (P.I.) 林　奉権 Tomonori Hayashi **連携研究者** (Associate Investigators) 大石　和佳（臨床研究部） Waka Ohishi （Dept. Clinical Studies) 中地　敬 Kei Nakachi **研究協力者** (Cooperative Investigators) Kim Young Min （統計部） (Dept. Statistics)	¥180,000	April 1, 2015	June 30, 2015	RP 4-04 RP-S4-11	放射線影響研究所 分子疫学研究 免疫学研究 RERF Molecular Epidemiology and Immunology Study
7 韓国と日本の子宮頸がんと乳がんの異なる治療応答に関連する分子疫学的要因 Molecular epidemiological factors associated with different treatment response of uterine cervical and breast cancers in Korean and Japanese populations	日本学術振興会　二国間交流事業 韓国との共同研究（NRF） 研究代表者　林　奉権 JSPS Bilateral Programs Japan-Korea Joint Research Project (NRF) Tomonori Hayashi	**研究代表者** (P.I.) 林　奉権 Tomonori Hayashi **連携研究者** (Associate Investigator) 中地　敬 Kei Nakachi **研究協力者** (Cooperative investigator) Kim Young Min （統計部） (Dept. Statistics)	¥1,080,000	July 1, 2015	March 31, 2016	RP 4-04 RP-S4-11	放射線影響研究所 分子疫学研究 免疫学研究 RERF Molecular Epidemiology and Immunology Study

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分子生物科学部 Department of Molecular Biosciences								
8	ヒト免疫老化表現型を特徴付けるトランスクリプトームおよび分子経路解析 Transcriptome and molecular pathway analysis to characterize phenotypes of human immunological aging	国立遺伝学研究所 2015年度大学共同利用機関法人情報・システム研究機構　共同研究（A1） 研究代表者　吉田　健吾 National Institute of Genetics (Japan) 2015 Collaborative Research and Research Meeting Research Organization of Information and Systems Collaborative Research (A1) Kengo Yoshida	**研究代表者 (P.I.)** 吉田　健吾 Kengo Yoshida **研究分担者 (Collaborators)** 楠　洋一郎 Yoichiro Kusunoki 三角　宗近（統計部） Munechika Misumi (Dept. Statistics)	¥194,000	April 1, 2015	March 31, 2016	RP P1-13	放射線影響研究所 免疫学研究 RERF Immunology Study
9	肺がんに関係する融合遺伝子の形成に対する放射線影響の解析 Analysis of radiation effects on the formation of fusion genes involved in lung cancer	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　多賀　正尊 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Masataka Taga	**研究代表者 (P.I.)** 多賀　正尊 Masataka Taga **研究分担者** (Collaborators) 濱谷　清裕 Kiyohiro Hamatani 伊藤　玲子 Reiko Ito	直接経費 (Direct cost) ¥1,300,000 間接経費 (Indirect cost) ¥390,000	April 1, 2015	March 31, 2016	RP 1-13	放射線影響研究所 分子腫瘍学研究 RERF Molecular Oncology Study
10	ラトビアと日本の放射線被曝者の炎症関連疾患発生の比較分子疫学研究 Comparative molecular epidemiology study of inflammation-related disease development between radiation-exposed populations in Latvia and Japan	日本学術振興会　二国間交流事業 オープンパートナーシップ共同研究（ラトビア） 研究代表者　吉田　健吾 JSPS Bilateral Programs Open Partnership Joint Research Project (Latvia) Kengo Yoshida	**研究代表者 (P.I.)** 吉田　健吾 Kengo Yoshida **連携研究者** (Associate Investigators) 林　奉権 濱﨑　幹也 児玉　喜明 大石　和佳 （臨床研究部） Tomonori Hayashi Kanya Hamasaki Yoshiaki Kodama Waka Ohishi (Dept. of Clinical Studies)	¥2,250,000	July 1, 2015	March 31, 2016	RP 4-02 RP 4-04	放射線影響研究所 分子疫学研究 RERF Molecular Epidemiology Study

