A HISTORY OF THE JOURNAL *CANCER RESEARCH*

Commemorating the Journal's 75th Anniversary

AACR American Association for Cancer Research

FINDING CURES TOGETHERSM

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The following history of the journal *Cancer Research* and its predecessors was written by June Eberharter, production editor for the Archives staff in the AACR Executive Office. June Eberharter died two months before this history was published. She had been managing editor for two AACR journals, *Clinical Cancer Research* and *Molecular Cancer Research*, and previously worked at most of the major publishing houses in the Philadelphia area — a mentor and teacher to a generation of editors. In her 13 years at the AACR, she applied her considerable editorial skills toward conquering the disease that ultimately took her life. This publication is dedicated to June.

Kathleen Case, AACR Archivist

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AACR: THE FOUNDING

Gaslights illuminated the streets of Washington on the evening of May 7, 1907, when a group of seven scientists with a mission met at the new Willard Hotel. At the time, the average life expectancy of a baby born in the United States was 47 years, and although pneumonia and influenza were the leading causes of death, with tuberculosis close behind, these men* met to discuss cancer, a disease that had the potential to overtake all the others. They planned to form an association for those working in the cancer field in the hope that having a place to share knowledge and ideas would lead to a cure. The next morning four others† joined them to finalize the proposal, and the new association was born.

* Drs. James Ewing, Silas P. Beebe, William B. Coley, J. Collins Warren, Robert B. Greenough, George H.A. Clowes, and Harvey R. Gaylord.

† Drs. George W. Crile, Leo Loeb, Frank B. Mallory, and Ernest E. Tyzzer.

Figure 1. Richard Weil, MD
Editor, 1916-1917

To further their mission of "sharing observations," the Council of the new American Association for Cancer Research (AACR) recognized the need for a journal to "collect under one cover such contributions as bear in any way upon the general problems of oncology." Those working in cancer believed that such a central voice would stimulate growth of the field. Although there were cancer journals in France, Germany, Italy, and Japan, the AACR's journal would be the first published in English and thus had special significance when it appeared in January 1916 under the leadership of the Editorial Committee. Richard Weil, a strong advocate for the journal on the AACR Council, became editor of *The Journal of Cancer Research* (Fig 1).

The first issue included a seminal paper on cancer mortality in the western hemisphere (Fig 2). Other important early papers included Yamagiwa and Ichikawa's study of the pathogenesis of carcinoma (1); Lathrop and Loeb's report that first implicated hormones in the development of tumors (2); and Tyzzer's discussion of tumor immunity in which he coined the term somatic mutation (3).

The journal quickly attracted so many papers that the Council considered publishing special issues or moving from quarterly to monthly publication. Then as now, authors pressured the editor to shorten the interval from submission to publication, which at that time was about 1 year.

THE JOURNAL OF CANCER RESEARCH

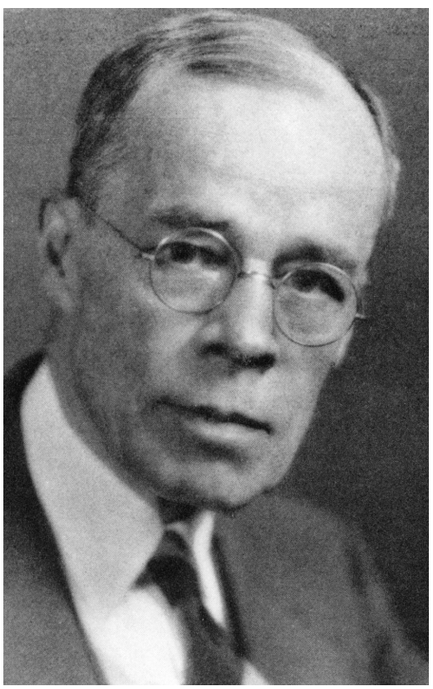
THE JOURNAL OF CANCER RESEARCH

CONTENTS

- **Further Investigations on the Origin of Tumors in Mice: III. On the Part Played by Internal Secretion in the Spontaneous Development of Tumors**
  A. E. C. Lathrop and Leo Loeb
- **The Mortality from Cancer in the Western Hemisphere**
  Frederick L. Hoffman
- **The Effect of Phloridzin on Tumors in Animals**
  F. C. Wood and E. H. McLean
- **Pathological Aspects of Some Problems of Experimental Cancer Research**
  James Ewing
- **Transplantable Sarcomata of the Rat Liver Arising in the Walls of Parasitic Cysts**
  G. L. Rohdenburg and F. D. Bullock
- **Chemotherapeutic Experiments on Rat Tumors**
  Richard Weil
- **Proceedings of the American Association for Cancer Research. Eighth Annual Meeting:** ***Held in St. Louis, April 1, 1915***

Figure 2. First table of contents of *The Journal of Cancer Research*, volume 1, number 1, January 1, 1916

Figure 3. William H. Woglom, MD
Editor, 1917-1924



The cost of publishing and distributing the journal to members as a benefit of membership was a burden on AACR. When the United States declared war on April 6, 1917, many paying AACR members became nonpaying "army members" and departed for foreign shores. Dr. Weil, who had been so instrumental in getting the journal off to an auspicious start, was an early volunteer. He died in November 1917 of pneumonia brought on by exhaustion at Base Hospital, Camp Wheeler, Macon, Georgia, where he was Chief of Medical Service. He was only 41 years old.

After the war, the journal's financial situation continued to deteriorate. In 1921, the Crocker Fund of Columbia University assumed financial responsibility for the journal, although the association continued to provide the content and editorial oversight.

William H. Woglom was the editor in the post-war period. Known for his individualistic approach to problems of science, Dr. Woglom was the author of important scholarly reviews, particularly those on transmissible tumors, and was influential in the AACR and the Crocker Institute. He was known for his precise style of scientific writing and unique ability to convey ideas clearly. He was editor until 1924, when the Crocker Institute formally took over publication.

The director of the Crocker Institute, Frances C. Wood, became editor in 1924. The AACR continued to provide the journal to members and paid the Crocker Institute for each subscription. The first Review articles were published, as were short clinical papers dealing with radiation therapy and surgical treatment of some cancers (4-6).

