



Medical Physics World

Bulletin of the International Organization for Medical Physics

Adhering National Organizations 1982

Austria • Belgium • Brazil • Canada • Denmark • Federal Republic of Germany • Finland • France • German Democratic Republic • Greece • Hungary • India • Ireland • Israel • Italy • Japan • Mexico • Netherlands • New Zealand • Norway • Poland • South Africa • Switzerland • Spain • Sweden • Thailand • United Kingdom • United States of America

President's Message

Dear Friends and Colleagues:

I have been honored to undertake the duties of President since the last International Congress in Hamburg in 1983. In succeeding Professor John Mallard, I have taken over a task which it will not be easy to fulfill as successfully as he did. His persistent struggle for the admission of the International Union of Physical and Engineering Sciences in Medicine (IUPESM) to the International Council of Scientific Unions (ICSU) must be mentioned, and this gives us, although as Associate Member, international recognition comparable to that of the long-established scientific unions which are rich in tradition. There are good reasons why John Mallard is the first President of the IUPESM! Together with John Mallard, Prof. Rune Walstam, Secretary General, has retired from the Board of Officers. Rune Walstam held this busy post for 6 years. He has established valuable contacts with the associate member organizations and got in touch with colleagues in those countries which were not yet members of our IOMP or were still reluctant to join us. Sincerest thanks from all of us to John Mallard and Rune Walstam!

The new team deciding on the fate of our organization until the Helsinki Congress in 1985 consists, besides myself, of Prof. Lawrence Lanzl, Vice President, and Dr. Brian Stedeford, Secretary General. Dr. Lanzl will then become our new President and Brian Stedeford, I hope, will still be the Secretary General.

Upon our inauguration, we have set ourselves goals for our three years in office. Focal points will be, among others, close cooperation with international organizations, such as the World Health Organization (WHO) and the International Atomic Energy Agency (IAEA) in such matters as, for

Continued on page 2



Brazilian Association of Physics in Medicine, History and Founding

In July 1969, twenty-five physicists met in São Paulo to discuss the importance of and the need for a Brazilian Association of Physicists in Medicine and Biology. On August 25 of that year, the Brazilian Association of Physicists in Medicine (A.B.F.M.) was created. Thomaz Bitelli was elected the first president.

Hospital physics started in Brazil in 1956, when Ester Nunes Pereira joined the staff of the National Institute of Cancer in Rio de Janeiro. In 1957, the physicist Dirceu Martins Vizeu became a staff member of the Radiotherapy Center of the São Paulo State Association for the Fight Against Cancer; and in 1963, another physicist, Adelino José Pereira, joined the Center.

In 1971, the first linear accelerator for radiation therapy in Brazil and in all of South America, a Clinac 4, was purchased by the Oswaldo Cruz Radiotherapy Institute in São Paulo. Dirceu Martins Vizeu was appointed head of the Medical Physics Section of the Institute. In 1972, the second linear accelerator in the country was acquired by the Radiotherapy Institute of the Sirio Libanes

Continued on page 2

In this issue:

President's message by A. Kaul	1
Brazilian Association of Medical Physics.....	1
Calendar of Events.....	3
Announcements of Medical Physics World.....	3
Brief History of IOMP by R. Walstam	4
Statutes of IOMP.....	6
IAEA/WHO Dosimetry Network by H. Eisenlohr ...	9
American Association of Physicists in Medicine	13

Continued from page 1

example, quality control and assurance in diagnostic radiology and nuclear medicine, together with education and training in medical physics. The same applies to cooperation with our friends in the European Federation of Organizations for Medical Physics (EFOMP).

However, we consider it of special importance to establish and to maintain contact with our associated organizations and their members. This Bulletin should contribute to this aim, the foundations of which were already laid in the Mallard-Walstam era and which have finally been realized. The credit for this goes to Lawrence Lanzl, and it is one of his tasks as Vice President to manage the Bulletin. Of course, its success is mostly dependent on collaboration by you and your organization, for communication means bidirectional exchange!

Let us continue with this work together, and help us to make "Medical Physics World" worthy of its title!

Alexander Kaul

Brazilian Association of Physics

Continued from page 1

Hospital in São Paulo. Adeline José Pereira became the head of the Medical Physics Section, which includes Dr. Eugenio Del Vigna and Paulo Mota Craveiro. Presently, twenty-seven linear accelerators for radiation therapy are in operation, each under the supervision of two or more medical physicists.