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分子生物科学部 Department of Molecular Biosciences								
11	全ゲノムシークエンス法による放射線のマウス精原細胞に及ぼす遺伝的影響評価 Estimation of genetic risk of radiation on mouse spermatogonia by whole genome sequencing	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　佐藤　康成 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Yasunari Satoh	**代表研究者 (P.I.)** 佐藤　康成 Yasunari Satoh **連携研究者** (Associate Investigators) 小平　美江子 Mieko Kodaira 浅川　順一 Jun-ichi Asakawa	直接経費 (Direct cost) ¥3,400,000 間接経費 (Indirect cost) ¥1,020,000	April 1, 2015	March 31, 2016	RP 2-13	放射線被曝の遺伝的影響 Genetic effects of radiation exposure
12	In vivo, in situ突然変異検出系を用いた環境および放射線リスク評価 In vivo, in situ mutagenic risk evaluation of radiation and environmental chemicals using newly developed knock-in mouse systems	日本学術振興会・科学研究費助成事業 「基盤研究(S) 」 研究代表者　野田　朝男 JSPS Grant-in-Aid for Scientific Research Scientific Research (S) Asao Noda	**代表研究者 (P.I.)** 野田　朝男 Asao Noda **研究分担者 (Collaborator)** 濱﨑　幹也 Kanya Hamasaki	直接経費 (Direct cost) ¥27,500,000 間接経費 (Indirect cost) ¥8,250,000 他機関（東大、阪大、茨城大、広大）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 collaborators at other institutes (The Univ. of Tokyo, Osaka Univ., Ibaraki Univ. and Hiroshima Univ.).	April 1, 2015	March 31, 2016	RP 1-08	放射線被曝の遺伝的影響 Genetic effects of radiation exposure
13	放射線により生じる修復不能なDSBの特異的定量法開発 Development of new methods that specifically detect and measure radiation-induced unrepairable DSBs	日本学術振興会・科学研究費助成事業 「挑戦的萌芽研究」 研究代表者　野田　朝男 JSPS Grant-in-Aid for Scientific Research Challenging Exploratory Research Asao Noda	**代表研究者 (P.I.)** 野田　朝男 Asao Noda	直接経費 (Direct cost) ¥500,000 間接経費 (Indirect cost) ¥150,000	April 1, 2015	March 31, 2016	RP-A4-09	生物学的線量推定 Biodosimetry
14	ビキニ水爆関係資料の線量評価に関する研究 Study on the dose evaluation of hydrogen bomb test in Bikini	厚生労働省・厚生労働科学研究費補助金 「特別研究事業」 研究代表者　明石　真言 国立研究開発法人放射線医学総合研究所　理事 Health and Labour Sciences Research Grants (MHLW) Special Research Project Makoto Akashi Director National Institute of Radiological Sciences	**研究分担者 (Collaborator)** 児玉　喜明 Yoshiaki Kodama	¥150,000	July 1, 2015	March 31, 2016	RP 8-93	生物学的線量推定 Biodosimetry

平成27年度 外部資金研究一覧表
FY2015 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
情報技術部 Department of Information Technology								
1	セミパラチンスク旧核実験場近郊住民を対象とした疫学解析用統一データベース構築 Construction of the integrated database of an epidemiological analysis for the people living in Semipalatinsk test site area	日本学術振興会・科学研究費助成事業 「基盤研究(B)」 研究代表者　片山　博昭 JSPS Grant-in-Aid for Scientific Research Scientific Research (B) Hiroaki Katayama	**研究代表者 (P.I.)** 片山　博昭 Hiroaki Katayama	直接経費 (Direct cost) ¥3,700,000 間接経費 (Indirect cost) ¥1,110,000 他機関（広大、金沢大、島根大、筑波大）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 collaborators at other institutes (Hiroshima Univ., Kanazawa Univ., Shimane Univ. and Tsukuba Univ.).	April 1,2015	March 31, 2016	No RP	低線量被曝による人体への影響 Low dose radiation effects to human being
2	カザフ核実験場周辺住民の放射性降下物被曝の実態解明−線量評価及び健康影響解析− Study on exposure to radioactive fallout in people residing around the Semipalatinsk nuclear test site -Dose estimation and analysis of radiation's health effects-	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　星　正治 広島大学　平和科学研究センター　名誉教授 JSPS Grant-in-Aid for Scientific Research Scientific Research (A) Masaharu Hoshi Professor Emeritus, Institute for Pease Science, Hiroshima University	**研究分担者** (Collaborator) 片山　博昭 Hiroaki Katayama	直接経費 (Direct cost) ¥200,000 間接経費 (Indirect cost) ¥60,000	April 1, 2015	March 31,2016	No RP	低線量被曝による人体への影響 Low dose radiation effects to human being

平成27年度 外部資金研究一覧表
FY2015 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
その他 Other Office							
1 放射線被曝は循環器疾患のリスクを上昇させるか？動物実験による検証。 Can radiation increase the risk of cardiovascular diseases? Evaluation by animal model studies.	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　高橋　規郎 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Norio Takahashi	**研究代表者 (P.I.)** 高橋　規郎 Norio Takahashi **研究分担者 (Collaborators)** 大石　和佳（臨床研究部） Waka Ohishi （Dept. Clinical Studies） 丹羽　保晴 （分子生物科学部） Yasuharu Niwa （Dept. Molecular Biosciences） **連携研究者** (Associate Investigator) 村上　秀子 （分子生物科学部） Hideko Murakami （Dept. Molecular Biosciences）	直接経費 (Direct cost) ¥0 間接経費 (Indirect cost) ¥0	April 1, 2015	March 31, 2016	RP 1-11	循環器疾患研究 RERF Circulatory Disease Study
2 どの程度低い放射線被曝、どの程度低い線量率被曝が循環器疾患と相関するか？ How lower radiation dose and how lower radiation dose rate associate with circulatory diseases?	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　高橋　規郎 JSPS Grant-in-Aid for Scientific Research Scientific Research (C) Norio Takahashi	**研究代表者 (P.I.)** 高橋　規郎 Norio Takahashi **研究分担者 (Collaborators)** 大石　和佳（臨床研究部） Waka Ohishi （Dept. Clinical Studies） 丹羽　保晴 （分子生物科学部） Yasuharu Niwa （Dept. Molecular Biosciences） 三角　宗近（統計部） Munechika Misumi （Dept. Statistics）	直接経費 (Direct cost) ¥1,300,000 間接経費 (Indirect cost) ¥390,000	April 1, 2015	March 31, 2016	RP 1-11	循環器疾患研究 RERF Circulatory Disease Study

補助事業期間延長により、平成26年度の未執行額（1,766,184円）を使用。
平成27年度に新たな助成金の交付はなし。
With extension of the funded term, the unexecuted amount for FY2014 (1,766,184yen) was used.
No grant was provided for FY2015.

