



On the Occasion of Publication of RERF's 30th Anniversary Special Issue

Toshiteru Okubo, Chairman

In 2005, the 60th anniversary of the atomic bombings, the Radiation Effects Research Foundation (RERF) marked the 30th anniversary of its establishment. For those who survived the bombings' terrible devastation, from which people believed not a single tree or plant would grow for 70 years, development of various delayed health effects was considered likely. Through epidemiological research of these A-bomb survivors, RERF has strived to contribute to the medical care and welfare of the survivors by means of providing the latest scientific information.

Our mission is only half accomplished. We have thus compiled on the basis of the anniversary ceremony this special issue of the *RERF Newsletter*, which includes words of strong encouragement provided by various parties, special lectures delivered by Dr. Ohtsura Niwa and Dr. William J. Schull, and impressions or memories expressed by the Adult Health Study participants and former employees of RERF who attended the ceremony. We regard this issue as an important record for enabling RERF to further fulfill the expectations of those

concerned and make the Foundation's activities ever more meaningful.

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Commemorative Events in Hiroshima and Nagasaki Reflecting on 30 Years, Pledge for Further Progress Is Renewed

The Radiation Effects Research Foundation (RERF) marked its 30th anniversary in April of last year (2005), and events in commemoration of the occasion were held in Hiroshima and Nagasaki last November. RERF was preceded by the Atomic Bomb Casualty Commission (ABCC), established by the U.S. in 1947 and reorganized into RERF, jointly funded by the U.S. and Japan, in the spring of 1975. Since the reorganization, 30 years have passed.

Both Hiroshima and Nagasaki RERF devised and prepared their own unique plans to commemorate the occasion.

(Newsletter Special Issue Editorial Subcommittee)

[Hiroshima] The commemoration in Hiroshima consisted of two events—a commemorative tree planting at RERF and a commemorative ceremony and lectures at the Minami-ku Cultural Center. It should be noted that participants in the Adult Health Study (AHS), which has been conducted by both ABCC and RERF, were invited and many attended the events.

Tree Planting Conducted for the First Time

The commemorative events of RERF's 30th anniversary started with a ceremony involving the planting of a seedling from the offspring of the A-bombed *aogiri* (Chinese parasol tree). Distinguished guests and employees gathered around the planting site set up on RERF's grounds next to Building H. The ceremony started with Chief of Secretariat Mr. Eiji Akimoto's opening greetings at 11:30 a.m.

The origin of the seedling can be traced back to an *aogiri* tree that stood 1.3 kilometers from the hypocenter. The side of the tree trunk facing the hypocenter was scorched, but the tree produced shoots the following spring. It had been said at the time that no grass or trees could possibly grow in the devastated Hiroshima for 70 years. The tree survived nevertheless and its green leaves gave courage to people in Hiroshima, who had no hope whatsoever, to live on. The tree was later transplanted in Peace Park and is now being carefully tended as the "offspring of the A-bombed *aogiri*,"

60 years after the A-bombing.

Following RERF Chairman Dr. Toshiteru Okubo's greetings and Permanent Director Mr. Takanobu Teramoto's explanation about the A-bombed *aogiri* offspring, planting of the seedling was conducted by a pair of planters at a time with shovels, as follows: representatives from the U.S. and Japanese governments, Dr. Masaru Umeda, Director for Minister's Secretariat, Ministry of Health, Labour and Welfare (MHLW) (on behalf of Dr. Masaharu Nakajima, Director-General, Health Service Bureau, MHLW) and Mr. Steven V. Cary, Deputy Assistant Secretary for Health, Office of Environment, Safety and Health, U.S. Department of Energy (DOE) (on behalf of Mr. John S. Shaw, Assistant Secretary for Environment, Safety and Health, DOE); Mr. Hisao and Mrs. Fumiko Miyama, AHS participants; and Mr. Sunao Tsuboi, Chairman, Hiroshima Prefectural Confederation of A-bomb Sufferers Organizations, and Dr. Okubo. Wishing for healthy growth of the seedling, the planters gently covered its roots with dirt. The tree-planting ceremony came to a close at 11:45 a.m. as scheduled.

Dr. Okubo Extends Gratitude to AHS Participants at Ceremony

In the afternoon of the day of the tree planting, a ceremony and lectures were held at the Minami-ku Cultural



Mr. Hisao and Mrs. Fumiko Miyama, AHS participants, plant a seedling from the *aogiri* offspring.



Mr. Takanobu Teramoto explains about the offspring of the A-bombed *aogiri* (Chinese parasol tree).

Center at the foot of Hijiyama hill. The large hall with a capacity of 550 was filled with an audience comprising 134 AHS participants, 41 distinguished guests, 58 retirees, and 205 employees, and at 1:15 p.m., amid a solemn atmosphere, the opening buzzer rang and the stage curtain rose.

On stage, distinguished guests were seated on the right, while RERF staff were seated on the left. The masters of ceremonies, Mr. Akimoto and Ms. Rumi Sumitani (Master File Section, Epidemiology Department), announced the opening of the ceremony.

Dr. Okubo expressed gratitude in his opening greetings: “Our research studies originated in the devastation wrought by the atomic bombs, but the obtained results continue to contribute to the health maintenance and welfare of A-bomb survivors and their children, and are a valuable resource with which to enhance the health of all humanity. Without the cooperation of the participants in our health examinations, such achievements could never have been possible. I would like to take this occasion to personally express my heartfelt gratitude for this support.” Considering the oft-mentioned concerns about aging of the A-bomb survivors, it was all the more significant that long-time participants in RERF’s studies took time to come to the ceremony and join RERF staff in celebrating the Foundation’s 30th anniversary.

Following Dr. Okubo’s greetings, distinguished guests’ greetings were delivered by Dr. Umeda of MHLW and Mr. Cary of DOE, representatives of the Japanese and U.S. governments, respectively. The greetings from the distinguished guests ensued, as words of encouragement were delivered by Ms. Joyce Rabens, Minister-Counselor for Environment, Science and Technology, the U.S. Embassy in Japan; Mr. Hiroaki Kurokawa, Treasurer of Hiroshima City (on behalf of Mr. Tadatosh Akiba, Mayor of Hiroshima); Dr. Shizuteru Usui, President, Hiroshima Prefectural Medical Association; and Mr. Tsuboi, Chairman, Hiroshima Prefectural Confederation of A-bomb Sufferers Organizations.

Two commemorative lectures were delivered. In the first, titled “Contributions of RERF to Understanding Radiation Risk and Radiation Protection,” which was moderated by Dr. Nori Nakamura (Chief Scientist/Chief of Department of Genetics), Dr. Ohtsura Niwa, Professor of the Kyoto University Radiation Biology Center, spoke



The commemorative ceremony in Nagasaki is held at Wel City Nagasaki, a public Kosei-Nenkin Kaikan meeting hall.

about the people who contributed to management and research at ABCC and thereafter. Dr. Niwa also called RERF’s research projects useful world heritage resulting from the collaborative work between A-bomb survivors and RERF, and requested that RERF continue to enhance this heritage.

In the next lecture, titled “Radiation Effects Research Foundation: After 30 Years,” which was moderated by Dr. Kazunori Kodama (Chief Scientist/Chief of Department of Epidemiology), Dr. William J. Schull, RERF Permanent Director (Professor Emeritus and Ashbel Smith Professor of Academic Medicine, Human Genetics Center, School of Public Health, University of Texas), compared RERF at the time of its establishment with RERF of present, and spoke interestingly about the directors, number of employees, and research programs, among other topics.

The commemorative events, comprising the ceremony followed by the lectures, concluded somewhat earlier than the scheduled 5 p.m. Photographs and panels looking back on the history of ABCC-RERF were exhibited in the lobby of the hall, and those attending enjoyed viewing them during breaks in the ceremony and lectures.

Taking off into the Future

The seedling of the offspring of the A-bombed *aogiri* tree that was planted on the grounds next to Building H on the day of the commemorative events of RERF’s 30th anniversary, is now surrounded by daffodils and standing tall amidst this bleak, severe winter. Next to the tree stands a 17 cm × 21 cm white explanatory plate that clearly bears the following lettering: “Offspring of A-

bombed *aogiri* (*Firmiana platanifolia*) planted in commemoration of the 30th anniversary of RERF on November 8, 2005.” Sixty years have passed since the atomic bombings, and at present 42% of RERF’s Life Span Study subjects are still alive. Cancer mortality among these subjects is expected to peak between 2020–2030, because the survivors who were young at the time of the bombings are reaching ages of increased cancer risk. One wonders how tall the seedling will have grown by then.

The RERF Future Plans Review Committee is currently considering the Foundation’s future with a focus on RERF’s mission. In 2006, a new external review committee (tentatively called the “New Multinational Blue Ribbon Panel”) will be established. A springboard is thus being readied for RERF to take off into the future.

(Hiroshima Commemorative Event Executive Committee)

[Nagasaki] Starting at 1:15 p.m. on Friday, November 11 of last year, a commemorative ceremony and lectures in celebration of RERF’s 30th anniversary were held at Wel City Nagasaki, a public Kosei-Nenkin Kaikan meeting hall, and 282 distinguished guests, retirees, current employees, and AHS participants attended the event.

First, on behalf of RERF, Dr. Toshiteru Okubo, Chairman, expressed gratitude to those attending in his opening address: “RERF has conducted studies on the medical effects of atomic-bomb radiation on humans and diseases caused by such exposure, and the obtained results continue to contribute to the health maintenance and welfare of A-bomb survivors and their children, and are a valuable resource with which to enhance the health of all humanity. We owe this to the support from all concerned, and in particular, without the understanding and cooperation of the participants in our health examinations and health-related studies for more than 30 years, such achievements could never have been possible. I would like to take the opportunity presented by RERF’s 30th anniversary to personally express my heartfelt gratitude for this support.” He then concluded his address by saying, “We are determined to strive and make efforts on a daily basis, and your continued support and cooperation are kindly requested.” An opening address by Dr. Charles A. Waldren, Vice Chairman, ensued. After introduction of the distinguished guests, congratulatory addresses were delivered by the following guests: Mr. Hitoshi Sano, Chief of Office of Guidance and Investigation, General Affairs Division, MHLW; Mr. Steven V. Cary, Deputy Assistant Secretary for Health, Office of Environment, Safety and Health, DOE; Dr. Martin Murphy, Environment, Science and Technology Deputy, the U.S. Embassy in Japan; Dr. Kevin D. Crowley, Director, Board on Nuclear and Radiation Studies, Division on Earth and Life Studies, National Research Council, National Academy of Sciences

(NAS); Dr. Hiroshi Saito, President, Nagasaki University; Dr. Shinichiro Yamasaki, Director, General Health and Welfare Department, Nagasaki Prefectural Government; Dr. Toshihiko Awazu, Vice President, Nagasaki Prefecture Medical Association; and lastly Ms. Sakue Shimohira, President, Nagasaki Surviving Families Association, an AHS participant who delivered a congratulatory address.

The commemorative lectures were delivered as in Hiroshima by Dr. Ohtsura Niwa, Professor of the Kyoto University Radiation Biology Center, who gave a lecture titled “Contributions of RERF to Understanding Radiation Risk and Radiation Protection” (moderator: Dr. Akihiko Suyama, Chief, Nagasaki Department of Epidemiology), and then by Dr. William J. Schull, RERF Permanent Director, who gave a lecture titled “Radiation Effects Research Foundation: After Thirty Years” (moderator: Dr. Masazumi Akahoshi, Chief, Nagasaki Department of Clinical Studies).

Starting at 5 p.m., 15 Kassui High School Hand-bell Club members performed a commemorative concert. The concert, which included three pieces and an encore played magnificently, was received by the audience with enthusiastic applause.

Finally, Mr. Takanobu Teramoto, Permanent Director in charge of Nagasaki Laboratory, extended his appreciation to the study participants in attendance, the distinguished guests, Dr. Niwa and Dr. Schull for their lectures, and the Kassui High School members for their wonderful performance, concluding the commemorative events by saying, “RERF’s 30-year history is valuable in that the Foundation has contributed to global human health through its studies conducted from a humanitarian standpoint. We have the responsibility to make future plans based on this legacy. I am convinced that RERF will accomplish its assigned mission through concerted efforts together with all of you.”

Also, starting at 9:30 a.m. on the day of these commemorative events, an opening ceremony for a permanent exhibition room was held and attended by Dr. Okubo,



Kassui High School Hand-bell Club members perform a commemorative concert (Nagasaki).