The Brazilian Nuclear Energy Commission has set up a Radiation Dosimetry Laboratory already in 1956. H. Cullen and Edgar Meyer, two physicists at the Catholic University in Rio de Janeiro, took charge of the Laboratory, which developed into the present Institute of Radioprotection and Dosimetry (a secondary standard dosimetry laboratory).

Physics in nuclear medicine in Brazil started in 1959, when Alipio Luiz Dias Netto joined the Nuclear Medicine Center of the University of São Paulo.

After the A.B.F.M. was established, rapid progress began in radiotherapy, nuclear medicine, diagnostic radiology, and bioengineering in Brazil.

During the first two years after its founding, most of the members of A.B.F.M. were from São Paulo and Rio de Janeiro and their environs. As the Association has continued to grow, the number of members has increased to nearly 400, with members working in various cities.

Over the past ten years, two Latin American Conferences on Physics in Medicine and Radiation Protection were held, one in 1972 and the other in 1975. In 1977, the International Seminar on Medical Physics was held in Teresópolis, just prior to the International Congress of Radiology, which took place in Rio de Janeiro.

The A.B.F.M. collaborates with the Brazilian College of Radiology in several ways. The Association has played, and will continue to play, an important role in the development, not only of medical physics, but also of radiotherapy, nuclear medicine, diagnostic radiology, and bioengineering in Brazil.

Officers of the Council/IOMP

President

Alexander Kaul, Prof. Dr.
Inst. F. Radiation Hygiene, Federal Health Office,
Ingolstädter Landstr. 1, 8042 Neuherberg,
Federal Republic of Germany

Vice President

Lawrence H. Lanzl, Ph.D., Prof.
Medical Physics, Rush-Presbyterian-St. Luke's
Medical Center,
1753 West Congress Parkway, Chicago, Illinois
60612, U.S.A.

Secretary-General

Brian Stedeford, Ph.D., Dr.
Dept. of Radiation Physics, Churchill Hospital,
Headington, Oxford OX3 7LJ United Kingdom

Editorial Board

Lawrence H. Lanzl, Ph.D., Editor
Alexander Kaul, Prof. Dr. (ex officio)
Brian Stedeford, Ph.D., Dr. (ex officio)
Colin Orton, Ph.D., Prof.
Radiation Oncology Center
Harper-Grace Hospitals
3990 John R
Detroit, Michigan 48201, U.S.A.
Lauri Patomäki, Prof. Dr.
Kuopion Korkeahoulu, P. O. Box 138
70101 Kuopio 10, Finland

Editorial correspondence should be addressed to Dr. L. H. Lanzl. Business correspondence should be addressed to Dr. Colin Orton. IOMP correspondence should be addressed to Dr. A. Kaul and Dr. B. Stedeford.

ANNOUNCEMENT

With this initial issue, the International Organization of Medical Physics (IOMP) is inaugurating *Medical Physics World* to expand the channels of communication among its membership. The general content of *Medical Physics World* will include a calendar of events, articles with news on our national societies of medical physics, reports from the officers of IOMP, general IOMP information, editorials which will be controversial when the need arises, guest editorials, letters to the editor, and other items.

A vital component of *Medical Physics World* will be its advertisements. We hope that our members will consider the products and services of our advertisers, who will be expressing their faith in the medical physics profession.

It is our goal to provide a copy of *Medical Physics World* to each member of all national medical physics organizations. Copies will be distributed through the national groups of medical physicists.

Lawrence H. Lanzl, *Editor*

CALENDAR OF EVENTS

1984

Inter-American Meeting of Medical Physics
15-19 July 1984
Chicago Marriott Hotel, Chicago, Illinois

The First Inter-American Meeting of Medical Physics will include contributions from North, Central, and South America. This meeting is being hosted by the American Association of Physicists in Medicine as a regional conference endorsed by IOMP.

The 1984 Annual Meeting of the American Association of Physicists in Medicine will be held as part of this gathering. Details concerning the scientific program and local arrangements will be provided in future announcements. Immediate information may be obtained by contacting the following individuals responsible for organizing the meeting.