II. Activities necessary for the above projects

1. Implementation of Secretariat reorganization due to continued personnel reduction

To cope with the personnel reduction of general employees, the Foundation has intermittently negotiated with the RERF Labor Union to reach a labor-management agreement over the reorganization of the Secretariat to a group-based system, in advance of the reorganization of the Research Departments. In addition, the Foundation sought changes in part of the position allowances. In response to a counter-proposal presented by the Labor Union in January 2016, we recently resumed negotiations to reach a final labor-management agreement over the implementation of the reorganization. Through continued negotiations with the Labor Union, we hope to proceed with preparatory activities for revising RERF regulations, including the Regulations Concerning Organization of the Secretariat, and for undertaking personnel assignments, review-related work transfers, and space reallocation. We plan to carry out the reorganization in the first half of FY2016.

2. Review of recruitment plan for young staff in preparation for the aging of general staff

In accordance with the 13th personnel reduction plan (FY2015–2019), which began this fiscal year, the number of budgeted general employees was reduced by five in FY2015, to 161 employees at the end of the fiscal year. The plan calls for further reducing the number of budgeted employees by four each year from FY2016 through FY2019, resulting in a total of 145 general employees by the end of FY2019.

To facilitate hiring of young employees, beginning this fiscal year, we transferred some re-employed staff members currently budgeted under personnel costs (general fund) to the category of overhead costs (special fund), thus maintaining personnel slots budgeted under the general fund. This made it possible to hire six personnel in April 2015, in addition to five hired last fiscal year, thus leveling the personnel age structure and offsetting the average age of current RERF general employees, which had been rising steadily year by year. The average age fell to approximately 50 years old in April 2015, down from approximately 51 years old last fiscal year. We will continue to consider mid-term hiring plans for the next five years.

3. Improvement of the Biosample Center’s facilities and systems

An ultra-low-temperature, automated, sample storage and retrieval system (robotic biorepository), installed on the first floor of Building G in October 2015, will manage approximately 600,000 biosamples currently stored by individual research departments, as well as samples yet to be collected, in an integrated manner. New samples will be stored in two-dimensionally barcoded containers. In FY2015, three additional technicians joined the Biosample Center to inventory existing samples and undertake other routine work. As a result, preparations were completed to begin transfer of samples from deep freezers to the robotic biorepository on a sequential basis in May 2016. In FY2016, the Center will continue the procedures necessary for the transfer. A

preparatory room, a laboratory, an office and a storage room required to expedite sample transfer have been set up on the first floor of Building G, and a core system for sample preservation using two-dimensionally barcoded containers has been created. In FY2016, the Center will improve this system to minimize human error.

4. Facility upgrades

(1) In Hiroshima, installation of a robotic biorepository system in Room 107 of Building G required upgrades of the Biosample Center's experimental facilities on the first floor of Building G, and renovation of the laboratory of the Department of Radiobiology/Molecular Epidemiology (RME) on the second floor of Building B (cost: 13,750,000 yen). Rooms on the second floor of Building G were also converted to offices for researchers of the RME, the NEWS office, and others (cost: 9,350,000 yen).

In addition, the following work was completed in March 2016, using the Japanese supplementary budget for FY2015:

1) Replacement of the high-voltage power-receiving units (6600V) and the electric cables of the low-voltage distribution boards in Buildings A and Da (cost: 167,745,000 yen);

2) Seismic strengthening of Buildings I and J to prevent these old structures from collapsing in the event of a disaster (cost: 158,112,000 yen).

Bids were taken for the following work and contracts were entered into by the end of December 2015, using the supplementary budget from the DOE (U.S.) for FY2015:

3) Renovation of electric-power facilities in each building (excluding Buildings A and Da) and the Hijiyama Hall, which began in January 2016 and will be completed by the end of March 2017 (cost: 177,120,000 yen);

4) Installation of an automatic gas fire extinguishing system, in both Hiroshima and Nagasaki, to protect RERF's valuable research materials and data from fire, scheduled for completion by the end of August 2016 (cost: 138,240,000 yen).

(2) In Nagasaki, the following work has been conducted to upgrade the facility:

1) The previous number of fuel tanks had been sufficient to operate emergency generators for 24 hours. To increase the capacity of emergency generators to run ultra-low-temperature freezers for 48 consecutive hours, more fuel tanks were added in the basement. This work was completed in March 2016 (cost: 9,504,000 yen).

5. Revision of rules and regulations

To organize RERF's administrative operation as a public interest incorporated foundation, revisions were made to the following rules and regulations.

- Regulations for Protection of Personal Information [Effected on July 15, 2015 and applied from April 1, 2015]

  These regulations set forth necessary matters for the proper handling of personal information at this juristic person based on the provisions of Paragraph 2, Article 65 of the RERF Articles of Incorporation. Because the Ethical Guidelines for Epidemiological Research and the Ethical Guidelines for Clinical Research were combined to establish a new Ethical Guidelines for Medical and Health Research Involving Human Subjects as of April 1, 2015, partial revisions were made to these regulations to strengthen the operation as a public interest incorporated foundation.

- Supplementary Regulations Concerning Organization of the Laboratory (Research Departments) [Effective date: August 1, 2015]

  To establish the organizational structure needed for the Epidemiological Study of Health Effects in Fukushima Emergency Workers, these supplementary regulations were revised to establish the Emergency Workers Health Study Office at the Department of Clinical Studies in Hiroshima.