RERF directors and employees, and distinguished guests from DOE and NAS. The exhibition space was established within the Nagasaki Laboratory as another project com-

memorating RERF's 30th anniversary.
(Nagasaki Commemorative Event Executive Committee)

Distinguished Guests (Hiroshima)

Masaharu Nakajima, Director-General, Health Service Bureau, Ministry of Health, Labour and Welfare

(Proxy: **Masaru Umeda**, Director for Minister's Secretariat, Ministry of Health, Labour and Welfare)

John S. Shaw, Assistant Secretary for Environment, Safety and Health, U.S. Department of Energy

(Proxy: **Steven V. Cary**, Deputy Assistant Secretary for Health, Office of Environment, Safety and Health, U.S. Department of Energy)

Joyce Rabens, Minister-Counselor for Environment, Science and Technology, U.S. Embassy in Japan

Kevin D. Crowley, Director, Board on Nuclear and Radiation Studies, Division on Earth and Life Studies, National Research Council, National Academy of Sciences

Tadatoshi Akiba, Mayor of Hiroshima City

(Proxy: **Hiroaki Kurokawa**, Treasurer of Hiroshima City)

Yuzan Fujita, Governor of Hiroshima Prefecture

(Proxy: **Kazuhiro Araki**, Director, Department of Welfare and Health, Hiroshima Prefecture)

Shizuteru Usui, President, Hiroshima Prefectural Medical Association

Sunao Tsuboi, Chairman, Hiroshima Prefectural Confederation of A-bomb Sufferers Organizations

Tsuguru Usui, Dean, Graduate School of Biomedical Sciences, Hiroshima University

(Proxy: **Motoyuki Sugai**, Assistant Dean, Graduate School of Biomedical Sciences, Hiroshima University)

Toshimasa Asahara, Director, Hiroshima University Hospital
(Proxy: **Tetsuji Okamoto**, Assistant Director, Hiroshima University Hospital)

Motofumi Asai, President, Hiroshima Peace Institute, Hiroshima City University

Keiichi Hiramatsu, President, Hiroshima City Medical Association

Hiroo Dohy, Director, Hiroshima Red Cross Hospital and Atomic-bomb Survivors Hospital

Kozo Sanada, President, Hiroshima Atomic Bomb Casualty Council

Toshikazu Omori, President, Hiroshima Prefectural Second Generation A-bomb Victims Liaison Council

Kenji Okabe, President, Central Headquarters, All Japan Prefectural and Municipal Workers' Union

fectural and Municipal Workers' Union

Kokoro Someya, Deputy Director, General Affairs Division, Health Service Bureau, Ministry of Health, Labour and Welfare

Elizabeth White, Program Manager, Office of Environment, Safety and Health, U.S. Department of Energy

Yuriy R. Fedkiw, Secretary for Science and Technology, U.S. Embassy in Japan

Koichi Uchida, Energy Specialist, U.S. Department of Energy Asia Office, U.S. Embassy in Japan

Evan B. Douple, Board on Nuclear and Radiation Studies, Division on Earth and Life Studies, National Research Council, National Academy of Sciences

Tsukasa Sasaki, Chief, Office of Countermeasures for A-bomb Survivors and Poisonous Gas Sufferers, Department of Welfare and Health, Hiroshima Prefecture

Masaki Kanou, Chief, Investigation Section, Atomic Bomb Survivors Relief Department, Bureau of Social Affairs, Hiroshima City

Teruaki Inada, Group Leader, Investigation Section, Atomic Bomb Survivors Relief Department, Bureau of Social Affairs, Hiroshima City

Kenji Kamiya, Former Director, Research Institute for Radiation Biology and Medicine, Hiroshima University

Hideo Sasaki, Director, Health Management and Promotion Center, Hiroshima Atomic Bomb Casualty Council

Ohtsura Niwa, Professor, Kyoto University Radiation Biology Center

Roy E. Shore, Professor, Department of Environmental Medicine, New York University School of Medicine

Takashi Mukai, President, Hiroshima Headquarters, All Japan Prefectural and Municipal Workers' Union

Tsugihiko Satoh, Chief of Secretariat, Hiroshima Prefecture Peace Movement Center

Sumiharu Dote, President, Liaison Council of A-bomb Survivors Organization, Hiroshima Headquarters, All Japan Prefectural and Municipal Workers' Union

Manso Hamamoto, RERF Labor Union Consultant Emeritus (former Minister of Labour)

Toraji Miyagawa, President, Hiroshima ABCC-RERF Retirees Association

Distinguished Guests (Nagasaki)

Masaharu Nakajima, Director-General, Health Service Bureau, Ministry of Health, Labour and Welfare

(Proxy: **Hitoshi Sano**, Chief, Office of Guidance and Investigation, General Affairs Division, Health Service Bureau, Ministry of Health, Labour and Welfare)

John. S. Shaw, Assistant Secretary for Environment, Safety and Health, U.S. Department of Energy

(Proxy: **Steven V. Cary**, Deputy Assistant Secretary for Health, Office of Environment, Safety and Health, U.S. Department of Energy)

Martin Murphy, Environment, Science and Technology Deputy, U.S. Embassy in Japan

Kevin D. Crowley, Director, Board on Nuclear and Radiation Studies, Division on Earth and Life Studies, National Research Council, National Academy of Sciences

Hiroshi Saito, President, Nagasaki University

Genjiro Kaneko, Governor of Nagasaki Prefecture

(Proxy: **Shinichiro Yamasaki**, Director, Welfare and Health Department, Nagasaki Prefecture)

Shizuo Deguchi, Chief, Atomic Bomb Survivors Affairs Department, Nagasaki City

Tetsuya Iseki, President, Nagasaki Prefectural Medical Association

(Proxy: **Toshihiko Awazu**, Vice President, Nagasaki Prefectural Medical Association)

Keisuke Eguchi, Chief of Secretariat, Nagasaki City Medical Association

Kazuhiko Shindo, Director, Japanese Red Cross Nagasaki Atomic Bomb Hospital

Genjiro Noguchi, President, Nagasaki A-bomb Survivors Casualty Council

Sakue Shimohira, President, Nagasaki Surviving Families Association

Nobuto Hirano, President, All Japan Second Generation A-bomb Victims Liaison Council

Roy E. Shore, Professor, Department of Environmental Medicine, New York University School of Medicine

Shuichi Oshige, Deputy Director, General Affairs Division, Health Service Bureau, Ministry of Health, Labour and Welfare

Elizabeth White, Office of Environment, Safety and Health, U.S. Department of Energy

Evan B. Douple, Board on Nuclear and Radiation Studies,

Division on Earth and Life Studies, National Research Council, National Academy of Sciences

Ohtsura Niwa, Professor, Kyoto University Radiation Biology Center

Yoshitaka Nakano, Chief, Atomic Bomb Victims Affairs Division, Welfare and Health Department, Nagasaki Prefecture

Noriko Sukizaki, General Affairs Unit Supervisor, Investigation Division, Atomic Bomb Survivors Affairs Department, Nagasaki City

Hiroshi Okumura, Professor, Atomic Bomb Disease Institute, Nagasaki University Graduate School of Biomedical Sciences

Yoshisada Shibata, Professor, Atomic Bomb Disease Institute, Nagasaki University Graduate School of Biomedical Sciences

Yuji Nagayama, Professor, Atomic Bomb Disease Institute, Nagasaki University Graduate School of Biomedical Sciences

Noritaka Kitahara, Permanent Director and Chief of Secretariat, Nagasaki A-bomb Survivors Casualty Council

Sumiteru Taniguchi, Deputy President, Nagasaki Confederation of A-bomb Sufferers Organizations

Katsuichi Fukahori, President, Nagasaki Prefecture Hibakusha Health Handbook Holders' Association

(Proxy: **Ryoichi Yajima**, Chief of Secretariat, Nagasaki Prefecture Hibakusha Health Handbook Holders' Association)

Koichi Kawano, Chairman, Local Industrial Unions A-bomb-exposed Kyogikai Liaison Council, Nagasaki Prefecture Peace Movement Center

Kazuyuki Sakaeda, Director, Nagasaki Occupational Health Promotion Center

Makoto Tateoka, President, Nagasaki Prefectural Education Association

Kenji Okabe, President, Central Headquarters, All Japan Prefectural and Municipal Workers' Union

(Proxy: **Yuko Izumi**, Member, Central Headquarters, All Japan Prefectural and Municipal Workers' Union)

Yukio Nakazaki, President, Nagasaki Headquarters, All Japan Prefectural and Municipal Workers' Union

Yoshio Okamoto, President, Nagasaki ABCC-RERF Retirees Association

Note: All titles shown in this issue are those as of November 2005.

Commemorative Ceremony in Hiroshima

Appreciation for long-standing cooperation in RERF research

Toshiteru Okubo, Chairman

Today, on the occasion of the 30th anniversary of the establishment of the Radiation Effects Research Foundation, we would like to extend our deepest condolences to the victims of the atomic bombings, as well as our sincere appreciation to the A-bomb survivors, their children and others concerned for the generous cooperation they have provided us along the way. To our honored guests present today, we would sincerely like to thank you all for taking time out of your busy schedules to be here.

RERF has conducted studies on the medical effects of atomic-bomb radiation on humans and diseases caused by such exposure. Our research originated in the devastation wrought by the atomic bombs, but the obtained results continue to contribute to the health maintenance and welfare of A-bomb survivors and their children, and are a valuable resource with which to enhance the health of all humanity. We owe this to the support from all concerned, and in particular, without the understanding and cooperation of the participants in our health examinations and health-related studies for more than 30 years, such achievements could never have been possible. I would like to take the opportunity presented by RERF's 30th anniversary to personally express my heartfelt gratitude for this support.

We sent invitations for this event to the participants in the Adult Health Study who have participated in all of the biennial health examinations since 1958, and 179 of them are here

today. Following the commemorative ceremony, which will start shortly and last until 2:30, commemorative lectures are scheduled: first, Dr. Niwa of Kyoto University will explain about how RERF's research results have been utilized, and then Dr. William J. Schull, who has assisted RERF for more than 40 years since the days of ABCC, will look back on the 30 years of RERF history, starting with its founding. Your attendance at the lectures about RERF's research achievements is kindly requested for your further understanding of our organization.

We still have much to accomplish, but are determined to strive and make efforts on a daily basis to reach our goals. I hereby conclude my greetings for RERF's 30th anniversary by requesting your continued support and cooperation. Thank you very much.



Making the utmost effort to respond to everyone's support and trust

Charles A. Waldren, Vice Chairman and Chief of Research



I want briefly to reiterate Dr. Okubo's comments in offering our profound gratitude to the survivors and to all of you gathered here today, but also to everyone in Hiroshima, Nagasaki, Japan and from all over the world, who have steadfastly supported our research

efforts. We are also profoundly grateful to the governments of Japan and the United States for their steady and generous funding.

While we have accomplished much already so that our work is highly regarded worldwide, we will, we believe, learn more in the next 30–40 years about the effects of radiation on humans than we have in the previous 30 or even 50 years, but only with your continued support, both moral and financial. Given the chance, we promise most sincerely to do our very best to warrant your continued support and trust.

Thank you.

Steady implementation of research for promotion of A-bomb survivor relief measures

Masaharu Nakajima, Director-General, Health Service Bureau, Ministry of Health, Labour and Welfare
(Proxy at Hiroshima: **Masaru Umeda**, Director for Minister's Secretariat)
(Proxy at Nagasaki: **Hitoshi Sano**, Chief, Office of Guidance and Investigation, General Affairs Division, Health Service Bureau)



Dr. Masaru Umeda

I would like to say a few words of congratulations on this occasion of the ceremony commemorating RERF's 30 years since its establishment.

RERF was founded in April 1975 as a U.S.-Japan joint research institute to continue the research of the Atomic Bomb Casualty Commission, which was established by the U.S. government. Since that time to the present for 30

years, with the endeavors of its staff in Hiroshima and Nagasaki and support from the U.S. Department of Energy and local governments and many others, RERF has consistently accomplished marvelous results.

Substantial research projects in various fields, such as epidemiology and clinical studies, have been conducted with the cooperation of A-bomb survivors. We are very proud that RERF's research results and findings have been widely used in radiation protection and gained international recognition, and thus would like to express our heartfelt respect and appreciation to all those concerned for their efforts.

The Japanese government has adopted comprehensive relief measures for the public health care, medical treatment, and welfare of the A-bomb survivors. Continuation of RERF's studies on the health effects of A-bomb radiation is increasingly important for promotion of these extensive measures.

The U.S. and Japanese governments have agreed to establish a second Blue Ribbon Panel consisting of leading world scientists, ten years after the first such panel, to assess RERF's present status and consider its future research direction, and preparations to convene the panel are now underway.