James M. Galvin, D.Sc.
Scientific Program Coordinator
University of Pennsylvania Hospital
Radiation Therapy Department
3400 Spruce Street
Philadelphia, Pennsylvania 191904

Lawrence H. Lanzl, Ph.D.
Chairperson, Local Arrangements Committee
Rush-Presbyterian-St. Luke's Medical Center
Medical Physics Section
1753 West Congress Parkway
Chicago, Illinois 60612

1985

VII International Conference on Medical Physics and XIV International Conference on Medical and Biological Engineering will be held in Espoo, Finland in **July or August 1985**. Information concerning the conferences is available from

Hannu Seitsonen
Secretary General of the Conference
and

Niilo Saranumi
Chairperson of the Program Committee
P.O. Box 105
SF-00251 Helsinki 25
Finland

1988

VIII International Conference on Medical Physics and the XV International Conference on Medical and Biological Engineering Physics will be held in **San Antonio, Texas**, during the **Summer, 1988**. Information about the conference may be obtained from

Gary Fullerton, Ph.D.
Secretary, American Association of Physicists
in Medicine
University of Texas Health Science Center
Radiology Department
7703 Floyd Curl Drive
San Antonio, Texas, 78284 USA

International Organization for Medical Physics

A Brief History

by Rune Walstam, Ph.D.

A brief history of the International Organization for Medical Physics (IOMP) was published in *Physics in Medicine and Biology* in 1974. This report includes the previous presentation written by the secretary general in 1974, Prof. J. R. Cameron, and is extended to cover the period up to October 30, 1982.

The concept of an international organization for medical physics was first discussed at the International Congress of Radiology, Munich, in 1959. At that time an international committee was formed which had its first meeting in Stockholm in 1961. At this meeting, attended by more than fifty medical physicists from twelve countries, a steering committee was elected which was to prepare a constitution for the proposed International Organization. This committee met in Montreal in 1962 and formally agreed to the establishment of the International Organization for Medical Physics (IOMP) as of January 1963. At the Montreal meeting, the committee elected the following acting officers:

Acting President, S. Benner, Sweden
Acting Vice-President, L. F. Lamerton, United Kingdom
Acting Secretary-General, J. Mallard, United Kingdom

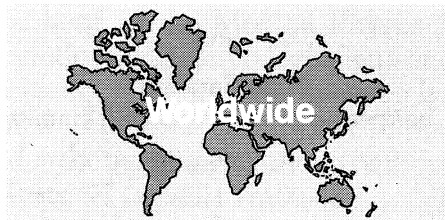
The First International Conference on Medical Physics was held in Harrogate, England, September 8-10, 1965. Professor Mayneord was president of the conference, and officers of IOMP were elected.

The following International Conferences on Medical Physics have been held:

- I. Harrogate, England, September 8 - 10, 1965; President, W. Mayneord
- II. Boston, Mass., USA, August 10-14, 1969; President, L. S. Taylor.
- III. Göteborg, Sweden, July 30 - August 4, 1972; President, I. Petersén.
- IV. Ottawa, Canada, July 25-30, 1976; President, H. E. Johns.
- V. Jerusalem, Israel, August 19-24, 1979; President, E. H. Frei.
- VI. Hamburg, Germany, September 5-11, 1982; President, D. Harder.

The VIIth conference will be held in Helsinki, Finland, in 1985.

Most congresses have so far been financially successful, making it possible for the national organizers to refund "seed money" supplied by IOMP; they have all contributed substantially to IOMP finances. Digests or proceedings of all congresses have been published and are still available in limited numbers from the organizers of each conference.



varian Is The Radiotherapy Equipment Of Choice

- Varian Clinac Medical Accelerators
- Varian/Ximatron 5 Simulators
- CAP-PLAN Treatment Planning System*

* Service support worldwide, sales outside USA



AUSTRALIA 781 Pacific Highway, Chatswood, N.S.W. 2067 Tel: 411-1277
HONG KONG East Commercial Center, Room 1901, 397 Hennessy Road Tel: 5-729204
BRAZIL Avenida Dr. Cardoso de Melo 1644 CEP 04548, Sao Paulo SP Tel: 240-1622
MEXICO Francisco Petrarca 326 Mexico 5, D.F. Tel: 531-3170
DENMARK Jyllingevej 58 DK-2720, Vanløse Tel: (01) 74-75-76
GERMANY Alsfelderstrasse 6, Postfach 11-11-54, D-6100 Darmstadt Tel: 06151/7030
SWITZERLAND Steinhauserstrasse, CH-6300 Zug Tel: (042) 23-25-75
USA 611 Hansen Way, Palo Alto, CA 94303 Tel: 415-424-6200;
120 Interstate No. Pkwy E., Suite 400, Atlanta, GA 30339 Tel: 404-955-1367;
205 W. Touhy Avenue, Park Ridge, IL 60068 Tel: 312-825-6232