With the onset of the Depression in 1929, the association's plans for cancer research and the journal were once again disrupted. The AACR was forced to cut dues by more than 70%, and financial deficits continually jeopardized the future of the journal. Of particular concern were long articles with many illustrations, which were expensive to produce.

Figure 4. Frances C. Wood, MD
Editor, 1924-1940

THE AMERICAN JOURNAL OF CANCER

In 1931, the Chemical Foundation offered to fund expanding the scope of the journal to include clinical treatment, both surgical and medical, as well as content covering education and public health. The publication became *The American Journal of Cancer* in 1931. The journal also became the official journal of the American Society for the Control of Cancer. Dr. Wood continued as editor. Among the important early papers was seminal work by Furth and Kahn, a study of malignant cells maintaining the hematopoietic tumor, which was the first such article to refer to cancer stem cells (7).

The financial situation of the Chemical Foundation became a concern, and pressure increased on the AACR Council to support the journal. In 1941, the AACR was incorporated and began publishing *The American Journal of Cancer* under another new title, *Cancer Research*.

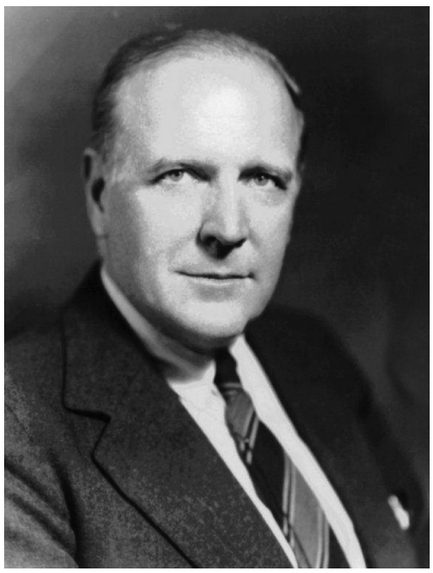


Figure 5. James B. Murphy, MD
Editor, 1941-1944

CANCER RESEARCH, THE NEW JOURNAL

Figure 6. Stanhope Bayne-Jones, MD
Editor, 1946-1947

Funding for the new journal was obtained from several foundations and from Eli Lilly Company, and the AACR's Board of Directors (formerly the Council) voted to allocate part of their member dues to the journal. An advisory board was made up of the chair of the Editorial Committee and one representative from each foundation that provided financial support: the International Cancer Research Foundation, The Jane Coffin Childs Memorial Fund for Medical Research, and The Anna Fuller Fund. The Editorial Committee had editorial oversight and was composed of James B. Murphy, Chair; Stanhope Bayne-Jones, Secretary; John J. Bittner; Alexander Brunschwig; Louis F. Fieser; Jacob Furth; William U. Gardner; Balduin Lucké; Murray J. Shear; and Shields Warren. Dr. Murphy served as editor.

The first year's issues contained ground-breaking articles by Charles Huggins (later a Nobel Laureate) and Clarence Hodges on the effect of castration on prostate cancer (8) and by Isaac Berenblum on the mechanism of carcinogenesis (9). Soon, however, the number of submissions diminished with the number of authors called to serve in World War II. The AACR was determined to keep publishing the journal during the war, even if that meant fewer issues.

THE POST-WORLD WAR II YEARS

Dr. Woglom re-assumed the editor's responsibilities immediately after the war(1945-1946). In mid-1946, General Stanhope Bayne-Jones returned to civilian life, and he took on the editorship under grim circumstances. The printing company had changed ownership and eventually ceased operations, with many manuscripts still in its possession. To complicate matters, Dr. Bayne-Jones soon was appointed to head the New York Hospital-Cornell Medical Center, which necessitated his resigning as editor. Balduin Lucké became the new editor in 1947, and he, along with Dr. Mildred Schram, long-time chair of the Advisory Board, managed to get the journal back to a regular printing schedule.

The Advisory Board recommended forming a Board of Managers, comprising five members responsible to the Board of Directors. The Board would select the editor and a full-time business manager who would be responsible for prompt publication and funding. The Advisory Board was dissolved, and Dr. Schram relinquished her responsibilities with the gratitude of the association. The first Board of Managers of Cancer Research consisted of Balduin Lucké, Paul E. Steiner, Albert Tannenbaum, E. W. Shrigley, and Clarence Cook Little.

Figure 7. Balduin Lucké, MD
Editor, 1947-1948

THE JOURNAL RESTRUCTERED: 1950-1959

The first issue of *Cancer Research* published under the auspices of the new Board of Managers and new publisher (University of Chicago Press) appeared in 1949. Charles Huggins, AACR president, announced in the January 1949 issue the formation of a holding company for *Cancer Research*, the officers of which would be the officers of the AACR (10). He also announced the appointment of the new editor, Paul E. Steiner. Associate editors included William U. Gardner, Balduin Lucké, and Harold P. Rusch. The AACR Board of Directors later changed this structure, forming an executive council and assigning financial management to the AACR Secretary-Treasurer.

Harold P. Rusch took over the leadership of the journal in 1950, and in the ensuing years, the journal thrived editorially. Dr. Rusch was the longest-serving editor of the journal, retiring at the end of 1964. He was a prominent researcher and director of the McArdle Laboratory for Cancer Research at the University of Wisconsin until 1972. Under his aegis, the journal's pages increased more than 90%, and the number of subscribers increased almost 75%. In 1953, *Cancer Research* began publishing the Proceedings of the AACR Annual Meeting as the April issue.

This was an exciting time for science. Biomedical advances built on research conducted during the war and benefitted from the country's feelings of postwar exuberance. The molecular structure of DNA was discovered, as were important anti-cancer drugs such as interferon, 5-fluorouracil, cyclophosphamide, and methotrexate. Partial and complete remissions were obtained in acute leukemia with combination therapy. In 1955, the Cancer Chemotherapy National Service Center was created to obtain and test cancer drugs. Papers on subjects such as neoplastic diseases in infants and children, chemotherapy of leukemia, and carcinogenesis appeared in *Cancer Research* during this time (11-14).