I sincerely hope that each and every staff member of RERF will take the 30th anniversary to renew their aspirations as they envision RERF's future and pursue their research. I also hope that both Japanese and American directors and staff further unite in their effort to achieve significant results through mutual trust and sincerity.

I would like to conclude my words by wishing good health to all of you here today and further success to RERF. Thank you.



Mr. Hitoshi Sano

RERF is a model of worldwide scientific cooperation

John S. Shaw, Assistant Secretary for Environment, Safety and Health, U.S. Department of Energy
(Proxy: **Steven V. Cary**, Deputy Assistant Secretary for Health, Office of Environment, Safety and Health, U.S. Department of Energy)



Thank you for your attendance today. I'm very happy to be the United States Department of Energy representative at the Radiation Effects Research Foundation's 30th anniversary.

RERF is an important priority for the Department of Energy and for the United States.

It represents the strength of our friendship and international alliance.

The scientific and humanitarian work of the Atomic Bomb Casualty Commission was continued when the RERF was established in 1975. When the United States and Japanese governments solidified their commitment in supporting research that would benefit the atomic bomb survivors as well as mankind.

I would like to extend the United States government's, and especially the Department of Energy's, sincere gratitude to the atomic bomb survivors for their understanding and support of the important work of the RERF.

The RERF represents the longest partnership of the United States and Japanese governments in a scientific program, and is a model of worldwide scientific cooperation.

I would like to thank and congratulate all current and past employees of the RERF who have produced landmark studies of international significance.

Finally, I would like to thank our partners, the Japanese

Ministry of Health, Labour and Welfare, who have worked with the Department of Energy to jointly fund the RERF.

I have confidence that together we will succeed in our continuing journey to further understand the health impacts of radiation exposure and how to best protect current and future generations.

RERF contributes to establishment of international radiation safety standards

Joyce Rabens, Minister-Counselor for Environment, Science and Technology, U.S. Embassy in Japan



Dr. Okubo, Dr. Waldren, Mr. Teramoto, Director-General Nakajima. Distinguished guests. I would like to start by thanking you for inviting me to offer brief remarks on behalf of Ambassador Schieffer and the U.S. Department of State. The Ambassador asked me to personally convey his best wishes and hearty

congratulations on the occasion of the Radiation Effects Research Foundation's 30th anniversary.

Even though this is my very first visit to RERF as Minister-Counselor for Environment, Science and Technology Affairs, I am well aware of the very important and groundbreaking work the Foundation has done over the past 30 years. I am honored to be here today to celebrate 30 very important years of RERF's contributions not only to the knowledge and welfare of the United States and Japan, but also to the entire global community.

The Foundation's groundbreaking research on cancer incidence rates in atomic bomb survivors, the late effects of radiation and radiation dosimetry is truly unique both in the size and scope of the studies. It is not an overstatement to claim that RERF's Life Span Study is the most important epidemiological study of radiation effects in humans ever undertaken.

RERF builds on the work started by the Atomic Bomb Casualty Commission nearly sixty years ago. The Foundation's multidisciplinary approach that cuts across several fields of study by researchers from both the United States and Japan forms a core body of knowledge on radiation effects that will benefit generations to come.

RERF's research results are in high demand by scientists all over the world. In the United States, government agencies

such as the Nuclear Regulatory Commission, the Environmental Protection Agency and the Department of Health and Human Services have benefited from the knowledge produced by RERF scientists. Public service organizations like the U.S. National Council on Radiation Protection and Measurements and the National Academy of Science's Advisory Committee on the Biological Effects of Ionizing Radiation have used the Foundation's study results to inform radiation safety standards. These standards directly impact nuclear industry workers, medical personnel and the general public. The information provided by RERF helps experts around the world to assess the impact of accidents involving radiation and the risk to the public of environmental exposures.

Though the Foundation has been around for some time, I understand that much work remains to be done. The children of survivors study—or the F₁ sample—will continue to provide important information on the potential genetic effects of radiation exposure. I am confident that the excellent scientists on Hijiya Hill and in Nagasaki will continue to produce top-notch research on radiation risks for many years to come.

RERF is a potent example of successful U.S.-Japan bilateral cooperation. It is a testament to how close our two nations have become in the past decades.

Even though I did not have a chance to work with Dr. Burton Bennett, the immediate past Chairman of the Foundation, please allow me to take this opportunity to thank Dr. Bennett for his many years of hard work and dedication. I also would like to formally welcome Dr. Okubo as the new Chairman of the Foundation. Finally, I would like to recognize the cooperation and goodwill of the atomic bombing survivors present in the room today. Your support, and the cooperation provided by your respective organizations, has ensured that the knowledge produced by RERF will greatly benefit our children and future generations.

I wish the Foundation and everyone present here today great success in the future. Thank you.

Further research promotion expected through cooperation with local organizations

Tadatoshi Akiba, Mayor of Hiroshima City
(Proxy: **Hiroaki Kurokawa**, Treasurer of Hiroshima City)

I would like to say a few words of congratulations on the occasion of the ceremony commemorating RERF's 30 years since its establishment.

RERF was founded in April 1975 as a nonprofit foundation by an agreement reached between the Japanese and U.S. governments to continue the research of the Atomic Bomb Casualty Commission, which was established by the U.S. government in 1947. Since that time to the present, with the support and cooperation of A-bomb survivors over many years, RERF has endeavored to elucidate health effects of radiation, such as diseases possibly attributable to radiation and the genetic effects of radiation, and accomplished marvelous results.

Its findings not only are used for health management and medical care of the A-bomb survivors but also greatly contribute to the field of radiation medicine in Japan and abroad and play a significant role in the emergency medical care of the radiation-exposed in times of nuclear power plant accidents.

All of these are the results of the devotion and efforts of the RERF chairmen and others concerned for many years. I would like to express my appreciation from the bottom of my heart.

Sixty years have passed since the atomic bombs were

dropped. Yet, not all health or genetic effects of radiation are understood. I sincerely hope that RERF, in collaboration with local institutes, will further pursue its research and thus make even greater contributions to this field.

I also hope that RERF, taking the opportunity of its 30th anniversary and using its valuable experiences and achievements in the research projects that contributed to the health management and medical care of the A-bomb survivors, will take a further leap forward in a new and attractive research environment in keeping with the future development of Hiroshima.

I would like to conclude my address by wishing good health to all of you here today. Thank you.



RERF's research results are important treasure for humanity's survival

Shizuteru Usui, President, Hiroshima Prefectural Medical Association



I would like to say a few words of congratulations on behalf of the Hiroshima Prefectural Medical Association on the occasion of the ceremony and lectures commemorating RERF's 30 years since its establishment.

Looking back, in 1972, individuals living in Hiroshima and involved in medical science and

medical care established a committee for reviewing the ideal vision of how ABCC should be. The committee submitted its constructive report to the then Ministry of Health and Welfare, helping the move forward to reorganization of the institute.

In December 1974, a decision was made to establish a new nonprofit foundation, and at a meeting of the Founding Committee in February 1975, the name, Radiation Effects Research Foundation, or RERF, was officially decided. On April 1, 1975, RERF was inaugurated, with Dr. Hisao Yamashita, Professor at the Keio University School of Medicine, as its

first chairman. All these facts are recorded thus in historical documents.

This year, 30 years since the reorganization from its predecessor ABCC, Dr. Toshiteru Okubo assumed the heavy responsibility of serving as the 6th chairman of RERF.

This year marked the 60th anniversary of the atomic bombings. Yet, I'm sorry to say that there is no safe place in the world today, and we are in a sad and horrifying situation with no assurance that use of nuclear weapons will be abolished completely. Amid such circumstances, RERF has conducted interdisciplinary studies on the health effects of radiation for peaceful purposes and contributed to the health and welfare of the A-bomb survivors. Its findings and reports of scientific studies will serve as valuable treasure for the survival of human beings.

I would like to express my deepest appreciation to all those concerned for their generous efforts despite the difficult financial situation caused by the equal-sharing budget system and fluctuating economies of the two countries for the past 30 years.

In closing my remarks, I would like to ask RERF to address issues that require attention with all the knowledge and wisdom that it can gather and to continue its operations and activities, with a careful eye on its long-term outlook.

Many congratulations on this day.

Full research cooperation in hopes of abolishing nuclear weapons

Sunao Tsuboi, Chairman, Hiroshima Prefectural Confederation of A-bomb Sufferers Organizations

Thank you for your introduction. I am Sunao Tsuboi, and an A-bomb survivor myself. Let me say a few words of congratulations on the occasion of the ceremony commemorating RERF's 30 years since its establishment. RERF not only contributes to the United Nations but also significantly to the broad area of radiation-related research.

Looking back on our lives as A-bomb survivors, we were the first in human history to experience the late effects of radiation caused by atomic bombs.

The anxiety and fear caused by that experience gradually dominated us emotionally, making us less and less confident in ourselves. It is true that during that dark period, we A-bomb survivors turned our back on RERF's research and passed around inconsiderate rumors about RERF. It is also true that we did things that would discourage the noble research on radiation effects, resulting in stalled research. I cannot regret such actions enough. However, we must overcome these problems and move on to the future.

Despite such adversity, RERF has devoted all its energies to scientific research dispassionately and with integrity. I would like to express my sincere admiration and respect for this.

A-bomb survivors earnestly wish for the total abolition of nuclear weapons for the future of humankind, and also are determined to give our full support to radiation effects research.

There are survivors who remain unmarried even now, without having their own families. Such a life is difficult, particularly for female survivors. I would like to take this opportunity to ask RERF to pay close attention and provide kind consideration to those survivors.

I would like to conclude my words of congratulations, believing that RERF will continue to contribute to the future of humanity to the fullest extent. Thank you very much.



Commemorative Ceremony in Nagasaki

RERF's advanced radiation risk research should be continued for a long time to come

Martin Murphy, Environment, Science and Technology Deputy, U.S. Embassy in Japan



Dr. Okubo, Dr. Waldren, Mr. Teramoto. Distinguished guests. On behalf of U.S. Ambassador Schieffer and the U.S. Embassy, I wish to convey our best wishes and congratulations on this, the 30th anniversary of the Radiation Effects Research Foundation.

I am honored to be here today in Nagasaki to celebrate 30 very important years of RERF contributions, not only to the knowledge and welfare of Japan and the United States, but also to the entire global community.

Your groundbreaking research is truly unique both in the size and scope of your studies, and it is no exaggeration to state that RERF's Life Span Study is the most important

epidemiological study of radiation effects in humans ever undertaken.

Your research results are used by scientists all over the world. In the United States, many government agencies have benefited from the knowledge produced by RERF scientists.

Several public service organizations in the U.S. have used the Foundation's study results to inform radiation safety standards. These standards directly impact nuclear industry workers, medical personnel, and the general public. And the information provided by RERF helps experts around the world to assess the impact of accidents involving radiation and the risk to the public of environmental exposures.

Though the Foundation has been around for some time, we recognize that much work remains to be done. The children of survivors study—or the F₁ sample—will continue to provide important information on the potential genetic effects of radiation exposure. We are confident that the excellent scientists in Nagasaki and in Hiroshima will continue to produce top-notch research on radiation risks for many years to come.

Equally important as the work you do is the recognition that RERF has become a shining example of successful U.S.-Japan bilateral cooperation and is a testament to how close our two nations have become.

Please allow me to take this opportunity to again thank Dr. Bennett for his many years of hard work and dedication and to again welcome Dr. Okubo in his new leadership position.

Finally, I would like to recognize the cooperation and goodwill of the atomic bombing survivors. Your support and the cooperation provided by your respective organizations have ensured that the knowledge produced by RERF will greatly benefit our children and future generations.

I wish the Foundation and everyone present here today great success in the future. Thank you.

Establishing a leading international research network of radiation medicine

Hiroshi Saito, President, Nagasaki University



I would like to offer my heartfelt congratulations on the occasion of the 30th anniversary of RERF's founding.

Nearly 20 years ago was when I came to know of RERF. It was soon after I joined Nagasaki University. At a meeting between RERF and the Nagasaki University School of Medicine, Dr. Itsuzo

Shigematsu, RERF Chairman, kindly introduced me to the late Emeritus Professor Ichiro Hayashi of Nagasaki University, whose warm friendship I very much enjoyed. Since then, successive RERF chairmen, namely, Dr. Shigematsu, Dr. Shigenobu Nagataki, Dr. Burton Bennett, and Dr. Toshiteru Okubo, all have offered me warm support, both officially and privately. I am very grateful to them.

Nagasaki University's "International Consortium for Medical Care of Hibakusha and Radiation Life Science" was selected as a 21st century COE program, and Nagasaki University is making efforts to become a center of excellence in the studies of health effects of radiation. This was only possible through the long-standing partnership with RERF. I would like to take this opportunity to express my sincere appreciation to RERF for this.