- Regulations on Management Authority of Directors [Effective date: November 20, 2015]

  Following the appointment of three directors (Chairman, Vice-Chairman and Executive Director) due to expiration of their predecessors' terms of appointment, it was necessary to define the duties to be managed by each of these directors. To this end, revisions were made to the appended table related to Article 7 of the Regulations on Management Authority of Directors in accordance with Paragraph 5, Article 33 of the RERF Articles of Incorporation, upon approval of the BOD at its 14th meeting held on November 20, 2015.

- Regulations Concerning Organization of the Laboratory (Research Departments) [Effective date: January 1, 2016]

  In accordance with Paragraph 2-4, Article 40 of the RERF Articles of Incorporation, the BOD approved at its 14th meeting held on November 20, 2015 that these regulations would be revised to merge the Department of Genetics and Department of Radiobiology/Molecular Epidemiology into the Department of Molecular Biosciences, resulting in a change of significant organization at this juristic person.

- Regulations for Protection of Study Subjects [Effective date: March 4, 2016, and implemented from April 1, 2016]

  In accordance with Paragraph 2, Article 66 of the RERF Articles of Incorporation, the BOD approved at its 15th meeting held on March 4, 2016, that these regulations would be revised to specify domestic/applicable overseas regulations and guidelines involving human subject protection that are applied to RERF's research studies on a consistent basis; and to strengthen compliance with these regulations and guidelines by the RERF staff.

6. Significant personnel matters

With respect to appointment or removal of significant personnel, stipulated in item (3) of paragraph 2 of Article 40 of the Articles of Incorporation, appointments or removals were conducted in FY2015 as follows:

- Dr. Robert L. Ullrich (current Vice Chairman and Executive Director) left the Associate Chief of Research post effective on June 20, 2015.
- Mr. Eiji Akimoto, Chief of Secretariat, resigned effective on March 31, 2016.
- Mr. Douglas C. Solvie, Associate Chief of Secretariat, was appointed as Chief of Secretariat effective on April 1, 2016.
- Dr. Eric J. Grant, Assistant Chief of the Department of Epidemiology, was appointed as Associate Chief of Research effective on April 1, 2016.

人 員 構 成 表
PERSONNEL COMPOSITION

2016年 4月 1日現在
AS OF 1 April 2016

部　　名 DEPARTMENT	役員等 DIRECTORS AND ETC.	研究員 RESEARCH STAFF	A 事務職 STATISTICAL, CLERICAL, ETC.	B 作業・技能 MANUAL AND GEN. TECH.	C 医療技術職 I LABORATORY TECHNOLOGISTS	D 医療技術職 II NURSES AND OTHERS	合計 TOTAL	外部資金研究員 EXTERNAL RESEARCH FUNDS	専門委員 非常勤研究員 EXPERT ADVISE VISIT. RES. ASSO	来所研究員 VISITING RES. FELLOWS	再雇用(定員外) ADJUNCT SPECIALIST (EXCESS OF COP)	臨時職員 臨時要員 TEMPORARY EMPLOYEE
広　島 HIROSHIMA												
役　　員 DIRECTORS	3	0	0	0	0	0	3	0	0	0	0	0
事務局長 CHIEF OF SECRETARIAT	1	0	0	0	0	0	1	0	0	0	0	0
顧問研究員 SENIOR CONSULT. SCI.	0	0	0	0	0	0	0	1	0	0	0	0
主席研究員 CHIEF SCIENTISTS	0	2	0	0	0	0	2	0	0	0	0	0
理事長付 ASST. CHIEF TO CHAIRMAN	0	0	1	0	0	0	1	0	0	0	0	0
臨床研究部 CLINICAL STUDIES	0	5	11 (1)	0	10	8	34 (1)	1	18	0	3	12
分子生物科学部 MORECULAR BIOSCIENCES	0	10.2 (1.2)	4	0	17	0	31.2 (1.2)	0	3	2	0	5
疫　学　部 EPIDEMIOLOGY	0	5	20 (1)	0	1	0	26 (1)	0	5	0	1	9
統　計　部 STATISTICS	0	7.6 (0.6)	2	0	0	0	9.6 (0.6)	0	4	0	0	1
情報技術部 INFORMATION TECHNOLOGY	0	1	13	0	0	0	14	0	0	0	0	1
放射性同位元素使用施設 RADIOISOTOPE FACILITY	0	0	0	0	0	0	0	0	0	0	0	0
生物試料センター BIOSAMPLE CENTER	0	1	1	0	2	0	4	0	0	0	1	6
事　務　局 SECRETARIAT	0	0	38 (1)	0	0	0	38 (1)	0	0	0	2	4
広　島　計 HIROSHIMA TOTAL	**4**	**31.8 (1.8)**	**90 (3)**	**0**	**30**	**8**	**163.8 (4.8)**	**2**	**30**	**2**	**7**	**38**
2015/4/1 の実績 Actual number in 2015/4/1	4	34.2 (1.2)	89	0	31	8	166.2 (2.2)	0	32	4	6	33
2016/4/1 との差 Difference compared with 2016/4/1	0	-2.4 (0.6)	1	0	-1	0	-2.4 (2.6)	2	-2	-2	1	5
長　崎 NAGASAKI												
顧問研究員 SENIOR CONSULT. SCI.	0	0	0	0	0	0	0	0	0	0	0	0
主席研究員 CHIEF SCIENTISTS	0	0	0	0	0	0	0	0	0	0	0	0
臨床研究部 CLINICAL STUDIES	0	3	7 (1)	0	7	8	25 (1)	0	40	0	1	1
疫　学　部 EPIDEMIOLOGY	0	0	10 (1)	0	2	0	12 (1)	0	4	0	0	4
生物試料センター BIOSAMPLE CENTER	0	0	0	0	0	0	0	0	0	0	0	1
事　務　局 SECRETARIAT	0	0	7	0	0	0	7	0	0	0	1	0
長　崎　計 NAGASAKI TOTAL	**0**	**3**	**24 (2)**	**0**	**9**	**8**	**44 (2)**	**0**	**44**	**0**	**2**	**6**
2015/4/1 の実績 Actual number in 2015/4/1	0	3.6 (0.6)	25	0	9	8	45.6 (0.6)	0	46	0	2	5
2016/4/1 との差 Difference compared with 2016/4/1	0	-0.6 (-0.6)	-1	0	0	0	-1.6 (1.4)	0	-2	0	0	1
合　　計 GRAND TOTAL	**4**	**34.8 (1.8)**	**114 (5)**	**0**	**39**	**16**	**207.8 (6.8)**	**2**	**74**	**2**	**9**	**44**
2015/4/1 の合計 Total in 2015/4/1	4	37.8 (1.8)	114	0	40 (1)	16	211.8 (2.8)	0	78	4	8	38
2016/4/1 との差 Difference compared with 2016/4/1	0	-3	0 (5)	0	-1 (-1)	0	-4 (4)	2	-4	-2	1	6