Figure 9. Harold P. Rusch, MD
Editor-in-Chief, 1950-1964

Jane Cooke Wright, a prominent cancer researcher and an AACR member, used methotrexate to achieve remission of solid tumors, as opposed to its use in blood cancers (15). Later, her group would also achieve remission of mycosis fungoides with methotrexate. Financial support for the journal came through grants from the American Cancer Society, the Anna Fuller Fund, the Jane Coffin Childs Memorial Fund for Medical Research, and the Elsa U. Pardee Foundation.

Dr. Rusch was ably assisted by Elizabeth C. Miller (Fig 10 *top*), the journal's first formally appointed assistant editor and a noted researcher in her own right. Dr. Miller would later be elected AACR President. He was also assisted by Ilse L. Riegel (Fig 10, *bottom*), a senior scientist at the McArdle Laboratory, who served as assistant, associate, and managing editor from March 1955 through December 1964. Dr.Riegel was the coauthor of the history of the AACR from 1907-1940 (16).

Figure 8. Paul E. Steiner, MD, PhD
Editor-in-Chief, 1949

Figure 10 (*top*). Elizabeth C. Miller, PhD
Assistant Editor, 1953-1963

Figure 10 (*bottom*). Ilse I. Riegel, PhD
Assistant, Associate, and
Managing Editor, 1955-1964

Figure 11. Michael B. Shimkin,MD
Editor, 1965-1969

THE JOURNAL MATURES: 1960-1969

The AACR was not isolated from the many societal changes of the 1960s. The association adopted a more international viewpoint, and non-American scientists were recruited to become corresponding members. Although the Board of Directors had decided that AACR would not take part in public education or comment on public issues, the atom bomb tests in 1962 by the Soviet Union riveted the world's attention. The AACR did not boycott the 8th International Cancer Congress to be held in Moscow because it was believed that a boycott would be more harmful to the International Union than to the Soviet Union, but the AACR Policy Committee did ask that a factual article on consequences of atomic testing be prepared for *Cancer Research*. This article appeared in the November 1962 issue (17).

Although the idea of "guest editorials" had been discussed, the journal adopted the policy of having all editorials "initiated and approved" by the Board of Directors. A new section titled "Comments" was introduced to provide a forum for opinions of members and others. Associate editors assumed a new role, which was to coordinate reviewers' comments and make a recommendation to the editor on a paper's suitability for the journal.

SMOKING AND CANCER

Research on the connection between cigarette smoking and cancer had been appearing in scientific journals regularly (18-20), including in *Cancer Research* (11, 21), when "Smoking and Health: Report of the Advisory Committee to the Surgeon General" (22) was issued in 1964. According to Surgeon General Luther Terry, the report "hit the country like a bombshell." The lay press considered it front-page news, and it was a lead story on every radio and television station in the United States and many abroad. The report held cigarette smoking responsible for a 70% increase in the mortality rate of smokers over that of non-smokers. The report estimated that average smokers had a 9- to 10-fold risk of developing lung cancer compared with non-smokers, and heavy smokers had at least a 20-fold risk.

During the 1967 AACR Annual Meeting, the Policy Committee prepared a Policy Statement Concerning Smoking, which was approved by the Board of Directors and published in *Cancer Research* (23). The Surgeon General's report was the start of a decades-long public health campaign to stamp out the use of tobacco products. The campaign continues: *Cancer Research* published an AACR statement on smoking in 2010, and statements appeared in other AACR publications (24, 25).

Dr. Rusch's long and distinguished tenure as editor of *Cancer Research* ended in December 1964, and on January 1, 1965, the Board appointed Michael B. Shimkin, Professor of Medicine, Fels Research Institute of Temple University School of Medicine, Philadelphia, as his replacement. The Board also formed an editorial board to assist with peer review of the manuscripts and set a term limit of 5 years (renewable once) for editors. During Dr. Rusch's term, the interval from manuscript receipt to publication averaged 6 months, down from 12 months in the formative years, but Dr. Shimkin found this interval still too

long and made shortening it one of his goals. Dr. Shimkin sought to attract more clinical and virology papers. He also instituted the special historical covers that would distinguish the journal for the next 35 years. (Dr. Shimkin continued as cover editor for the journal for several years after he stepped down as editor.)

The editorial offices were relocated to the Fels Institute in space made available through Sidney Weinhouse, director of the Fels Institute. Dr. Shimkin improved the appearance of the journal, including use of better paper and a new design that would enable the same amount of material to be published on fewer pages. Publishing had moved from the University of Chicago Press to Williams & Wilkins in Baltimore in 1964; in 1967 publishing was moved to to Goodway, Inc., in Philadelphia, with the hope that having both the editorial office and the publisher in the same area would shorten production times. The number of manuscripts submitted and the number of pages published jumped exponentially. Important papers published included those by George and Eva Klein and colleagues on sarcomas (26), Nowell on phytohemaglutinin (27), Old and colleagues on the reticuloendothelial system and neoplasia (28), the Kleins and colleagues on Burkitt's lymphoma (29), and Clark and colleagues on melanoma (30). Victor A. Triolo's ambitious history of the 19th century foundations of cancer research captured the excitement that motivated researchers (31, 32). Three new features were introduced in this period: Brief Communications, Letters to the Editor, and Book Reviews.

Careful attention to finances was required. Financial subsidies from institutions, such as the National Cancer Institute and the American Cancer Society, continued to be important. Dr. Shimkin believed that publication costs might be added to grants so that page charges could be paid to journals, an idea that would come to fruition in the 1980s.

AACR LEADER PROFILE

HUGH J. CREECH, PHD

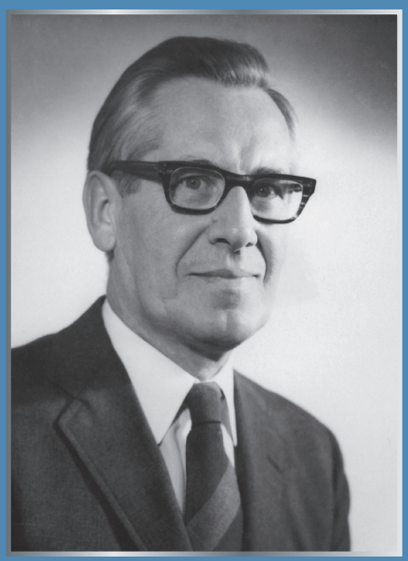


Figure 13.