Previous and Current Officers of IOMP

	President	Vice President	Secretary-General
1965-1969	W. Mayneord, U.K.	J. S. Laughlin, U.S.	B. Waldegog, Sweden
1969-1972	J. S. Laughlin	R. I. Magnusson, S.	J. R. Cameron, U.S.
1972-1976	R. I. Magnusson	R. Mathieu, Canada	J. R. Cameron
1976-1979	R. Mathieu	J. Mallard, U.K.	R. Walstam, S.
1979-1982	J. Mallard	A. Kaul, FRG	R. Walstam, S.
1982-1985	A. Kaul	L. H. Lanzl, U.S.	B. Stedeford, U.K.

A closer cooperation with the International Federation for Medical and Biological Engineering (IFMBE) was proposed and discussed at the congress in Göteborg. In Ottawa, the International congresses of the two organizations were arranged during successive weeks, making combined attendance of both possible for participants interested in both congresses. A committee was established which was to study possible advantages of future closer cooperation.

tion between the two organizations. This committee, consisting mainly of officers of the two organizations, proposed the establishment of a scientific union. The aims and statutes of such an umbrella organization was agreed upon at the combined IOMP/IFMBE congress in Jerusalem in 1979. The resulting INTERNATIONAL UNION ON PHYSICAL AND ENGINEERING SCIENCES IN MEDICINE has applied for membership in the International Council of Scientific Unions (ICSU). Its first application was turned down in 1980. A new application was made to the ICSU meeting in 1982, and support was requested from national academies of science and scientific members of the ICSU. The work on statutes of the union, the application to ICSU, and the preparation of evidence designed to elicit the necessary support have been the main topics of discussion for the officers of IOMP in recent years.

A regional organization for medical physics has existed in the Nordic countries (Denmark, Finland, Norway, Sweden, and Iceland) since 1959. A European Federation of Organizations for Medical Physics (EFOMP) with a purpose somewhat different from that of IOMP was established in London in May 1979, with support from IOMP. The EFOMP has been very active in its region, and, through cooperation between the two organizations, the number of IOMP members has increased.

During the period from the Jerusalem meeting in 1979 to June 1982, the IOMP has been engaged in three main activities.

1. Attempts have been made to maintain, widen, and strengthen the relations with the member countries. This has been achieved by two-way communication: several member countries have provided information to the secretariat by supplying annual reports and progress bulletins; and the Secretariat has issued periodic reports, ballots, and questionnaires to keep up with continuous organizational developments.

The officers of IOMP and some prominent individual members have participated in regional meetings and international courses on medical physics, and they have communicated information and greetings during study tours or consultant assignments in several developing countries. We have therefore seen the continuous growth of the organization. Correspondence regarding membership is still

under way with many countries, such as the People's Republic of China, Czechoslovakia, Egypt, Iraq, Kenya, Nigeria, Syria, and Yugoslavia.

Our relations with the IAEA and WHO have also been maintained in an informal, friendly atmosphere. In the opinion of the secretary we could do more in this area by combined efforts from dedicated individuals and national groups.

2. Improvement of relations with the IFMBE through the establishment of the International Union of Physical and Engineering Sciences in Medicine (IUPESM). The main objective in the establishment of the Union is to obtain a better association with the ICSU. Late in 1982 the Union was elected as an associate member of ICSU. Professor John Mallard led the effort on our behalf. IOMP relations with IFMBE and the cooperation between the two organizations in conducting the international congresses have been very friendly and successful.
3. Attempts have also been made to support the establishment of regional groups of National Medical Physics Organizations, such as the EFOMP, and to promote meetings in a certain region or on a specific subject — such as the symposium on ultrasound physics in German Democratic Republic in 1980. The secretary general (Dr. Walstam) also participated in a Symposium of Medical Physicists in Bratislava, Czechoslovakia, in 1981 and in the Symposium on Education and Training in Radiology in Dresden, in 1982. Through these meetings it has been possible to maintain good relations with the East European countries and to promote medical physics in that region. Much more could have been done with the assistance of dedicated individuals willing to take on duties in the various fields mentioned. The financial resources could have been utilized for more extensive programs, and the Bulletin, which was decided upon 1979, would have been very useful in creating better public relations for the IOMP and in providing feed back to the national organizations which are members of IOMP.