＊ 括弧内は人件費再雇用者

＊ Numbers in parentheses are those who were reemployed by personnel expenses

予算定員と期末実員との推移
CHANGES IN BUDGETARY PERSONNEL SLOTS AND ACTUAL PERSONNEL STRENGTH

As of 1 April 2016

年度別 Fiscal year / 区分 Classification		昭和50年度 1975	51年度 1976	52年度 1977	53年度 1978	54年度 1979	55年度 1980	56年度 1981	57年度 1982		58年度 1983		59年度 1984	60年度 1985	61年度 1986	62年度 1987	63年度 1988	平成元年度 1989	2年度 1990	3年度 1991	4年度 1992	5年度 1993	6年度 1994	7年度 1995
期首実員 Actual Personnel Strength (as of Apr. 1)		588	575	567	559	541	523	524	517		503		491	486	474	472	462	435	427	433	437	435	412	373
予算定員(期末) Budgetary Personnel Slots (Fiscal Yearend)		575	-2 573	-5 568	-10 558	-15 543	-13 530	-10 520	前期 1st half -5 515	後期 2nd half -5 510	前期 1st half -5 505	後期 2nd half -3 502	-8 494	-8 486	-9 477	-8 469	-8 461	-8 453	-8 445	-7 438	-4 434	-4 430	-4 426	-52 374
期末実員 Actual Personnel Strength (Fiscal Yearend)		570	564	543	534	517	517	516	497		489		481	472	463	472	461	427	431	434	431	413	377	336
内訳	役員 Directors	4	4	4	4	4	3	4	5		5		6	6	6	6	5	6	6	5	6	6	5	4*
	研究員 Research Staff	39	43	45	(1) 48	(4) 47	(3) 52	(3) 54	52		53		(1) 59	(2) 62	(3) 65	(2) 63	(2) 67	(2) 59	(1) 61	(1) 63	(1) 62	58	50	45
	一般職員 General Staff	527	517	494	482	466	462	458	440		431		416	404	392	403	389	362	364	366	363	349	322	287.0

注: 1. 有給来所研究員は研究員欄へ含め( )書で示す。
Visiting scientists on RERF payroll (their numbers in parentheses) are included in the research staff number.
2. * 事務局長を含む。
Chief of Secretariat included.

予算定員と期末実員との推移
CHANGES IN BUDGETARY PERSONNEL SLOTS AND ACTUAL PERSONNEL STRENGTH

区分 Classification ＼ 年度別 Fiscal year		8年度 1996	9年度 1997	10年度 1998	11年度 1999	12年度 2000	13年度 2001	14年度 2002	15年度 2003	16年度 2004	17年度 2005	18年度 2006	19年度 2007	20年度 2008	21年度 2009	22年度 2010	23年度 2011	24年度 2012	25年度 2013	26年度 2014	27年度 2015	28年度 2016	昭和50年度と平成27年度との比較 compared with 1975
期首実員 Actual Personnel Strength (as of Apr. 1)		331	317	292	284	281	269	271	270	270	263.8	257.6	251.8	248	241.8	234.8	231.6	223.2	217	218	211.8	207.8	
予算定員(期末) Budgetary Personnel Slots (Fiscal Yearend)		-28 346	-38 308	-24 284	-5 279	-3 276	-2 274	-3 271	-3 268	-3 265	-3 262	-6 256	-6 250	-6 244	-6 238	-5 233	-5 228	-5 223	-5 218	-4 214	-5 209	-4 205	-366.0
期末実員 Actual Personnel Strength (Fiscal Yearend)		317	297	284	278	266	267	271	264	264	260.4	253.4	248.0	244.4	236.4	230.6	220.2	214	209.4	203.8	198.2		-371.8
内訳	役員 Directors	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	4*	3		-1
	研究員 Research Staff	39	42	40	41	39	41	46	47	47	43.6	46.2	44.6	45.6	43	44.6	40.6	36.2	39.8	36.8	33.2		-5.8
	一般職員 General Staff	274.0	251.0	240.0	233.0	223.0	222.0	221.0	213.0	213.0	212.8	203.2	199.4	194.8	189.4	182.0	175.6	173.8	165.6	163.0	162.0		-365.0

注: 1. 有給来所研究員は研究員欄へ含め( )書で示す。
Visiting scientists on RERF payroll (their numbers in parentheses) are included in the research staff number.
2. * 事務局長を含む。
Chief of Secretariat included.