Hugh J. Creech was AACR Secretary-Treasurer from 1952 to 1977. During those 25 years, the association grew from about 800 members in the United States to 2500 worldwide. The challenges he faced were many: He constantly had to find funding to make up the shortfall between the amount of money the journal earned on subscriptions and the actual cost of producing it, which increased every year. This put to the test his negotiating skills with both large foundations and the printing vendors on an almost-daily basis. He minded the books for 25 presidents and kept the organizational minutiae from interfering with the important educational mission of the association and the journal, all while serving as chair of the Chemotherapy Division of the Institute for Cancer Research at Fox Chase Hospital from 1945 until 1970, where he investigated immunologic and antitumor effects of chemotherapy drugs. Dr. Creech also served as AACR president (1978) and then took on the task of archivist until 1999. Upon Dr. Creech's retirement as Secretary-Treasurer in 1977, Dr. Weinhouse, then editor of *Cancer Research*, wrote the following, which was later printed in the *Proceedings of the AACR* (March 1978, p. 455):

> On July 1, 1977, there will be a milestone in the history of the association. On that date, Hugh Creech will retire from the position of Secretary-Treasurer, a post he has held with distinction for 25 years. This span of years has been exciting for biomedical science but epoch-making for cancer research, as it has been also for the association. During this time Hugh Creech has been the focus of the association 's many activities and the one single person responsible for its high stature in the community of cancer researchers. No one could have been more effective or more unselfish in his devotion to all of the association's activities, but his service with respect to the financial matters of both the association and the journal deserves special appreciation. During the past 8 years, it has been my pleasure to work closely with Hugh Creech on the journal's business affairs, and I know better than most how effectively and prudently they have been managed. His constant attention to the journal and his understanding and helpful concern for the editorial staff will be remembered with deep appreciation.

DOCUMENTING THE WAR ON CANCER: 1970-1979

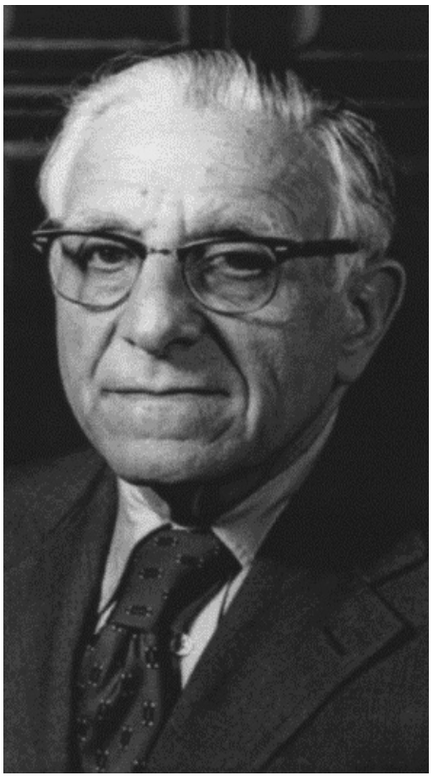


Figure 14. Sidney Weinhouse, PhD
Editor, 1969-1979

Dr. Shimkin relinquished his editorship in 1969 when he relocated to California, and Sidney Weinhouse agreed to step in, the first of several directors of Philadelphia's Fels Institute to serve as editor of the journal. Dr. Weinhouse presided over a journal continuing to grow in size (reaching 5307 pages in 1979) and prestige. The journal published papers that interpreted the field of cancer research broadly and included fundamental work on cell biology, cell regulation, and metabolism (33-35). In 1977, the journal published reflections on cancer research by Isaac Berenblum, who is credited with the discoveries that explained the basic mechanism of carcinogenesis (36).

In 1970 an editorial committee responsible to the Board of Directors was reestablished. It was anticipated that this committee, with its advice and counsel, would assist the editor and share responsibility for major policy matters. The committee was renamed the AACR Publications Committee in 1977 and continues to provide guidance to the editor and the publisher of *Cancer Research* and all AACR publications.

The journal was in a good position to record the giant strides being made by cancer researchers in the 1970s. In response to persuasion by many prominent scientists and lay people, in 1971 President Richard M. Nixon signed the National Cancer Act, which authorized the NCI director to coordinate cancer research activities. Passage of the act was informally considered the beginning of the war on cancer. It had an effect on cancer chemotherapy development and research expansion for many years to come. In 1974, the FDA approved doxorubicin, an anthracycline antibiotic from Streptomyces bacteria for cancer treatment (37), and in 1978, tamoxifen, a breakthrough drug in the treatment of hormone-driven cancers and an important weapon against recurrence, was approved by the FDA (38), as was the combination of cisplatin with other drugs for the treatment of metastatic testicular and ovarian cancer (39). Cisplatin was the first platinum-containing drug to be approved for cancer treatment and continues to be widely used today. Studies of these and other important drugs appeared in the pages of *Cancer Research*.

Figure 12. An historical cover highlighing the work of Bernardino Ramazzini.