Furthermore, starting this year, encouraged by Chairman Okubo, RERF, the Hiroshima University Research Institute for Radiation Biology and Medicine, the National Institute of Radiological Sciences, and Nagasaki University will make joint efforts to establish a leading international research network of radiation medicine. This will further enhance RERF's research achievements, which are already established as historical fact. And I believe such work is essential for Nagasaki University's further development. Nagasaki University intends to participate in this effort and to provide full cooperation. I look forward to working with you in this endeavor.

In conclusion, I wish RERF further development and continued prosperity. Thank you.

Further efforts expected for medical relief to radiation disaster victims

*Genjiro Kaneko, Governor of Nagasaki Prefecture
(Proxy: Shinichiro Yamasaki, Director, Welfare and Health Department, Nagasaki Prefecture)*

I would like to congratulate all of you today on the occasion of the 30th anniversary of the Radiation Effects Research Foundation.

RERF, since the establishment of its predecessor, the Atomic Bomb Casualty Commission (ABCC) in 1947, has carried out studies of radiation's health effects on humans and has elucidated various health effects in A-bomb survivors.

I would like to express my sincere appreciation to RERF for its contributions to the health management and well-being of the A-bomb survivors.

Together with Nagasaki and Hiroshima Universities, RERF has solidified its position as a research institute on medical care for the radiation-exposed. I believe that this is a product of the long-standing hard work and efforts by researchers from

the U.S. and Japan, Chairman Okubo, and many others. I would like to express my deepest respect and gratitude to them.

This year marks the 60th anniversary of the A-bombings of Hiroshima and Nagasaki. Many survivors still suffer from late effects of atomic bomb radiation in



both Japan and abroad. We take an active interest in relief measures for survivors in Japan and overseas in collaboration with medical institutes engaged in medical care of A-bomb survivors.

Next year marks the 20th anniversary of the Chernobyl nuclear accident. There, many children affected by radiation suffer from thyroid cancer. The world's people expect Nagasaki to utilize its experience as an A-bombed city to contribute to the promotion of medical care for the radiation-exposed.

The Nagasaki Association for Hibakushas' Medical Care (NASHIM), composed of Nagasaki Prefecture, Nagasaki City, Nagasaki University, RERF, and other organizations, intends to make further efforts to provide medical support to the vic-

tims of the Chernobyl accident and other radiation-related accidents.

While the importance of medical care for A-bomb survivors will continue to increase in relation to radiation-related disaster response, I understand that there is still much to be learned as to what kind of mechanisms in radiation give rise to lifestyle diseases, such as cancer. For this reason, RERF will play an ever more important role in the future.

On the occasion of RERF's 30th anniversary, I hope that RERF will devote itself to radiation effects studies to further contribute to the medical care of A-bomb survivors.

In conclusion, I wish RERF further development and everybody in this room today health and happiness. Thank you.

Anticipating further development as an international center for radiation risk

*Tetsuya Iseki, President, Nagasaki Prefectural Medical Association
(Proxy: Toshihiko Awazu, Vice President, Nagasaki Prefectural Medical Association)*



On behalf of Dr. Iseki, President of the Nagasaki Prefectural Medical Association, who cannot attend the ceremony because of a Japanese Association of School Health meeting, please allow me to read his congratulatory address.

(Congratulatory Address)

On behalf of the Nagasaki Prefectural Medical Association, I would like to extend my heartfelt congratulations to all of you today on the occasion of the 30th anniversary of the Radiation Effects Research Foundation (RERF), and I would also like to express my highest respect for your longstanding and unrelenting efforts.

In 1975, the Atomic Bomb Casualty Commission (ABCC) was reorganized into RERF, as a U.S.-Japan joint organization to carry out studies of radiation effects on human health in Hiroshima and Nagasaki.

Since its establishment, RERF with its excellent scientists and advanced analysis techniques has produced outstanding research results, which has earned RERF national and international praise.

RERF's research results are used as the basis for radiation

risk estimates throughout the world. As you all know RERF greatly contributes not only to medical care for the radiation-exposed but also to establishment of lasting peace for all mankind.

There are still, however, many diseases whose association with radiation is unknown. As for low dose radiation effects on humans, it is not yet clear how living organisms respond to very small doses of radiation, for which novel research approaches are necessary.

It is therefore essential for the A-bombed cities of Nagasaki and Hiroshima to play a central role in uniting organizations concerned in Japan and abroad for the further understanding of radiation's effects on human health.

Furthermore, the conventional dosimetry system, used to determine whether survivors are suffering from A-bomb-related diseases, is to be replaced by a new dosimetry system developed by RERF and others. This new dosimetry system is now drawing considerable attention.

In this light, the importance of research into radiation exposure and health effects is widely understood. The important task will be to consider how to continue such crucial studies and how to recruit and retain competent researchers.

On the occasion of RERF's 30th anniversary, I hope RERF will make further efforts for enhancement and betterment of its research to develop into an international center for radiation risk studies.

In conclusion, I wish RERF further success and Dr. Okubo and everybody here today continued health and happiness. Thank you.

Time for harnessing of collective wisdom to prevent the creation of A-bomb survivors ever again

Sakue Shimohira, President, Nagasaki Surviving Families Association

I would like to congratulate all of you today on the occasion of the 30th anniversary of the Radiation Effects Research Foundation.

One day 60 years ago, an atomic bomb exploded 500 m above the city of Nagasaki and instantaneously reduced the city to ruins.

Children called out for their parents and parents called out for their children, but the bonds between children and parents and between brothers and sisters were forever lost. Those of us who came crawling out of heaps of burned black corpses could neither live like humans nor die like humans, and were affected by diseases of an unknown nature.

It was at that time that the physicians and staff of RERF extended a helping hand to us. When they examined us, they always provided each of us with words of kindness. When they found something wrong, they strongly urged us to go to a hospital for treatment at the earliest possible date, resulting in timely and successful operations and treatment, which saved many A-bomb survivors' lives. I am one of them.

Currently, innumerable nuclear weapons are deployed in the world. We must do something to ensure a world in which no nuclear weapons are used in the future. It is high time that we harness our great amount of collective wisdom. What RERF can do to prevent there from ever being A-bomb survivors again is continue to devote itself to research to ensure continuation of its global contributions.

I would like to extend my sincere congratulations to RERF and to the many people present here today.

In conclusion, I wish all of you good health and prosperity. Thank you.



Congratulatory Messages

Further contributing to US-Japan relations and to the international community's well-being

Chikao Kawai, Director-General, North American Affairs Bureau, Ministry of Foreign Affairs

Dr. Okubo, distinguished guests. I would like to congratulate all of you today on the occasion of the 30th anniversary of the Radiation Effects Research Foundation.

Since its establishment in 1975 as a non-profit organization jointly funded and operated by the U.S. and Japanese governments, RERF has greatly contributed to peaceful purposes in the world, particularly in the field of nuclear safety, by elucidating radiation's effects on A-bomb survivors.

RERF continues to play an important role even now, 60 years after the end of World War II, which is a fine example

of close cooperation between the U.S. and Japan to address issues faced by the international community as good allies sharing the same basic set of values.

In conclusion, on the occasion of RERF's 30th anniversary, I hope that RERF will further contribute to U.S.-Japan bilateral cooperation and to the well-being of the international community through further development of its research activities towards peaceful purposes.

(The MC read the message on behalf of Mr. Kawai of the Ministry of Foreign Affairs.)



In Hiroshima, Mr. Eiji Akimoto (right) and Ms. Rumi Sumitani act as master and mistress of ceremonies, with Ms. Naomi Umehara (left, background) serving as interpreter.



The Minami-ku Cultural Center hall was filled with a large audience.

Remembering sacrifices and contributions made by A-bomb survivors and their children

Ralph J. Cicerone, *President, National Academy of Sciences*

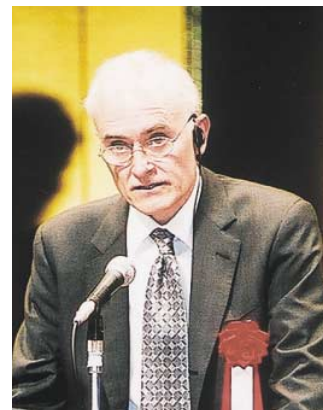
(Proxy: **Kevin D. Crowley**, *Director, Board on Nuclear and Radiation Studies, Division on Earth and Life Studies, National Research Council, National Academy of Sciences*)

On behalf of the National Academy of Sciences, it is my great pleasure to extend congratulations to you and the Radiation Effects Research Foundation (RERF) on the occasion of this week's ceremonies commemorating the Foundation's 30th Anniversary. The high-quality scientific work of your extremely dedicated RERF staff has earned a deserved reputation as "The Gold Standard" for estimation of the risks of health effects following exposure to ionizing radiation. The impacts of those risk estimations extend around the world as most countries have adopted the results of your analyses as the basis for establishing radiation protection standards.

Today we are once again reminded of the sacrifices and contributions made by the many thousands of atomic-bomb survivors and their children. We are especially grateful for the knowledge and understanding gained as a result of the hard

work of RERF staff and the contributions of the citizens of Hiroshima and Nagasaki, for together they form a legacy that continues to serve all humanity.

As RERF's unique and special mission continues to be vital, please accept the good wishes of the National Academy of Sciences for many more years of fruitful investigation and improved understanding. We hope to continue to provide assistance in support of your most honorable endeavor.



Gratitude for 20 years of collaboration since the Chernobyl accident

Anatoly F. Tsyb, *Professor and Academician, Russian Academy of Medical Sciences, Director, Medical Radiological Research Center and Chairman, Russian Scientific Commission on Radiation Protection*

(Proxy: **Natalia Seleva**, *Research Scientist, Medical Radiological Research Center*)



Dr. Okubo, colleagues. On behalf of Russian Academy of Medical Sciences, Medical Radiological Research Center (MRRC), Russian Scientific Commission on Radiation Protection I congratulate you on the 30th anniversary of Radiation Effects Research Foundation.

History made you the first research institute to study radiation effects on humans. RERF has been recognized as a leader in radiation epidemiology and radiation protection. Long-term follow up of A-bomb survivors and thorough documentation provided answers to many questions at the time of tragedy in our country about 20 years ago.

We thank the government and people of Japan for the aid provided to three republics of the Soviet Union affected by the Chernobyl catastrophe. We thank scientists of Japan especially RERF scientists for opening the doors of their laboratories to our specialists and for sharing their knowledge and experience with us. Thanks to you we managed to set up the registry of the

affected people and medical and dosimetric database for more than 600 thousand persons. The next year will mark the 20th anniversary of the Chernobyl accident and the 20th anniversary of the national radiation-epidemiological registry. It is difficult to overestimate contribution of your scientists especially Professors Shigematsu, Nagataki, Shibata, Preston to the implementation of the WHO International Program on Health Effects of the Chernobyl Accident known as IPHECA, Joint MRRC-Sasakawa Memorial Health Foundation Research Project and interpretation of epidemiological data.

You have made your institution as training center and given our junior researchers the opportunity to master new methods and use state-of-the-art equipment at your laboratories, and our senior researchers can carry out joint studies and analyses with your investigators. For twenty years of our cooperation, about 100 MRRC researchers were trained and 10 senior researchers served as visiting professors at RERF and Universities of Hiroshima and Nagasaki. Important role was played by HICARE and NASHIM.

Though years pass and new generations come in our stead, our friendship grows and cooperation becomes closer. We both are carrying out important job for use of invaluable information for peaceful purposes. Let's join our efforts.

I wish you well-being.

Commemorative Lectures

Contributions of RERF to Understanding Radiation Risk and Radiation Protection

Ohtsura Niwa, Professor, Kyoto University Radiation Biology Center



As just introduced, I stayed in Hiroshima for 13 years beginning in 1984. Before coming to Hiroshima, I was almost a layman in terms of radiation carcinogenesis. Under Professor Kenjiro Yokoro's guidance, I started studying radiation carcinogenesis. The experience gained under Dr. Yokoro and through attendance at seminars at the

Radiation Effects Research Foundation (RERF) made me realize that there were numerous themes to be pursued in the field of radiation carcinogenesis.

Today, I would like you to understand that RERF has been engaged in first-rate studies and that these studies are very meaningful to the international community of radiation risk assessment. However, as Mr. Tsuboi mentioned, RERF's achievements would have been impossible without the support of many A-bomb survivors.