定年退職者予定者数

NUMBER OF EXPECTED MANDATORY AGE RETIREMENTS

2015年度任意退職者及び定年退職者数並びに、2016年度以降5年間の規定による定年退職者数は次のとおりである。
The following are the numbers of voluntary retirements and mandatory age retirements in FY2015, and those expected yearly during the five-year period starting in FY2016 in accordance with the regulations.

As of 1 Apr. 2016

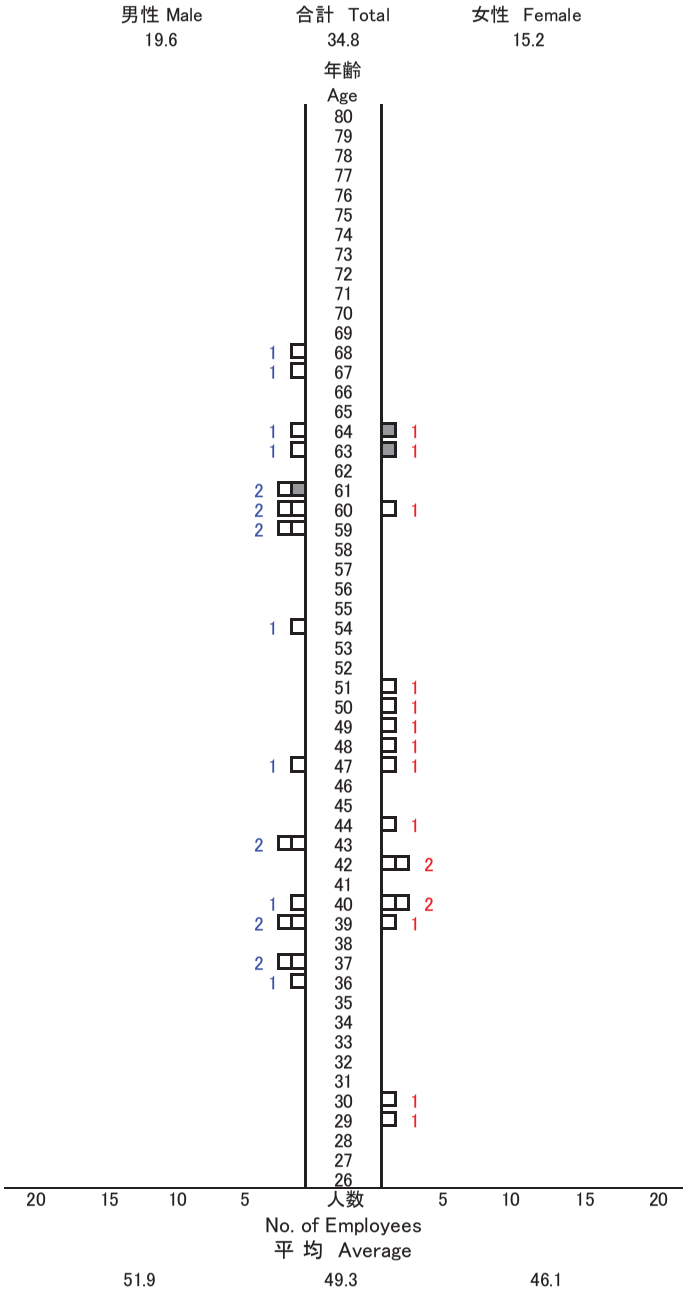
		平成27年度 FY2015	平成28年度 FY2016	平成29年度 FY2017	平成30年度 FY2018	平成31年度 FY2019	平成32年度 FY2020	合　計 Total(2016-2020)
広島 Hiroshima	男 Male	4 (2)	5 (2)	4 (0)	5 (0)	4 (0)	2 (0)	20 (2)
	女 Female	4 (1)	7 (0)	1 (0)	5 (0)	7 (0)	2 (0)	22 (0)
	計 Total	8 (3)	12 (2)	5 (0)	10 (0)	11 (0)	4 (0)	42 (2)
長崎 Nagasaki	男 Male	1 (0)	1 (0)	0 (0)	3 (0)	2 (0)	0 (0)	6 (0)
	女 Female	1 (0)	1 (0)	1 (0)	0 (0)	3 (0)	2 (0)	7 (0)
	計 Total	2 (0)	2 (0)	1 (0)	3 (0)	5 (0)	2 (0)	13 (0)
合計　Total	男 Male	5 (2)	6 (2)	4 (0)	8 (0)	6 (0)	2 (0)	26 (2)
	女 Female	5 (1)	8 (0)	2 (0)	5 (0)	10 (0)	4 (0)	29 (0)
	計 Total	10 (3)	14 (2)	6 (0)	13 (0)	16 (0)	6 (0)	55 (2)

注: ( ) 書は、研究員数を示す。
Note: The number in the parentheses indicates research scientists.