A DECADE OF INNOVATION: 1980-1989

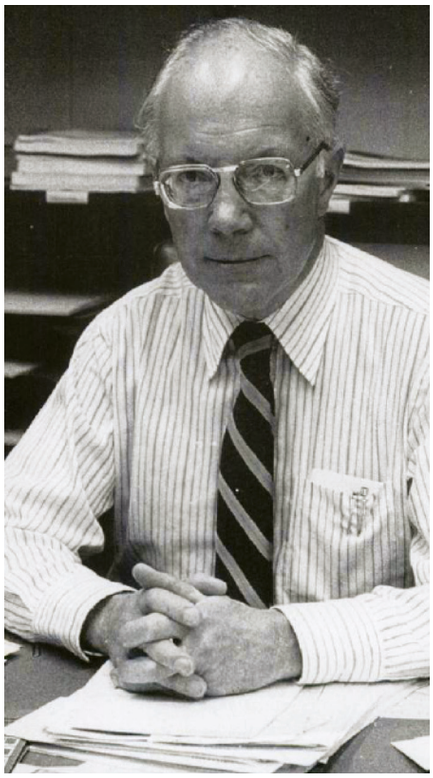


Figure 15. Peter N. Magee, MD
Editor, 1980-1989

After Dr. Weinhouse retired as editor, the job of steering the journal in the new decade of advances in cancer research was passed to another director of the Fels Institute, Peter N. Magee. The 1980s were an exciting time for cancer research. In 1979, the p53 gene, the most frequently mutated gene in human cancer, had been identified, and its importance was subsequently spelled out in the pages of *Cancer Research* (40-43). Hart and Fidler published their important work on tissue selectivity in metastasis in 1980 (44). In 1982 the first major DNA sequence databases were established in the United States and Germany. Colonoscopy came into use as a tool to screen for colon cancer, and the NCI launched the Community Clinical Oncology Program to identify NCI-designated Cancer Centers to participate in clinical trials. One of these trials resulted in the adoption of lumpectomy followed by radiation as the standard protocol for non-metastatic breast cancer. The HER2 proto-oncogene, whose overexpression in HER2 protein occurs in 25% of breast cancers, was cloned, and researchers developed the polymerase chain reaction and fluorescence in situ hybridization techniques. The connection between lung cancer and cigarette smoking was further documented, and the journal published the AACR position paper on smoking and lung cancer that was presented at the 75th AACR Annual Meeting in May 1984 (45). Robert Gallo and his colleagues at NCI, whose work appeared frequently in *Cancer Research* (46, 47), isolated the T-cell lymphotrophic virus 1 (HTLV-1), which causes adult T-cell leukemia/lymphoma and several other diseases, and a September 1985 supplement to the journal contained papers from an NIH symposium dedicated to this important work (48).

To improve dissemination, the journal began publishing twice monthly in 1987. At that time, the journal was receiving about 25% of manuscripts from outside the United States, so international associate editors were added. Early in his tenure, Dr. Magee revised the format of the journal to give more prominence to clinical studies. "Perspectives," which served as a forum for fresh insights and personal viewpoints, were introduced in 1983 and found a ready audience. The NCI grant, a major source of support for the journal since 1953, terminated in 1985, which necessitated the introduction of page charges to help defray publication costs.

In 1989 the journal published a consensus statement from the International Union Against Cancer urging consideration of new approaches to diagnose cancer and to address the role of endoscopy in detecting premalignant conditions and cancer in the gastrointestinal, respiratory, and urinary tracts(49). This report was complementary to consensus statements from the working parties on radiodiagnosis, immunodiagnosis, and cytology.

AACR LEADER PROFILE

MARGARET FOTI, PHD, MD (HC)

Figure 16.

During Margaret Foti's tenure as managing editor of the journal (a position she held in addition to her other AACR roles), the number of papers submitted and published increased dramatically, and the quality of the journal greatly improved. Computers had become the ubiquitous office tool, and time to publication was reduced, a metric that was constantly emphasized. The quality of peer review was improved with the addition of associate and senior editors. Dr. Foti garnered high praise from each editor for her skillful handling of challenging day-to-day operations.

Dr. Foti undertook a new portfolio of responsibilities when she was appointed AACR executive director (chief executive officer), in addition to her role as AACR publisher. The Board had decided that the size and complexity of the association required an on-site executive to oversee day-to-day operations. In appointing her to this new position in 1980, Dr. Frederick S.Philips, AACR Secretary-Treasurer, noted that the Board of Directors was confident of her ability to conduct the new office with the same competence and devotion to the objectives of the association that characterized her service as managing editor of *Cancer Research*. In this new capacity, Dr. Foti managed the association headquarters as well as Cancer Research, Inc., which had administrative and fiscal responsibility for *Cancer Research*.

Dr. Foti has always taken special interest in fulfilling the founders' goal of publishing pertinent information for researchers in a timely manner. In addition to her work on *Cancer Research*, she was instrumental in launching seven other highly regarded AACR scientific journals: *Cancer Epidemiology, Biomarkers & Prevention*; *Cell Growth & Differentiation*, which became *Molecular Cancer Research*; *Clinical Cancer Research*; *Molecular Cancer Therapeutics*; *Cancer Prevention Research*; *Cancer Discovery*; and *Cancer Immunology Research*.

ANTICIPATING THE NEW MILLENIUM: 1990-1999

The new decade found the offices of the association and the journal relocated across from Independence Hall in Philadelphia. Once again, AACR looked to the Fels Institute for an editor, and its director, Carlo Croce, became editor in 1990. In 1991, the journal celebrated 50 years of continuous publication with a symposium presented at the 82nd Annual Meeting. "Discoveries and Opportunities in Cancer Research: A Celebration of the 50th Anniversary of the Journal *Cancer Research*" included "cutting-edge presentations on the molecular genetics of cancer, tumor virology, carcinogenesis, tumor immunology, cancer biology, chemotherapy, radiotherapy, biological response modifiers, and cancer prevention" (50).

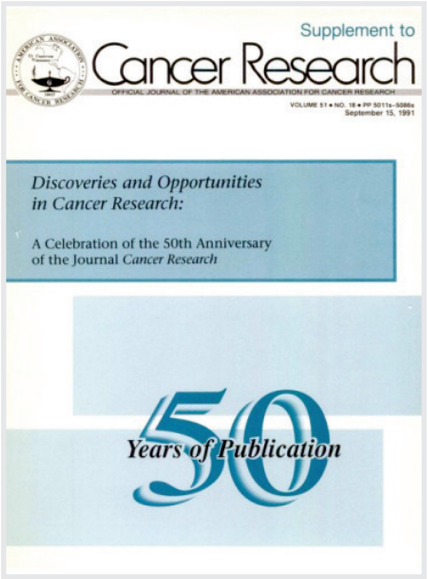


Figure 17. Cover of the 50th Anniversary Supplement to *Cancer Research*, September 15, 1991