When I came to Hiroshima, I was surprised to know that RERF's studies were originally planned during the 1940s and 1950s, and have since been continued steadily. In other words, I was amazed by the fact that this kind of big science had been implemented as early as the 1940s. The first slide shows a photograph of Leo Szilard and Albert Einstein. To avoid persecution by the Nazis, Szilard traveled to the United States, where he asked Einstein to write a letter to U.S. President Roosevelt about concerns regarding the possible development of atomic bombs in Germany. Einstein then wrote a letter to the President, leading to the initiation of an atomic-bomb development project in the United States several years later. Considering these episodes, this photograph is symbolic. Big science involving A-bomb development started with decisions made by only a handful of people.

The next photograph shows a scene from "Einstein's Gift," a Broadway show awarded recently. The main character is Fritz Haber, a very talented German chemist of Jewish ancestry. Haber worked out a method for fixing atmospheric nitrogen. Until then, nitrogen had been mainly obtained from ammonia or Chile saltpeter. However, Haber, together with Robert Bosch, devised a method for fixing atmospheric nitrogen

and opened the way for synthesis of nitrogen fertilizers. With this, it became possible to raise crops even in poor soil, and the two scientists were admired as saviors of humankind and awarded a Nobel Prize. On the other hand, Haber also produced yperite, a notorious poison gas, during the First World War. Yperite was used in battles near Brussels, Belgium, killing or maiming tens of thousands of soldiers. The outcome was so horrific that, as you may know, the use of chemical weapons was later banned throughout the world. Yperite also represented big science. Haber's discovery, which enabled the production of gunpowder without depending on saltpeter imported from Chile, greatly contributed to the conduct of the war. Because of this, Haber's wife committed suicide, and Haber himself fled to Switzerland, where he was pursued by the Nazis and died a very lonely death. His story was dramatized and performed on Broadway. It can be said that the First World War was a war of big science.

Now, I would like to briefly talk about what interests me in terms of the development and use of atomic bombs. In 1913, H.G. Wells predicted the use of such bombs in one of his science fiction novels. Szilard was very interested in atomic bombs, worked out the chain-reaction theory in 1933, and even applied for a patent. In those days, information about which atoms would cause a chain reaction was unknown. In 1938, Otto Hahn discovered that uranium exposed to neutrons would cause nuclear fission. This discovery made Szilard convinced of the possibility of atomic-bomb development, and as mentioned previously, he asked Einstein to write a letter to President Roosevelt. In 1942, the Manhattan Project was launched. Three years later, in August 1945, atomic bombs were dropped on Hiroshima and Nagasaki. Obviously, the Manhattan Project truly represented big science and big industry.

A study of the effects of atomic radiation was initiated by Atomic Bomb Casualty Commission (ABCC) in 1947. Despite a strong interest in health effects, it seems that a definite research direction was not established initially. For several



Albert Einstein (left) and Leo Szilard (first carried in TIME magazine, 1946)

years after initiation of the ABCC project, various problems and doubts surfaced. In 1955, the Francis Committee recommended the conduct of a long-term follow-up of a fixed study population.

The recommendations of the Francis Committee defined a research direction and methodologies for ABCC and RERF, which has continued to the present. Major studies include the mortality study of those directly exposed to the atomic bombs (about 120,000), those exposed *in utero* (about 3,000), and the children of A-bomb survivors (about 80,000), and periodic health examinations of about 20,000 individuals. Another very important aspect is individual exposure dose. Without dose information, it is impossible to determine whether or not a disease is attributable to radiation. The dosimetry system has been revised three times, remarkably increasing the quality of estimates. Preparations for individual dose reassessment (questionnaire surveys, etc.) were initiated as early as around 1955. This early start is very impressive. Needless to say, radiation effects continue throughout one's lifetime. Studies of such effects have been conducted vigorously for as long as 60 years. As today's guests have already emphasized, such studies must be continued for many years to come.

In my view, epidemiological research of this kind regarding A-bomb survivors also represents big science. I am interested in what kind of plans formed the basis for such research. The two persons in this photograph are Drs. Jablon and Beebe, who are considered to have had a decisive impact on ABCC's research direction. I have not met them directly, but heard a lot about them.

Following the reorganization of ABCC in 1975, RERF was established as a binational research institution. RERF is a very unique organization. There is no other example of binational research institution of this kind throughout the world. With the partnership of the two countries involved, high-level research is conducted. Dr. Itsuzo Shigematsu and Dr. Seymour Abrahamson, who is now in the United States, significantly contributed to RERF in terms of research direction and management. Very fortunately, I myself had the pleasure of meeting them sometime after I moved to Hiroshima and receiving instructions from them on various occasions.

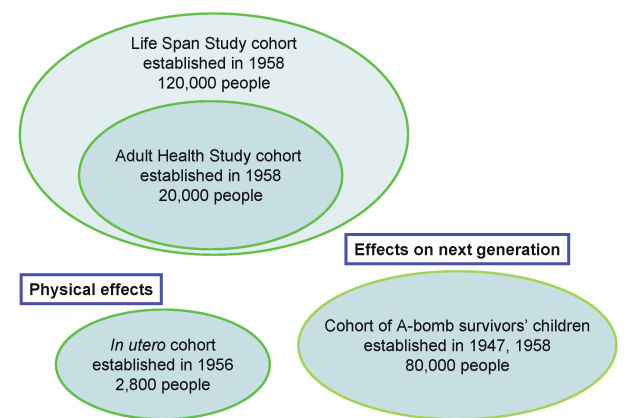
The late Dr. James V. Neel and Dr. William J. Schull, who will make a speech today, contributed to the actual conduct of studies on A-bomb survivors. I also had the pleasure of meet-

ing these two. People with whom I became acquainted after ABCC was reorganized into RERF include Drs. Hiroo Kato, Kiyohiko Mabuchi, Dale L. Preston, Akio Awa, and Shoichiro Fujita, who recently died an untimely death. I learned a lot from these people in terms of RERF's data, A-bomb survivor data, and A-bomb survivor research itself. There are many people whose photographs cannot be shown today because of limited time. In short, I would like you to know that RERF has moved forward thanks to the contribution of so many people.

Using simple graphs, I would like to explain what has been clarified through the epidemiological research on A-bomb survivors. Physical risks can be roughly classified into leukemia and solid cancer. With exposure to 1 Sv, the risk of leukemia increases about 5-fold, and that of solid cancer about 1.5-fold. The linear increase of cancer risk dependent on dose is very important basic information when considering risk, as well as radiation-protection issues. The Life Span Study covers about 100,000 individuals. There is no other example of an elaborate study on such a large population anywhere in the world. The pattern showing an almost linear increase of cancer risk with dose and an attained plateau at greater than 2 Sv has been cited in various places. The other important finding is that the incidence of cancer at 100 mSv or more has statistical significance. The fact that significant excess of cancer is observed at doses of 100 mSv or more suggests that cancer risk at even lower levels of radiation may be observed in the future in this study population of about 100,000 individuals. There is about a 10% variation in cancer incidence rates reported from prefectures in Japan. There is a 40% variation for liver cancer, for example. Under these circumstances, the fact that a risk increase of 5% has been verified with statistical significance demonstrates that the research in Hiroshima and Nagasaki is scientifically sound.

The cancer risk of those exposed to radiation when young is high, but the risk decreases with the elapse of time after exposure. This is also very important data. Even if I, a 62-year-old person, were to be exposed to radiation, I would not have to be overly concerned. However, radiation exposure is very hazardous for children. Thus, the above finding is important for the establishment of relevant policies regarding radiation risk.

As for genetic effects of radiation in children, a great concern for their parents, no such effect has been demonstrated through epidemiological research on about 80,000 individuals. This means that genetic effects are at an unidentifiable level based on a study of a 100,000-person cohort, although such effects might be detected by studying a larger population. This seems to be a "silver lining" for A-bomb survivors and for all humankind. Analysis at the DNA level has progressed gradually. It was reported that DNA-level effects were identified in the areas affected by the Chernobyl accident, even while no similar effects were identified through RERF studies. If RERF data had not been available, reports of study results from Chernobyl suggesting existence of DNA effects might have been accepted prematurely and caused social unrest. I therefore believe that RERF studies have immense significance for society.



Study cohorts: Contribution of both A-bomb survivors and researchers



Dr. Nori Nakamura acts as moderator.

Next, I would like to describe the roles A-bomb survivor research has played in the assessment of radiation risk as well as radiation protection. In Japan, the level of medical exposure to radiation is relatively high, with an annual mean dose of 2.25 mSv per person.

With the addition of natural radiation, the annual mean exposure dose for each Japanese reaches 3.8 mSv. The level of medical exposure increases year after year due to the widespread use of CT technology. The mean dose of medical exposure in developed countries may soon reach as high as 4 mSv or more per year. In considering how to deal with this situation, it is easy to understand the importance of risk assessment.

In Japan, there is a radiation protection law that sets the annual maximum permissible dose for the general public at 1 mSv. For occupational exposure, the mean permissible dose for five years is set at 20 mSv or less per year. However, because of its benefit in terms of disease diagnosis, medical exposure is not considered in the establishment of these permissible doses for the purpose of radiation protection. I will now describe how these values are determined. First, the U.S. Committee on Biological Effects of Ionizing Radiation (BEIR) and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) summarize various reports on risk assessment. Based on a summary of these reports, the International Commission on Radiological Protection (ICRP) makes recommendations on risk assessment and radiation protection standards. These recommendations are issued once every 10 to 15 years. The governments of various countries incorporate these recommendations into their laws, in which specific values, such as the aforementioned 1 mSv figure, are established.

The recommendation of an annual exposure dose of 1 mSv is based on the evidence of a linear increase of cancer risk with dose observed in the A-bomb survivors. Although the current data do not show a significant increase of risk at less than 100 mSv, ICRP has adopted the assumption that the risk increases linearly (to be on the safe side). Since lifetime cancer risk from the data in Hiroshima and Nagasaki is about 10% per 1 Sv, continued exposure to 1 mSv per year until the age of 70 would result in a lifetime dose of 100 mSv (1/10 of 1 Sv). ICRP considers this level of exposure (increase in lifetime risk of less than 1%) to be tolerable.

Although BEIR, UNSCEAR, and ICRP have adopted the linear hypothesis, various other hypotheses have been proposed. The French Academy of Sciences assumes that “no effect is observed under the threshold value.” On the contrary, some assume that “risk per unit dose is higher at low doses

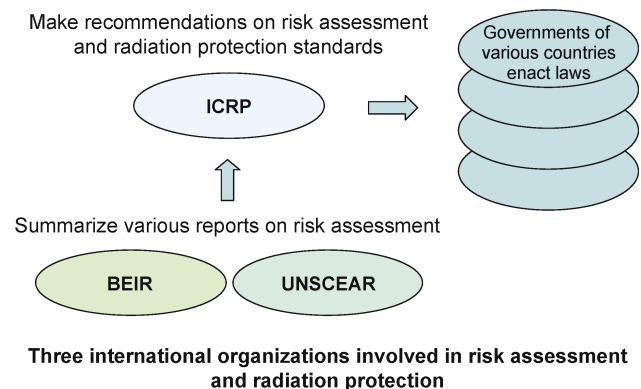
than at high doses.” However, there are no other data so solid as that from A-bomb survivors, which demonstrate the linearity of cancer frequency in this population.

In July 2005, World Health Organization (WHO) published a Chernobyl Forum report. It was reported that, considering A-bomb survivor data, absence of significant effect from the Chernobyl accident is understandable. It was also reported that, although thyroid cancer, a cancer that develops from radioactive iodide accumulating in the thyroid and thereby resulting in a high level of radiation exposure to the organ, has increased in children affected by the Chernobyl accident, no increase of leukemia has been observed in the general population. Here, A-bomb survivor data are used as reference. The French Academy of Sciences assumes the existence of a threshold dose based on comparisons with A-bomb survivor data. Thus, in various published reports, research results from A-bomb survivors are used as reference data, with debate made based on comparisons with such data. In other words, RERF’s study results have always been used as standards for comparison. This is sensible because RERF research employs accurate dose estimates, covers a large number of study subjects, and encompasses all age groups. Moreover, the study that has continued for 60 years has unparalleled credibility. That is how RERF has contributed to the world, impacting so many aspects, from science to policy-making.

The Second World War was a war involving big science. The consequences of that big science, including radiation and the actual state of A-bomb damage and its health effects, can only be clarified by means of science. To clarify these consequences, the lifetime study of A-bomb survivors and their offspring is obviously very important. In my view, A-bomb survivor research can be considered “living world heritage” resulting from cooperative effort by the A-bomb survivors and RERF. I hope that such research is further promoted.

Lastly, I would like to request personally that this internationally unique binational institution be maintained in the future. As for research, I would like the Foundation to investigate problems related to those exposed to the bombs when young, the *in utero* exposed, and the children of the A-bomb survivors. Such studies are important not only for A-bomb survivors, but also for all of humankind.