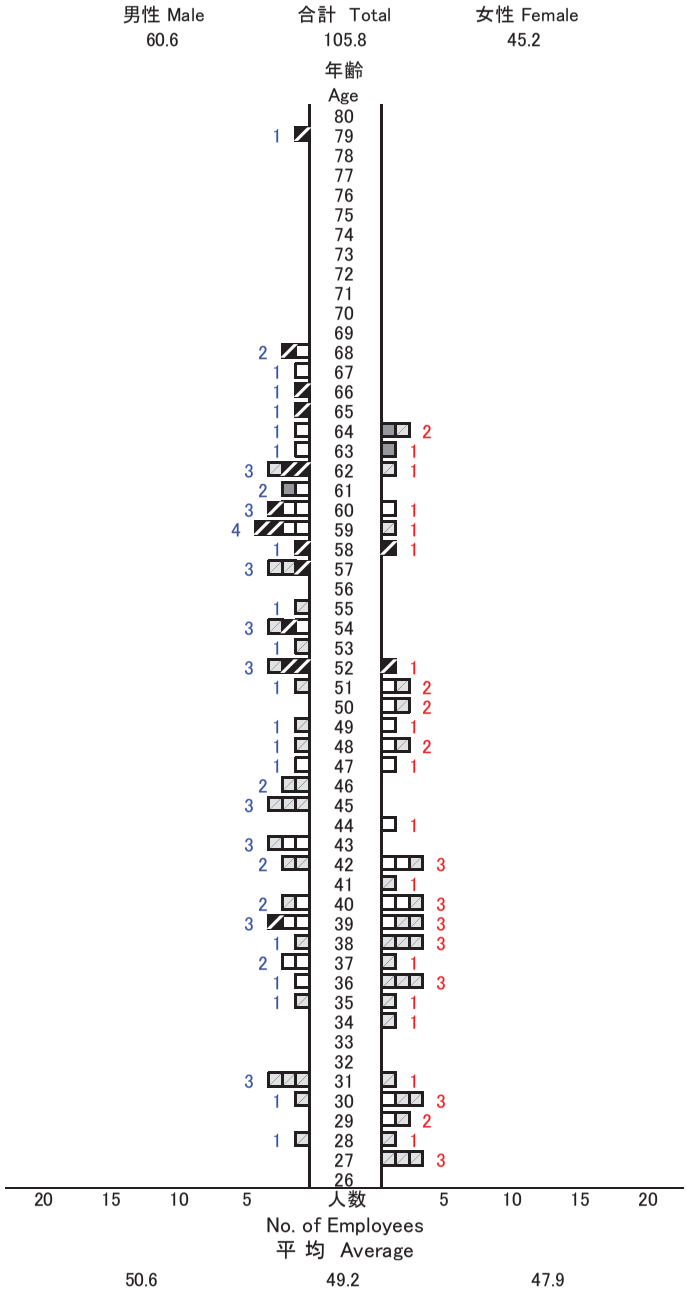
年齢別男女別構成表　Personnel Composition by Age & Sex

2016年 4月 1日現在
AS OF 1 April 2016

研究職(両市)　Professional Employees (Both Cities)



外部委嘱者(専門委員/非常勤研究員)を含む研究職(両市)
Professional Employees (Including Expert Advisers and Visiting Research Associates(Both Cities)



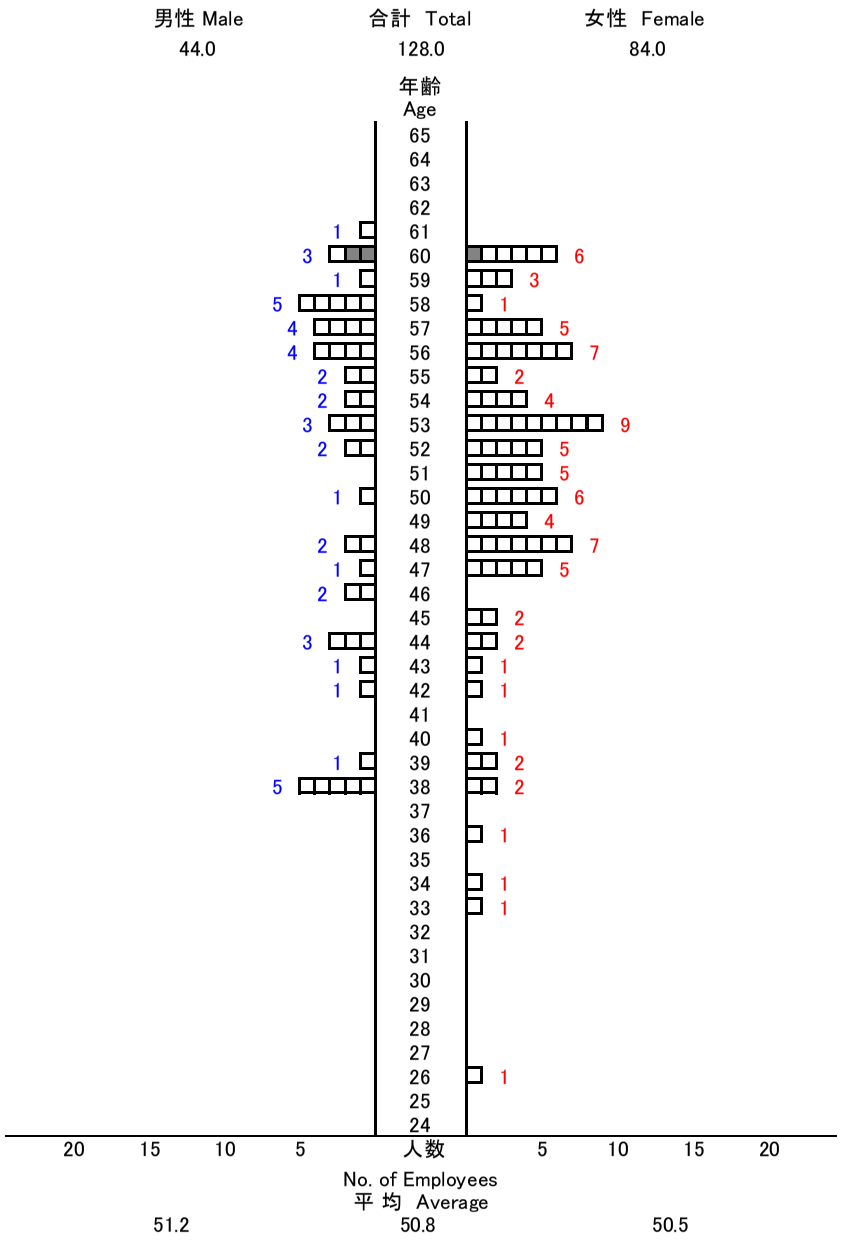
□…研究職 Professional Employees　■…定年再雇用者 Reemployment after mandatory retirement　◪…専門委員 Expert Advisers　▣…非常勤研究員 Visiting Research Associates