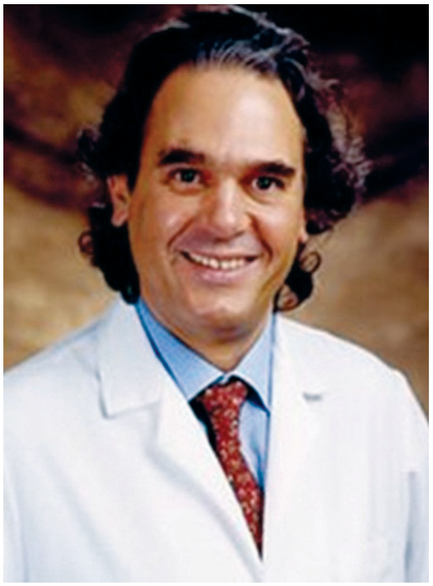


Figure 18. Carlo Croce, MD
Editor-in-Chief, 1990-1999

Participating were noted researchers such as Drs. Carlo Croce, Karen Antman, Eli Glatstein, Lance Liotta, Steven Rosenberg, and Bernard Weinstein. During its first 50 years, the journal had seen a greater than 60% increase in cancer research information to process, and advances in molecular biology and biotechnology in the 1990s held promise for even more information.

The journal reflected major progress in breast and ovarian cancer research with the cloning of the BRAC1 and BRAC2 genes, and an international workshop reported that mammography reduced breast cancer mortality in women aged 50 to 69. Mammography quality standards were adopted throughout the United States, and the National Cancer Advisory Board recommended that all women aged 50 or older receive screening mammograms. The finding of a decrease in contralateral breast cancer incidence following tamoxifen administration for adjuvant therapy led to the concept that the drug might play a role in breast cancer prevention. To test this hypothesis, the National Surgical Adjuvant Breast and Bowel Project initiated the Breast Cancer Prevention Trial (P-1) in 1992 (51). Tamoxifen was subsequently found to reduce the incidence of invasive and noninvasive breast cancer by almost 50% among women at high risk for the disease (52).

Several important cancer drugs, such as tretinoin, topotecan, irinotecan, and the first biologic, rituximab, were approved, and cancer researchers received a valuable weapon when Stephen Fodor developed the technology to produce DNA microarrays. A seminal paper in *Cancer Research* by Kastan and colleagues (53) documented the p53-dependent DNA-damage signaling pathway and one of the first p53 target genes, and Greenblatt and colleagues (54) later found clues to cancer etiology and molecular pathogenesis in mutations in p53.

The first sustained decline in cancer death rates since record keeping began in the 1930s was reported in 1996, a sign that decades of research was having effects at the bedside. Dr. Croce broadened the content scope to include more sub-disciplines, as these were considered critical to the mission of the journal. He set the goal of an acceptance rate of 35%, a significant lowering of the mid-50% acceptance rate when he began his tenure. By the end of his term, the acceptance rate was 27%. Dr. Croce also sought to increase the number of Perspectives and decrease the amount of time for peer review. The journal began a section titled, "Public Issues": short articles on funding, training, and public education. Supplements, such as those on leukemia (55) and non-Hodgkin's lymphoma (56), continued to appear.

Dr. Croce introduced the popular "Advances in Brief," short, definitive reports of exciting findings. These reports were credited with greatly increasing the number of submissions, and they received wide attention from the lay media, including the major networks and wire services. Kastan and colleagues (57) used Advances in Brief to update their important work on p53. By 1991, more than half of the content was edited online, further reducing submission to publication time. An emphasis on genetics attracted important papers (58, 59), including the work of Shutte and colleagues on the DCP4 gene (60).

A NEW CENTURY OF DISCOVERY: 2000-2009

Cancer Research began the new century under the leadership of Frank J. Rauscher, III, from the Wistar Institute in Philadelphia. Important new therapies continued to be developed and reported, with articles on raloxifene and trastuzumab and a new vaccine against cervical and vaginal cancer, Gardisil (61, 62).

Proliferating internet resources for scientists presented opportunities and challenges for AACR to expand online products and license content worldwide. One of Dr. Rauscher's goals was to introduce an online version of the journal, which was accomplished in 2001. The publishing group also used the internet to shorten review time by instituting a web-based review process in 2003, enabling peer review to be shortened from an average of 66 days to 44 days. (A second-generaton review system was launched in 2007.)

Dr. Rauscher expanded interpretive information by appointing editors to solicit short reviews on new research and named George Prendergast deputy editor for reviews to lead this initiative. The AACR's first online-only publication, *Cancer Reviews Online*, was launched in 2007. It included review articles from all of the AACR journals; Dr. Prendergast provided commentary on selected reviews.

The editors set a goal of a 20% acceptance rate. As *Cancer Research* continued to lower its acceptance rate each year, AACR launched new journals to accommodate articles with appeal to specialized audiences, with four of the total of eight AACR journals being launched after 2000.

Science was undergoing exciting changes in the 2000s, among the most important was sequencing the human genome. The Human Genome Project, which was formally founded in 1990 by the U. S. Department of Energy and the National Institutes of Health, had been expected to take 15 years, but the first available rough draft assembly of the genome was completed sooner than expected at the University of California, Santa Cruz, and ongoing sequencing led to the essentially complete genome in April 2003. In May 2006 the sequence of the last chromosome was published. Academic and research centers around the world had cooperated in the project, which had the primary goal of determining the sequence of chemical base pairs that make up DNA and of identifying and mapping the approximately 20,000 to 25,000 genes of the human genome from both a physical and functional standpoint. Sequencing of DNA helped in identifying oncogenes and explaining how mutations linked to different forms of cancer and formed the basis for today's precision medicine. Reports of progress on the Human Genome Project and articles on newly identified genetic mutations have frequently appeared in *Cancer Research* (63-65).

Continued federal funding for embryonic stem cell research was the focus of heated debate in the new millennium, with strong opposition from those who saw the process as experimentation on humans. In August 2001, President George W. Bush decided against funding embryonic stem cell research (66). In 2004, the AACR endorsed Proposition 71 (the California Stem Cell Research and Cures Act), approved by California voters to support stem cell research in the state. Throughout the next decade, Cancer Research continued to publish papers on embryonic stem cell research (67-69).