Thank you very much for providing me with the opportunity for making this presentation.



The Radiation Effects Research Foundation: After 30 Years

William J. Schull, Professor Emeritus and Ashbel Smith Professor of Academic Medicine, Human Genetics Center, School of Public Health, University of Texas, Houston

The history of the Radiation Effects Research Foundation (RERF) is a fascinating lesson in the bridging of the differences between two peoples, two cultures, and two economies in the achievement of a scientific mission. However, that history cannot be described independently of the events that preceded its creation. The achievements of the Foundation are intimately intertwined with those of its predecessor, the Atomic Bomb Casualty Commission (ABCC). The latter came into existence in 1947. When created it was largely funded and managed by the United States. Japan's involvement came mainly through the assignment of personnel to the Commission from the Japanese National Institute of Health (JNIH) through the establishment of a branch laboratory in each of the two cities. The Directors of these laboratories, Drs. Hiroshi Maki and Isamu Nagai, also functioned as Associate Directors of ABCC, and through this avenue had a voice in the policies of the latter institution.

As the years passed it grew more obvious that this form of governance was inequitable. However, little was done to remedy the situation until about 1970 when inflation in Japan and the freeing of the yen to seek its own international value coupled with budgetary issues in the United States forced a reconsideration of the administrative structure and funding of the Commission. The negotiations between the Japanese and American governments that ensued were protracted and their representatives wrestled with many issues. An Act of Endowment had to be drawn specifying the institution's mission as well as its administrative structure, cost sharing, and the relationship of the Foundation to other Japanese supported research institutions. These difficulties notwithstanding an accommodation satisfactory to both governments was reached.

1975

On April 1, 1975, the Foundation came into existence and the Commission was dissolved. In looking back, the timing of the creation of the Foundation was not auspicious. The dollar-yen exchange rate was not only unstable, but the yen had appreciated almost 20% relative to the dollar in the four years since it began to float in 1971. Contributing to the difficulties in this time of transition were geopolitical events, specifically the Yom Kippur War, that triggered the first of the world's oil shocks. The latter began in earnest in October of 1973 when the Organization of Petroleum Exporting Countries (OPEC) imposed an oil embargo against the United States, Western

Europe, and Japan.

The sharply rising price of oil precipitated by this action altered the political and economic relationship among many nations. Each sought the oil it needed to maintain its own economy without regard to the needs of others. While the embargo was lifted in March



1974, a year before RERF came into existence, the oil crisis was a major factor in prompting changes in the Japanese economy. Events of this nature are not commonly described in institutional histories but they are of importance not only because they play a major role in the economic well-being of a nation but because they define national priorities.

This new organization, in which the two nations were to participate on an equal footing, offered continued employment to ABCC and JNIH staff and inherited ABCC's physical facilities—its buildings, equipment, library and the like—as well as all of the accumulated data. The data aside this inheritance was not as munificent as it sounds. Most of the buildings comprising the facility were already 25 years old. No new construction of significance had occurred since 1968, and maintenance of those buildings that did exist had not been exemplary. These same remarks could be made for the major items of equipment. The mainframe, for example, was inadequate for the institution's needs and badly needed replacement. Fortunately, the research programs remained sound. Immediately prior to this transition, however, a major scientific review of the Commission's research program occurred under the chairmanship of James F. Crow, a distinguished geneticist and member of the U.S. National Academy of Sciences. This Committee made a number of recommendations, but the overriding and most important one was "that the basic elements of the ABCC program continue under the Foundation."

Let us now look briefly at the current status of the Foundation and then turn to the events that have intervened in the years following 1975.

2005

Administrative authority continues to rest in a 10-member Board of Directors, five members from Japan and five from the United States. Four of these directors constitute the Executive Committee responsible for the day-to-day activities of the Foundation. As fiscal 2005 opened, the Chairman was Burton Bennett and the Vice Chairman was Toshiteru Okubo; the head of the Foundation's Secretariat, its office of general administration, was Eiji Akimoto, and the Chief of Research and Permanent Director was Eiichi Tahara. (As of 1 July 2005, Toshiteru Okubo replaced Burton Bennett as Chairman, and Charles Waldren and Takanobu Teramoto assumed the offices of Vice Chairman/Chief of Research and Permanent Director, respectively.) A 10-member Scientific Council, with equal representation from the two countries, still exists to provide scientific advice and research counsel, and meets annually to discharge its responsibilities. Funding from the United States continues to come through contractual arrangements between the National Academy of Sciences and the Department of Energy. Japan's contribution stems from the Ministry of Health and Welfare (now the Ministry of Health, Labour and Welfare).

The Passage from There to Here

The scientific and administrative changes implicit in the differences between these two vignettes did not come easily, rapidly, or without compromise, and they have not been trouble-free. Maintenance of administrative equality in an organization as complex and visible as the Foundation is a demanding, continuing task. Administrative and scientific policy, for example, is to be established by the Executive Committee acting on behalf of the Board of Directors, but policy can be established by precedent, and thus inadvertently through the most perfunctory decision. This places a heavy burden on the administrative representatives of the two countries since they must defend their stewardship before their own national agencies, but avoid a parochial attitude that would compromise the integrity of the science or the binational character of the organization.

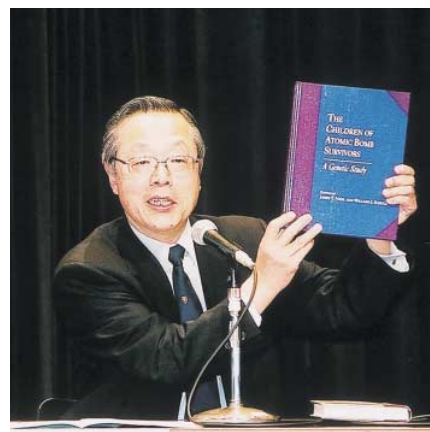
This administrative reorganization has not significantly altered the basic research strategy initiated under the Commission. Most of the studies continue to involve the fixed samples defined as an outgrowth of the recommendations made in 1955 by an earlier special review group, the Francis Committee (the committee derived its name from its chairman, Thomas Francis Jr., a distinguished American epidemiologist and virologist), or by the genetics studies launched in 1948. A larger laboratory component has been added to further investigations at the molecular and cellular levels that were not practical while ABCC existed. The Foundation, even more than its predecessor, has also been involved in collaborative studies with the faculties at the universities in Hiroshima

and Nagasaki as well as the special radiobiological research institutes established in 1961 at these institutions. RERF has continued, indeed broadened, the educational program initiated under ABCC's aegis. Its scientific

personnel, through summer internships and temporary foreign staff appointments, has figured prominently in the training of scientists from a variety of countries. And with the occurrence of the nuclear accident at Chernobyl in April 1986, the Foundation has provided advice and counsel in the design and support of the studies of the exposed populations in the Soviet republics of Belarus, Russia, and Ukraine. The Foundation has also assisted in the studies in the Chelyabinsk oblast in Russia (the site of Mayak, the most important of the Russian military's nuclear weapons facilities, and the Techa River, where thousands of individuals living downstream from the Mayak facility have been exposed to radioactive wastes dumped into the river) as well as in Semipalatinsk, the former Soviet nuclear weapons testing facility in Kazakhstan. Members of the Foundation have served in a consultative capacity to the studies of individuals residing in the high background area in southeast China and in southwest India (Kerala), and in the Taiwanese study of individuals residing in homes exposed to ionizing radiation as a result of the use of cobalt 60 contaminated reinforcing bars in the construction of high rise dwellings.

Both ABCC and the Foundation have been actively involved in efforts to better the lot of the survivors. To further civic involvement, the Foundation, for example, has convened committees of local persons to discuss social and scientific matters of concern to the survivors and to recommend policies to achieve a better mutual understanding of the aspirations of the survivors and the mission of the Foundation. Obviously the means available to address the concerns of the survivors continue to evolve, and new opportunities exist that were not possible even a decade ago. For example, the Foundation now maintains a bilingual website (<http://www.rerf.jp>) where one can find nontechnical explanations of the nature of ionizing radiation and its effects, where the organization of the Foundation is described, where recent scientific publications are highlighted, and where answers are to be found to many frequently asked questions (FAQ).

Thus far my remarks have centered on the administration



Dr. Kazunori Kodama, another moderator, introduces to the audience books written by the speaker.

of the Foundation but obviously its contributions to our understanding of the health consequences of exposure to ionizing radiation have brought it the international acclaim it has. The Foundation's achievements in the 30 years of its existence have been formidable. It has managed two major reassessments of the dosimetry, the DS86 and the DS02, as well as adjustments to both systems. It has completed six cycles of mortality surveillance and 15 cycles of examinations associated with the Adult Health Study. It has added 7,810 accessions to the Tumor Registry and 10,886 to the Tissue Registry. It has undertaken and completed two large mail surveys to document changes in the life style of the survivors of pertinence to their health risks, and has initiated a study of the diseases of mid-life among the children of the survivors. Scientific interest in RERF's studies has focused primarily on three processes—carcinogenesis, mutagenesis, and teratogenesis. It has long been known that ionizing radiation impinges on all of these. However, sixty years ago when the studies of the survivors began, it was not known how frequently impingement occurred, nor what the shape of the dose response relationship might be, nor how long the survivors and their descendants might be at risk. Our knowledge of the health consequences of exposure to radiation was very limited, and that fact invited baseless speculation. For example, the newspapers of the day asserted that Hiroshima and Nagasaki could anticipate an epidemic of grossly misshapen monsters, of cancer, and a foreshortening of life for ill-defined reasons. The work of the Foundation has shown these predictions were false. Through the unstinting cooperation of the survivors and the dedication of the Foundation's employees, our knowledge has increased exponentially, but does this mean that no questions remain? Hardly! Controversy still exists over the effects of exposure to low doses of radiation, those below 10 cGy. Not all investigators accept the linear no threshold hypothesis which has been and continues to be the prevailing view. But there are other unresolved issues. We know that cancer among the survivors has increased by about 8%, and we can identify a dozen or so cancers that have contributed to that increase. However, there are enigmatic omissions. For example, all of the acute forms of leukemia increase with increasing dose, and so too does chronic myelogenous leukemia. But chronic lymphocytic leukemia (CLL) does not. Why?

As to mutagenesis, whatever increase in mutations occurred has been so small as to elude measurement, biochemically or clinically, to this date.

Science today is global; a discovery in one nation is quickly known and pursued in others. Basic advances are no longer temporally or geographically limited. Science shares. In this regard, the Foundation has profited from relatively recent developments in statistics and the computing sciences that originated elsewhere. Two examples are (1) the development of proportional hazards survival regression and (2) the

introduction of distributed computing, that is, the use of programs that operate on multiple computers connected by a network. The former made possible better estimates of the risk associated with exposure to ionizing radiation as well as the assessment of such factors as city, sex, age at exposure, smoking and other variables, and the latter freed investigators from the constraints of mainframe-oriented computing. To its great credit, the Foundation, notably the Departments of Statistics, Epidemiology, and Information Technology, has not been just a passive recipient of these advances but an active contributor to them.

The Importance of These Studies

Ionizing radiation is neither a powerful mutagen nor a powerful carcinogen. As a result, its effects will usually be small and therefore, the worth of any study will be directly proportional to its size, the reliability and accuracy of the estimates of exposure, the duration of the follow-up, and the quality of the clinical information available. If the study is multi-institutional to this list of requirements can be added the comparability of the information across collaborating institutions. Only one study meets all of these requirements, and that is the study of the survivors of the atomic bombing of Hiroshima and Nagasaki. It is the most important of all of the radiation-related studies that have been conducted worldwide. As a consequence, this study and these data are more than a national or binational resource; they are an international one. It is imperative, therefore, that the data and findings are shared as widely as possible. Today, access to these data is easy. The internet provides a means to download the information quickly. ABCC and the Foundation have also always attempted to respond to all reasonable tabulation requests from non-institutional investigators. The aim has been to be as open with the data as possible without intruding on the privacy of the individual survivors, or the ongoing or contemplated research of the Foundation's investigators, who have been instrumental in the collection of the basic information.

As its 20th year of existence began, the Foundation was preparing for its first comprehensive review. The group of reviewers, known as the Blue Ribbon Panel, charged with this responsibility was international in composition. Its nine members, including its Chairman, Roger Clarke, were drawn from Argentina, Australia, Germany, and the United Kingdom as well as Japan and the United States. Their final report contained 21 recommendations regarding the scientific program, future activities, and strategic planning and program management. The tenor of the Panel's regard for the Foundation's activities is captured in the following paragraph:

“The population studies at RERF are unique not only because of the type of exposure received by such large number of subjects, but also because the quality of the

information recorded about each individual is extremely high. It seems unlikely that a comparable opportunity will present itself in the future: and even if it does, it will take 50 years to accrue as much information as now exists at RERF.”