年齢別男女別構成表

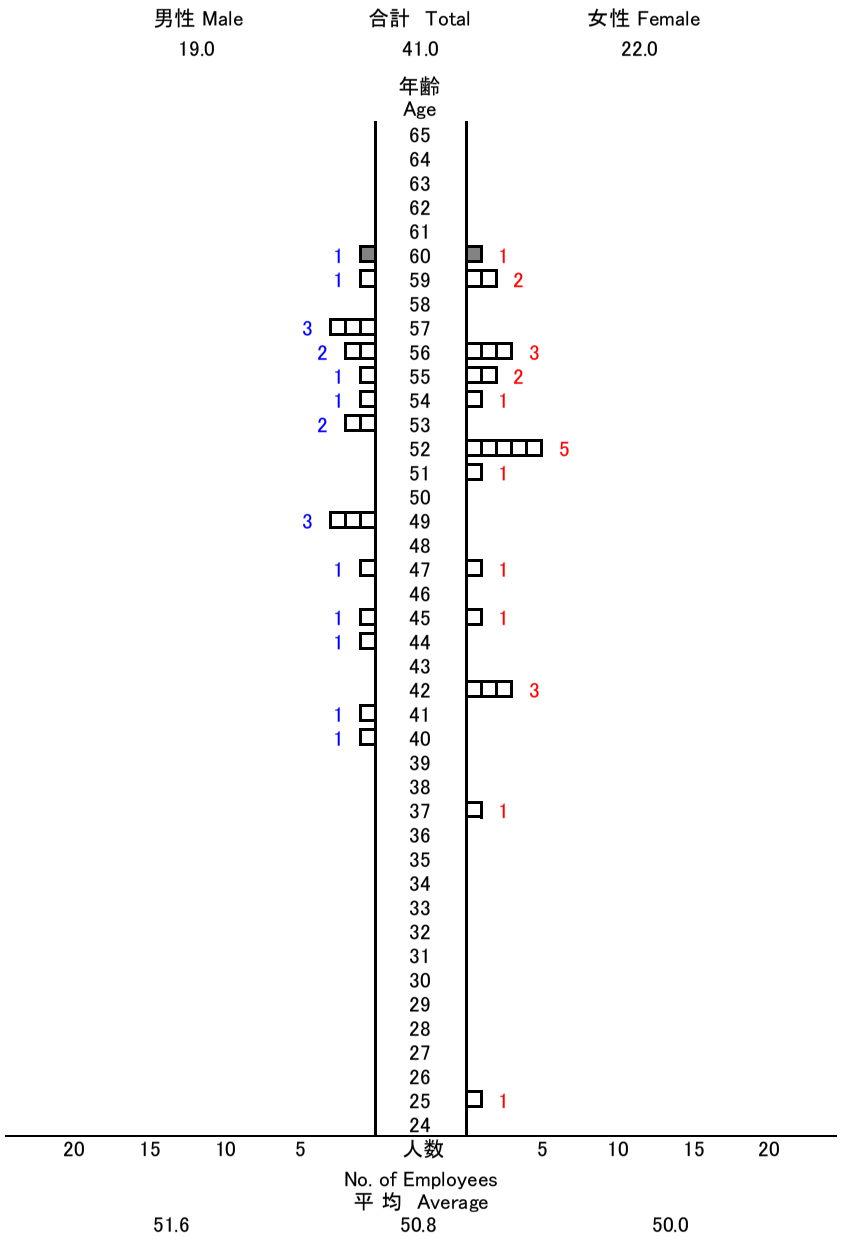
Personnel Composition by Age & Sex

2016年 4月 1日現在
AS OF 1 April 2016

一般職(広島) General Employees (Hiroshima)



一般職(長崎) General Employees (Nagasaki)



■…定年再雇用者 Reemployment after mandatory retirement

Appended documents to FY2015 report of activities

There were no items considered to be important matters for supplementing the contents of the FY2015 report of activities.