Figure 19. Frank J. Rauscher, III, PhD
Editor-in-Chief, 2000-2009

On September 11, 2001, life changed dramatically when terrorists attacked the World Trade Center and the Pentagon. The wars in Iraq and Afghanistan put serious financial strains on the federal budget and research appropriations, and grant money became even scarcer with the worldwide recession. The budget debates included advocacy for the notion that research funded by the public should be made free to the public. This viewpoint led to an ongoing controversy in the scientific community over open access to the scientific literature.

In 2009, among the first acts of President Barack Obama was to restore funding for stem cell research and commit to making affordable health care available for all Americans, including access to preventive tests at no charge. Emphasis shifted from disease treatment to disease prevention. "Vaccines" became a buzzword, and researchers sought to use the body's own defenses to treat cancer. Articles on cancer immunology increasingly filled the pages of *Cancer Research* (70).

Figure 20. George C. Prendergast, PhD Editor-in-Chief, 2010 —

CURRENT INITIATIVES: 2010 AND BEYOND

Dr. George Prendergast assumed the editorship of the journal in 2010 amid a time of unprecedented scientific achievement. The first synthetic tracheal transplant was carried out in 2011 using a plastic windpipe coated in stem cells, and in 2013, biomedical engineers and physicians used 3-D printing and injectable gels made of living cells to fashion artificial ears practically identical to human ears. There were new electronic tools, new ways of thinking, and unparalleled global alliances of scientists. With the results from the work on the genome being translated to precision cancer therapies, it has been said that more progress was made in cancer research in the most recent 2 decades than had occurred in the past 2 centuries. Cancer is now understood to be more than 200 diseases linked to more than 290 genes, with the list growing. Five-year survival rates for cervical, breast, and prostate cancer approached 90%. In 2012, the FDA approved 12 new cancer drugs, including Perjeta for late-stage breast cancer, Stivarga for colorectal cancer that has progressed, and Xtandi for late-stage prostate cancer (71). Many of the newer drugs were less toxic, and health professionals discovered new ways to reduce side effects so that patients were able to carry on their daily activities while undergoing treatment. All of these advances were reflected in *Cancer Research*, with Dr. Prendergast establishing new categories of articles such as Breaking Advances; Integrated Systems and Technologies; Therapeutics, Targets, and Chemical Biology; and Tumor and Stem Cell Biology.

Because health care insurance reform emphasized prevention, advocacy for screening and life-style changes has increased. The AACR Task Force on Tobacco issued a new policy statement on tobacco and cancer, which was published in *Cancer Research* in 2010 (24).

Dr. Prendergast recognized that competing for researchers' attention in the digital age was becoming increasingly more challenging. In 2010, there were 185 oncology journals, 40% more than there were just 3 years earlier. By 2014, that number was 211 journals. Speed was becoming more important in the age of instant communications. More people were reading journals and books in an electronic format, so content had to be presented dynamically, have good graphics, and be searchable. The journal launched a mobile interface in the first quarter of 2010 and a mobile application in the second quarter of 2011, and Dr. Prendergast edited every title and began writing a précis for each paper to make information more retrievable.

Acceptance rates had been declining slowly, from 29% in 2006 to 25% in 2009, but Dr. Prendergast set his goal even lower to 20%. Shortening the time to publication for all AACR journals was made possible by a new process whereby the accepted manuscript was uploaded to the website immediately upon acceptance, with the date of upload set as the official publication date; the copyedited, typeset article would later replace the author's manuscript on the website. *Cancer Research*'s average days from acceptance to first publication dropped significantly, and with stricter selection criteria, the the journal decreased in size by over 50%. Fewer articles also influenced the rise in the impact factor from 7.5 in 2009 to 9.3 in 2014 (*see* Appendix 1). Dr. Prendergast's goal, to secure the "breadth of impact" niche for *Cancer Research*, with papers that offer novelty and high impact to a broad audience, is well on its way to realization.

Today's *Cancer Research* editors are carrying on the work of so many distinguished editors and researchers who have contributed to the journal during its 75-year history. The goal set by the AACR Founders that early spring evening in 1907 remains the same: to bring to their colleagues in a timely fashion reports of the latest and most important research in oncology and to document the progress to a cure.