In November 1995, Warren Sinclair, perhaps in anticipation of the Panel’s findings, laid out the bases for the importance of the Life Span Study (LSS) as he saw them. He noted that because the number of persons involved is very large and the range of doses received varies from low to high, the LSS has more power than any other study to do the following:

- (a) to produce risk estimates for total cancer, mortality, and incidence,
- (b) to produce risk estimates for 10–20 individual organs,
- (c) to demonstrate the shape of the dose response,
- (d) to find the lowest doses for which there are statistically significant risks,
- (e) to examine the effect of variables such as age and sex,
- (f) to follow the fate of young cohorts: 0–9 years old and 10–19 at the time of the bombings,
- (g) to demonstrate latency and whether the risk of solid tumors decreases with time, and
- (h) to demonstrate cancer risks in sensitive groups such as fetuses.

The continued relevance of his remarks and the Foundation’s studies can be illustrated by the recent publication of the findings of a multinational study of nuclear workers by Cardis *et al.* in 2005. This study suggests an increase in the risk of cancer at doses substantially lower than those that have been demonstrated in Japan. It is asserted without qualification that “these estimates are higher than the risk estimates used for current radiation protection standards” and by inference that the prevailing standards are wrong! Needless to say, this study and this assertion have not gone unchallenged. Among the shortcomings noted two seem especially telling. First, the study fails to find a significant increase in leukemia yet the LSS (as well as others) indicate that the radiation-related risk of leukemia is the highest for any single malignancy. Second, much of the effect Cardis *et al.* find is ascribable to the study of Canada’s nuclear workers. If this group is removed, there is no significant effect of exposure at the doses these nuclear workers sustained. It is not my purpose here to reiterate the shortcomings of this study but rather to note that without the LSS there is little doubt that the Cardis *et al.* study would have gone unchallenged. Alternatively put, without the Life Span Study no means would have existed to evaluate allegations of the kind the Cardis *et al.* study represents.

A Personal Side

The Foundation is obviously much more than a collection of aged buildings or several thousand scientific publications.

Number of RERF Staff

	1975	2005
Permanent Directors	4	4
Professionals	40	45
Non-professionals	544	217
Total	588	266

It is also more than the sum of its Directors although both the Commission and the Foundation have been exceptionally fortunate to have had unusually able and long-serving chairmen, specifically George Darling and Itsuzo Shigematsu. These two men did much to establish the policies, image, and public acceptance of ABCC and RERF. In the final analysis, however, it is the cooperative spirit of the survivors and the thousands of employees, past and present, whose dedication, skills, and most importantly compassion and sensitivity that have made the Foundation the formidable, highly regarded organization it has become.

Over the years I have been associated with the studies in Hiroshima and Nagasaki, I have been repeatedly impressed by the resilience of the staff. You have adapted to changing leadership, new management needs, evolving scientific programs and new technologies readily and easily. Perhaps I can illustrate my admiration and respect for these achievements by citing an experience of my own. On one of the occasions when I served the Foundation (1978–1980), I found myself the Head of the Department of Epidemiology and Statistics. At that time, this department numbered about 150 individuals, exclusive of the professional and secretarial staff. These 150 persons were divided into four sections (master file and coding, field operations, medical records and coding, and computing) each with its own section chief. (This department was subsequently divided into a Department of Statistics, a Department of Epidemiology, and a Department of Information Technology.) Over these four sections, collectively known as the Statistical Laboratory, presided a laboratory chief. Frankly I had never previously been directly responsible for so large a staff. It is quite uncommon for an academic department to be as big and I was apprehensive. I need not have been. The work of these five individuals bordered on the incredible. They were the department! They had mastered every task that occurred in their section, knew the strengths and weaknesses of their colleagues, and could respond to every stress that arose in the course of my tenure. I consider myself very fortunate to have had their knowledge and skills available.

I have restricted these personal remarks to the nonprofessional staff intentionally. First, there are fewer avenues through which these individuals can be and are customarily recognized. Second, they ultimately determine the fate of the institution, and hence its recognition. Without

their dedication professional involvement, however skillful, would be for naught. In closing, I note that the Foundation and its predecessor, the Commission, are or have been truly remarkable institutions held together by a common purpose, common work, and shared memories. Their effectiveness has been achieved through a web of dependencies and influences probably more intricate than we will ever understand. Ours is a partnership and we must never forget that fact. Our partners are the citizens of Hiroshima and Nagasaki, and in particular those who survived the atomic bombing of these cities. Ultimately, we best serve their cause through the maintenance of a strong research program that carefully delineates the risks of exposure to ionizing radiation and identifies the molecular and cellular processes that radiation impairs.



A sketch of Hiroshima RERF by retiree Mr. Tadataka Kuribayashi



AHS participants and ABCC-RERF former employees listen to lectures (Hiroshima).



A crowd gathers in front of the panel displays in the hall lobby (Hiroshima).



Invited guests and AHS participants attend the ceremony in Nagasaki.



Minami-ku Cultural Center entrance, where a reception desk is located.

Messages on RERF's 30th Anniversary

Impressions of the 30th Anniversary Ceremony of RERF

Sumiko Tomoda, Hiroshima Adult Health Study Participant



It was my great pleasure that I could attend RERF's 30th anniversary ceremony and commemorative lectures held on the fine clear autumn day of November 8, 2005. Shortly after the atomic bombing, I suffered from boils and disease, and had to undergo surgery. With the elapse of 60 years after the bombing, I am now quite healthy and am grateful for that.

At the anniversary ceremony, Dr. Niwa from Kyoto

University made a speech using a slide presentation. His lecture was very technical, but I listened to it attentively, all the while taking notes. On the other hand, Mr. Tsuboi expressed in his speech his feelings as an A-bomb survivor, and so I empathized with him.

I will continue to make efforts to maintain my health and do my best in my own humble way. I appreciate the opportunity given me to attend the ceremony. I hope that no one will ever again experience an atomic bombing as we did, and pray that the world can continue to live in peace. I wish that RERF would continue its health examination program for A-bomb survivors. I also wish that RERF will conduct many studies and develop ever further in the future.

Looking Back at RERF's 30-year History

Tsukasa Uchida, Nagasaki Adult Health Study Participant

It is significant that the Radiation Effects Research Foundation is marking the 30th anniversary of its founding, and I would like to offer my heartfelt congratulations on this occasion.

During its long history, RERF has treated the A-bomb survivors like myself not as mere study subjects but as important guests. At each visit, I am very much obliged to RERF for this.

RERF was established as the successor to ABCC. Vast quantities of research results accumulated by ABCC were submitted to the Ministry of Health and Welfare as purely scientific data, and largely contributed to the establishment of the A-bomb Victims Medical Care Law in 1957. Upon hearing this at the time, I was very much encouraged. Subsequently, the Tokyo District Court in December 1963 ruled that the atomic bombings violated international law, and stated, "It is obvious that the level of the current A-bomb Victims Medical Care Law is not sufficient to provide relief to A-bomb survivors," which strongly spurred establishment of the "A-bomb

Victims Relief Law."

I personally believe that while RERF continues to study medical effects of radiation on human health, its research for the next 30–50 years using the stored lymphocytes from A-bomb survivors in addition to the research results accumulated for the past 30 years will directly make a positive contribution to not only A-bomb survivors but also all humankind. On looking back, there was a time when dark clouds were cast over the continued existence of RERF. However, the U.S. and Japanese governments have established a sound financial basis, which has led to RERF's continued existence to this day. I would like to pay my respect to those concerned for their efforts.



Thirty Years of RERF

Akio Awa, former Associate Chief of Research



In January 1967, I moved from Hokkaido to assume the post of research scientist at the Atomic Bomb Casualty Commission (ABCC)—predecessor of the Radiation Effects Research Foundation (RERF)—and spent 28 years engaging in research until my retirement from

RERF in June 1995. My assignment to this post happened to coincide with the very beginnings of the process of reorganization from ABCC to RERF. With government negotiations between the U.S. and Japan started, all staff members anxiously watched the developments. Not until both governments reached agreement and assured continuation of the research were our worries eased. Nonetheless, it was a start with many problems yet to be solved. In the evening of March 31, 1975, the U.S. flag flying on the roof of ABCC's front entrance had

completed its final mission and was quietly lowered.

It was a chilly but sunny day on April 1 when an RERF inauguration ceremony was held in front of the main entrance with the participation of all employees. With every officer and employee watching, the Japanese flag was raised. I am sure that many people are familiar with this scene, since pictures taken on this occasion are on display in RERF. After introduction of new Chairman Hisao Yamashita and other officers (Vice Chairman LeRoy Allen, Permanent Director Masuo Takabe, and Chief of Research Gilbert Beebe) and speeches, the memorial ceremony was concluded in celebration of the

organization's beginning. I always remember participating in the ceremony with mixed feelings of expectation and anxiety about this new research institute. Thirty years have gone by very quickly. The research activities of ABCC, whose continued existence was in serious doubt back then, have made spectacular progress thanks to the participation of new staff members. I cannot help feeling deep gratification and profound emotion on the occasion of RERF's 30th anniversary. I would like to wish RERF further progress in its research activities and extend my sincerest congratulations on its 30 years of history. November 11, 2005 (Friday)

Memories of the Early Days of ABCC

Isao Moriyama, former President, Hiroshima ABCC-RERF Retirees Association

Congratulations on the 30th anniversary of RERF's founding. Already 60 years have passed since ABCC was established. On this occasion, I was asked for my memories of ABCC-RERF, and so I wrote my own recollections of 38 years.

At the instruction of someone from the U.S. occupation forces in Japan to study genetic effects in A-bomb survivors and non-exposed people, the Atomic Bomb Casualty Commission (ABCC) asked the Red Cross Hospital in Hiroshima for cooperation in a study overseen by Dr. Takeshima, who worked for the hospital at the time. I heard that cooperation was also requested of Kure's city government in order to have the Kure region's residents serve as non-exposed age-matched controls for the study, for which Mr. Nitta, who then worked at city hall, was responsible. As I boarded at the house of one of Mr. Nitta's neighbors in those days and was Mr. Nitta's subordinate in the former Japanese navy, he arranged to have me hired by ABCC on January 8, 1948, to serve as patient liaison. Around that time, employee number totaled slightly more than 20 people.

The number of ABCC staff members rapidly increased, however, in accordance with the almost daily increase in study participants. There were times in which several dozen job interviews were conducted each day, and staff members at

the Hiroshima Laboratory ultimately reached more than 700. Since there were so many workers including drivers for the more than 100 jeeps used to transport study participants, ABCC became well known in Hiroshima.

ABCC relocated to the former Gaisen-kan building in the Ujina district from its initial one-room location in the Red Cross Hospital. By 1950, the Quonset hut facilities at the top of Hijiya were completed, to which ABCC moved in autumn of the same year, and they became a renowned location in Hiroshima. If my memory is correct, ABCC was operated by occupation force funds at the beginning, and when it was reorganized in 1975, RERF became jointly operated by the Japanese and U.S. governments.

I feel grateful that I was able to work without incident for 38 years full of so many memories. I close with best wishes for RERF's continuation in the future as a valuable research institute.



On the Occasion of the RERF 30th Anniversary Ceremony

Yoshio Okamoto, President, Nagasaki ABCC-RERF Retirees Association



I attended the ceremony commemorating 30 years since RERF's establishment in Nagasaki on November 11, representing RERF's retiree association. The commemorative lectures given by Dr. Ohtsura Niwa, Professor at Kyoto University, and Dr. William Schull, which followed the ceremony, were deeply impressive for the retirees. Both speakers offered high praise for the cooperation of the Adult Health Study participants, making me keenly aware of RERF's indebtedness to their support. I was told that more than 140 AHS participants were present at the venue,

and was impressed and touched anew by their strong consciousness and motivation.

As the two speakers mentioned, RERF research results are grounded in the support of its study participants. To obtain their cooperation, ABCC employees in its early days must have made enormous efforts, contacting the study participants and encouraging them to participate in the health examinations at RERF, and carefully conducting routine work to facilitate their continued participation on a biennial basis. Such sincere efforts have been passed on for more than 45 years, establishing ever better relations with the study participants. This, I believe, bore fruit, leading to the large turnout of so many study participants. I would like to pay my deepest respect to the many employees directly and indirectly engaged in such work.

History of ABCC-RERF

August 1945 An atomic bomb was dropped on Hiroshima (6 August 1945).

An atomic bomb was dropped on Nagasaki (9 August 1945).

September Japanese medical teams and scientists from the United States established the Joint Commission.



Dr. Tsuzuki



Dr. Oughterson



Dr. Warren

1945 Joint Commission established

March 1947 A portion of the Hiroshima Red Cross Hospital was leased to establish the Atomic Bomb Casualty Commission (ABCC).



1947 ABCC established in Hiroshima Red Cross Hospital

January 1948 The Japanese National Institute of Health (JNIH) of the Ministry of Health and Welfare formally joined the studies of ABCC.

ABCC was relocated to the former Gaisen-kan, Ujina, Hiroshima.

March A major genetic study was initiated.



1948 ABCC relocated to Gaisen-kan



1948 Home visit

July 1948 Nagasaki ABCC was established in Nagasaki Medical University Hospital (Shinkozen Primary School).

October A major pediatric program commenced in Nagasaki.



1948 Pediatric examination

March 1949 A major pediatric program commenced in Hiroshima and Kure.

July A groundbreaking ceremony was held and construction of research facilities commenced at the Hijiyama site.



1949 Construction in progress at Hijiyama



1949 IBM verifier

August 1949 The ABCC Radiation Census started.
November Nagasaki ABCC was relocated to Nagasaki Prefectural Kyoiku Kaikan.



1949 Nagasaki ABCC relocated to Nagasaki Prefectural Kyoiku Kaikan

January 1950 The Leukemia Survey was initiated.
August The Adult Medical Survey commenced in Hiroshima and was later extended to Nagasaki.
October A national survey of A-bomb survivors was conducted as a supplement to the National Census.
November Construction of new facilities at the Hijiyama site was completed and relocation initiated.
January 1951 A study of children exposed *in utero* commenced.



1950 ABCC relocated to Hijiyama

January 1952 A pilot study on mortality and cause of death began.

December 1953 A 10-bed ward was established within ABCC facilities in Hiroshima.

September 1955 The first annual Buddhist memorial service was held in Hiroshima honoring autopsied survivors at Tokuo Temple, Tera-machi.



1955 First annual Buddhist memorial service

November 1955 The National Academy of Sciences-National Research Council (NAS-NRC) Ad Hoc Committee reviewed ABCC research design, resulting in recommendations to conduct the "Unified Study Program" based on a fixed population.
 The first meeting of the Japanese Advisory Council for ABCC was held in Tokyo.

July 1958 The Adult Health Study commenced.
August Written agreement was exchanged with JNIH for conduct of the Life Span Study. The basis of a cooperative US-Japan research system was established.



1958 Written agreement exchanged with JNIH for conduct of the Life Span Study

June 1966 The first ABCC Open House was held in Nagasaki.

February 1975 A team dispatched by NAS visited ABCC, resulting in a report of the Committee for Scientific Review of ABCC dated March 26.



1975 RERF inauguration ceremony in Hiroshima

- April 1975** RERF inauguration ceremonies were held in Hiroshima and Nagasaki. The first Board of Directors meeting was held in Hiroshima.
- July** The first Scientific Council meeting was held in Hiroshima.
- September** The first meeting of the Hiroshima Local Liaison Council was held.



1975 First meeting of Hiroshima Local Liaison Council

- September 1975** The first meeting of the Nagasaki Local Liaison Council was held.
- January 1977** The full-scale Biochemical Genetics Study commenced.



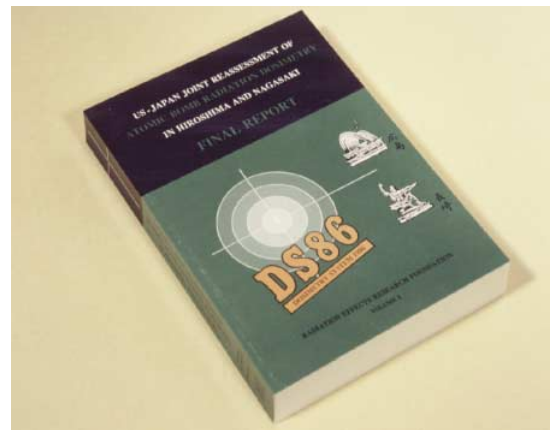
1985 Agreement reached on exchange of researchers with the Laboratory of Industrial Hygiene, China

- June 1979** RERF was designated as a WHO Collaborating Center.
- June 1982** The "A-bomb Radiation Dose Appraisal and Review Committee" was inaugurated.
- February 1983** The first US-Japan Joint Workshop for Reassessment of A-bomb Radiation Dosimetry was held in Nagasaki.



1983 First US-Japan Joint Workshop for Reassessment of A-bomb Radiation Dosimetry

- April 1985** Agreement was reached on exchange of researchers with the Laboratory of Industrial Hygiene, China.
- August** Major departmental reorganization resulted in creation of the Departments of Clinical Studies, Genetics, Radiobiology, Epidemiology, Statistics, etc.
- July 1987** "US-Japan Joint Reassessment of Atomic Bomb Radiation Dosimetry in Hiroshima and Nagasaki" (DS86 final report) was published by RERF.



- September 1987** The final DS86 report was submitted to the ICRP general meeting.
- August-September 1990** RERF participated in the IAEA Chernobyl health effects study group.
- October** A meeting of the WHO Scientific Advisory Committee on Chernobyl accident was held at RERF.

August 1995 The first RERF Open House was held in Hiroshima.

February 1996 The Blue Ribbon Panel held a meeting.



1996 Blue Ribbon Panel meeting

June 1996 The final report of the Blue Ribbon Panel was completed, resulting in recommendations on RERF's future studies.

June 1997 The commemorative symposium for the 50th anniversary of ABCC-RERF was held in Washington, DC.

August The first RERF Open House was held in Nagasaki.

November The commemorative ceremony and lectures for the 50th anniversary of ABCC-RERF were held in Hiroshima.

November 1998 The commemorative ceremony and lectures for the 50th anniversary of the ABCC-RERF Nagasaki Laboratory were held in Nagasaki.



1997 50th anniversary of ABCC-RERF

May 1999 An agreement was reached with the Second Generation A-bomb Victims Liaison Council concerning the health study of A-bomb survivors' children.

October RERF participated in a health study of residents living in the vicinity of the Tokai-mura village criticality accident.

April 2002 RERF researchers were assigned as adjunct professors of Hiroshima University Graduate School.



1999 Agreement reached with Second Generation A-bomb Victims Liaison Council concerning a health study

April 2002 A joint meeting of US-Japan Dosimetry Reassessment Working Groups reached an agreement on a new dosimetry system (DS02) and recommended it as a new system at RERF.



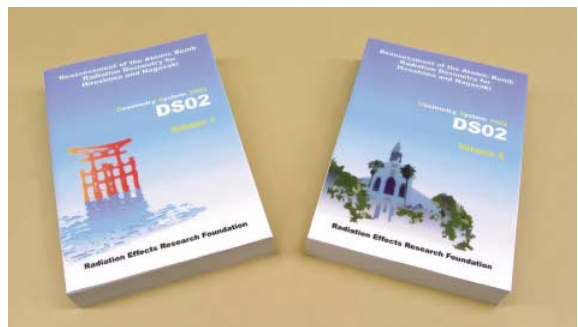
2002 Joint meeting of US-Japan dosimetry reassessment

March 2003 Final approval was obtained for the new dosimetry system DS02.

April 2005 The first meeting of the Analysis Subcommittee for the Scientific and Ethics Committees for the Health Effects Study of the Children of A-bomb Survivors was held in Hiroshima.

November The commemorative ceremonies and lectures for the 30th anniversary of RERF were held on November 8 in Hiroshima and November 11 in Nagasaki.

December "Reassessment of the Atomic Bomb Radiation Dosimetry for Hiroshima and Nagasaki—Dosimetry System 2002" (DS02 report) was published by RERF (delivered and distributed in February 2006).



Introduction of RERF Departments and Secretariat

(as of Decemer 2005)

Department of Clinical Studies



(Hiroshima)



(Nagasaki)

The Department of Clinical Studies examines A-bomb survivors and their children to study health effects [Adult Health Study] and genetic effects [clinical health study on the children of A-bomb survivors] of atomic bomb radiation. The Adult Health Study is a clinical research program on A-bomb survivors (original size at the onset of this study was about 20,000 survivors) who have undergone a health examination every two years since 1958. The clinical health study on the children of A-bomb survivors, which started in 2002, has been conducted to investigate whether the development of lifestyle diseases is related to parental exposure to radiation. The study participants are provided with all the test results and referred to a medical specialist when necessary.

Department of Genetics



The Department of Genetics consists of a cytogenetics group and a molecular genetics group. The cytogenetics group evaluates individual radiation dose by detecting the frequency of chromosome aberrations in A-bomb survivors' blood cells. This group also evaluates radiation dose by measuring the radicals remaining in donated teeth. The molecular genetics group investigates whether *de novo* mutation are increased among the children of A-bomb survivors by studying the DNA of both parent and child. This group is also making efforts to accurately detect the frequency of radiation-induced gene mutations using mice. A study of genetic effects of genomic instability and cancer has also started.

Department of Radiobiology/Molecular Epidemiology



This department is studying the mechanisms of biological effects of radiation from the following three viewpoints. The first involves immunology research, the aim of which is to clarify the mechanisms among A-bomb survivors of attenuation of T-cell immunity and acceleration of sub-clinical inflammation status as well as their relationship with disease development. The second involves immuno-genome research, which seeks to identify genetic factors involved in inter-individual differences in radiation sensitivity or cancer susceptibility. The third involves molecular oncology research, in which the characteristics of cancers among A-bomb survivors are figured out through molecular biological analysis of cancer tissue samples. With these studies, we aim at the improvement of the health of A-bomb survivors, as well as the control of biological effects of radiation and prevention of diseases, which are important tasks for modern society.

Department of Epidemiology



(Hiroshima)



(Nagasaki)

A major role of this department is to elucidate health effects of atomic bomb radiation via epidemiological studies. Follow-up studies on over 200,000 people from the cohorts of A-bomb survivors, *in utero* survivors, and children of A-bomb survivors (F₁) have been carried out for almost 50 years. This department, while considering non-radiation effects, analyzes disease mortality and cancer incidence in relation to radiation dose. The department, entrusted with local cancer registry and tissue registry operations in Hiroshima City, Hiroshima Prefecture, and Nagasaki Prefecture, analyzes data collected for these registries. These data provide valuable information on cancer incidence for not only A-bomb survivors but also the general population.

Radioisotope Facility

The Radioisotope (RI) Facility constitute a common-use laboratory for experiments using unsealed (mainly liquid) RI. At the laboratory, biological effects of radiation are studied utilizing the characteristics of RI that enable measurement of minute sample quantities. The use of RI is strictly controlled based on relevant laws established by the Ministry of Education, Culture, Sports, Science and Technology.



Department of Statistics



The Department of Statistics is involved in four major activities. We collaborate with other RERF researchers in the design and analysis of studies on A-bomb radiation effects on health and longevity of the survivors. We conduct research on statistical methodologies for analyzing the data that arise from those studies. We work closely with the Epidemiology Department to develop and apply approaches to assessing radiation risk, such as the dose response and its modification by other factors (time, age at exposure, lifestyle and genetic factors, and other disease-causing agents). Finally, we are involved in the implementation and refinement of A-bomb radiation dosimetry.

Department of Information Technology



The Department of Information Technology consists of the Systems Technology Section and the Library and Archives Section. The Systems Technology Section provides the network/computer environment necessary for research, manages the valuable data accumulated at RERF, and strives to safeguard private information. The Library and Archives Section manages a library specialized in radiation medicine/biology, provides services relating to RERF's research papers, maintains valuable documents from ABCC-RERF, and handles inquiries from inside and outside RERF regarding the research papers and other documents. The department is also active in technical cooperation with other research institutes involved in radiation emergency medicine and standardization of local cancer registries across the country.

Secretariat



(Hiroshima)



(Nagasaki)

The Secretariat covers the entire range of administrative activities such as personnel management, accounting, and maintenance of facilities, supporting the research departments at RERF. The Secretariat is responsible for the management of major meetings at RERF, including meetings of the Scientific Council and the Board of Directors, as well as for liaison and coordination with other institutions concerned. The department is also responsible for the compilation of various publications aimed at conveying RERF's study results among scientific circles and the general public, preparation and update of RERF's website, and translation and interpretation services. Secretariat staff also escort, whenever required, RERF visitors on tours of the facilities.



Hiroshima Laboratory



Nagasaki Laboratory

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Professor and Head, Division of Radiation Oncology, University of Texas M.D. Anderson Cancer Center

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