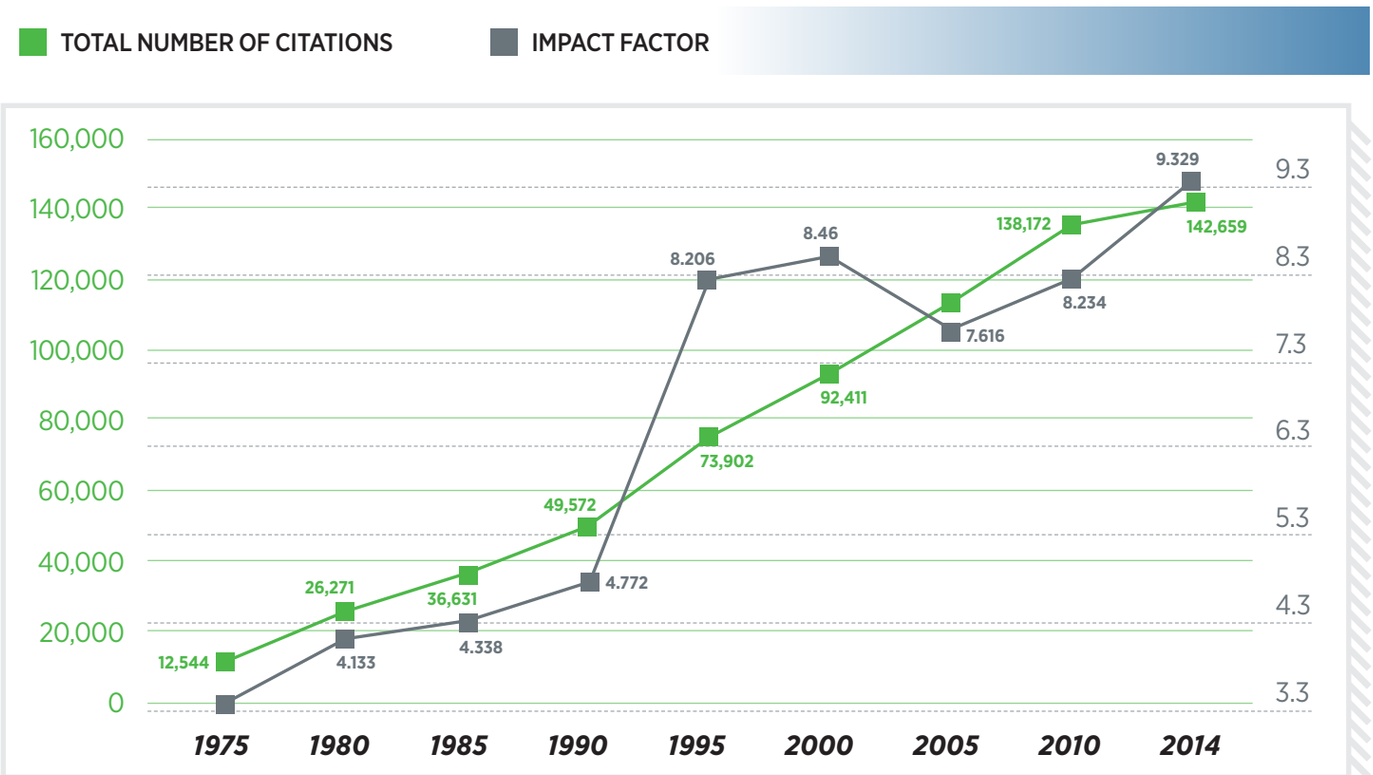
APPENDIX 1. JOURNAL STATISTICS AND RANKINGS

Bibliometric indicators gauge the impact of a journal. These incude the total number of citations the journal receives, number of citations per document, and listings of highly cited papers. Readers also seek the highest ranking journals. Whether it is possible to rate the quality of a journal and whether a ranking actually measures quality or is the result of manipulation are disputed. The combined use of several indicators of different aspects of scientific output is generally recommended for a clearer picture of a journal's influence.

JOURNAL CITATION REPORTS

Science citation indexes were first reported by the Institute for Scientific Information (ISI) in its Journal Citation Reports (JCR) in 1975; however, the term impact factor was not in general use at that time. In 1988 the AACR Board was first made aware of the impact factor for *Cancer Research*, with a notation that the journal ranked 20th in citations among all scientific journals. By 1995 journals were beginning to place more emphasis on impact factors, and it was reported that *Cancer Research*'s rank had risen to 15th among all scientific journals and 3rd among 92 oncology journals, with an impact factor of 8.2. Since then, nearly two decades, the journal's impact factor has ranged between 7 and 9.3 (Fig A-1), and the number of oncology journals has increased to 211 in the latest figures available (2014). The journal continues to be the most frequently cited oncology journal in the world with nearly 143,000 total citations in 2014.

Figure A-1. *Cancer Research* Trend in Impact Factor and Total Number of Citations: 1975-2014



APPENDIX 1. JOURNAL STATISTICS AND RANKINGS

THE EIGENFACTOR®

The Eigenfactor® is based on the number of times a journal's articles published in the past 5 years have been cited in the JCR year, but it also considers which journals have contributed these citations so that highly cited journals will influence the network more than lesser cited journals. References to another article from the same journal are removed, so that the Eigenfactor® is not influenced by journal self-citation. Since its inception in 2007, the Eigenfactor® rankings have placed *Cancer Research* either first or second in the list of oncology journals; it was first in 2013 and second in 2014. *Cancer Research* also scores high in the Article of Influence component of the Eigenfactor, which measures the average influence of a journal's articles over the first 5 years after publication. A score greater than 1.00 indicates that each article in the journal has above-average influence. *Cancer Research*'s Article Influence was 3.21 in 2013.

THE H-INDEX AND SCIMAGO JOURNAL RANK (SJR)

The h-index was developed by J.E. Hirsch (72). It attempts to measure both the productivity and citation impact of the published body of work of a scientist or scholar. The index is based on the set of a scientist's most cited papers and the number of citations received in other publications. The SCImago Journal and Country Rank is a portal that includes the journals and countries scientific indicators developed from the information contained in the Scopus Database (Elsevier B.V.). In October 2015 *Cancer Research* was ranked 2nd among 320 oncology-related journals by SCImago (73).

Figure A-2. SCImago Journal and Country Rank October 2015

SCImago Journal and Country Rank October 2015

RANK	TITLE	SJR	H INDEX	TOTAL DOCS. (2014)	TOTAL DOCS. (3 YEARS)	TOTAL REFS.	TOTAL CITES (3 YEARS)	CITABLE DOCS. (3 YEARS)	CITES/DOC. (2 YEARS)	REF./DOC.
1	J Clin Oncol	6.908	402	837	3378	23186	29588	2153	13.87	27.7
2	Cancer Res	4.703	352	718	2209	30461	18697	2078	8.59	42.42
3	Nat Rev Cancer	21.831	297	192	549	9722	8277	216	36.29	50.64
4	J Natl Cancer Inst	5.58	284	421	1047	6028	5628	501	10.94	14.32
5	Clin Cancer Res	4.097	233	698	2323	27500	18384	2151	8.3	39.4
6	Cancer Cell	12.192	227	197	526	7171	8185	503	15.16	36.4
7	Cancer	2.51	224	645	2233	16282	9881	1890	5.16	25.24
8	Int J Radiat Oncol Biol Phys	2.15	186	655	2619	13133	9746	2252	4.24	20.05
9	Int J Cancer	2.175	177	733	2143	30242	10334	2004	4.96	41.26
10	Br J Cancer	2.205	175	725	1996	21469	9367	1811	4.86	29.61
11	Lancet Oncol	11.216	172	598	1162	9417	11417	428	25.48	15.75
12	Ann Oncol	3.138	158	344	1699	9101	10281	1471	6.9	26.46
13	Eur J Cancer	2.183	157	387	1242	12137	6137	1148	5.61	31.36
14	Cancer Epidemiol Biomarkers Prev	2.413	150	350	915	14137	3779	824	4.23	40.39
15	Cancer Lett	1.891	125	493	1230	24591	6333	1196	5.49	49.88

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