Continued on page 6

Available Proceedings of International Congresses on Medical Physics

Second ICMP, Boston, 1969.

Advances in Medical Physics, John S. Laughlin & Edward W. Webster, Editors
Available through The Second International Conference on Medical Physics, Inc.; Secretary, Dr. E. W. Webster, Dept. of Radiology, Massachusetts General Hospital, Boston, Massachusetts, U. S. A. 02114

Third ICMP, Göteborg, 1972.

Digest of the Third ICMP, Including Medical Engineering.
Extra copies can be obtained from: The Third ICMP, Executive Committee. Att. R. Kadefors, Dept. of Applied Electronics, Chalmers Univ. of Technology, Fack, 402 20 Göteborg 5, Sweden.

Fourth ICMP, Ottawa, Canada, 1976.

Digest of the Fourth ICMP. Available through Mr. Paul M. Pfalzner, Ontario Cancer Foundation, Ottawa Civic Hospital, Carling Ave., Ottawa, Ontario, Canada.

Fifth ICMP, Jerusalem, 1979.

Digest of the Combined Meeting: XII ICMBE and V ICMP:
Five Parts.
Available through Mrs. N. Noam, Medical Physics Dept., Beilinson Medical Center, Petah Tikva, Israel.

Sixth ICMP, Hamburg, 1982.

Proceedings of the Combined Meeting 13th ICMBE and 6th ICMP.
Available through Prof. Dr. D. Harder, Institute for Medical Physics and Biophysics, Gosslerstr. 10f, D-3400 Göttingen, Federal Republic of Germany.

To the extent that copies are available, they are being supplied through the above address at low cost.

Statutes of the International Organization for Medical Physics

The following IOMP statutes were ratified at the General Meeting of the delegates of the IOMP on 3 August 1972, Göteborg, Sweden.

I. Aims and Functions of the Organization

1. The objectives of the International Organization for Medical Physics are:
 - (a) To organize international cooperation in medical physics and to promote communication between the various branches of medical physics and allied subjects.
 - (b) To contribute to the advancement of medical physics in all its aspects.
 - (c) To encourage, promote, assist, and advise on the formation of national organizations of medical physics in those countries which lack such organization, and also the possible formation of national committees in those countries where there is more than one medical physics organization.
2. For these purposes it shall have the power:
 - (a) To set up bodies for specific purposes which will further the objectives of the organization.
 - (b) To organize and/or sponsor meetings and international conferences. The time interval between such international conferences (normally three years) shall be referred to in these statutes as the period.
 - (c) To collaborate or affiliate with other scientific organizations.
 - (d) To develop any activity deemed helpful to the forwarding of its declared objectives.

II. Membership

1. The membership of the International Organization shall consist of all individual members of national organizations associated with adhering national bodies. In each country the adhering body shall be an appropriate national organization of medical physics. In countries where more than one national organization wishes to adhere, the adhering body shall be a national committee representing all

members of such national medical physics organizations.

2. Adherence to the Organization shall be ratified when a constitution submitted by the appropriate national group, as defined in (1) supra, has been accepted by the Council (see IV).
3. During intervals between Council Meetings adherence may be approved on an interim basis by the Officers of the Council.

III. Membership Fees

1. Any adhering body with less than 10 members shall not be required to pay an annual subscription.
2. An adhering body having 10 or more members shall pay an annual subscription proportional to the number of blocks of members, calculated as the quotient of its total membership by 25, rounded off to the next larger integer.
3. The annual subscription per block of 25 members, calculated as in III (2) above will be determined by Council from time to time.
4. Council shall have power to waive or reduce the subscription of any adhering body, for any year, if special circumstances make this desirable.

IV. Administration

1. The International Organization shall be administered by a Council which shall consist of:
 - (a) The delegates appointed by the adhering national bodies are defined in II (1) in accordance with the following schedule:
 - (i) Any adhering body with fewer than 10 or more members shall have the right to be represented on Council by one non-voting delegate.
 - (ii) An adhering body having 10 or more members shall have the right to appoint a number of delegates, with voting rights, in accordance with the following table:

No. of members	No. of delegates
10 to 100	1
101 to 400	2
More than 400	3

- (iii) If a delegate is unable to attend, his national body is expected to designate an alternate and the Secretary-General must be notified of such designation.
 - (b) The Officers of Council as defined in IV (2) following.
 - (c) The immediate Past-President and past Secretary-General.
2. The Officers of Council shall be:
 - (a) The President, who shall hold office for one period only and not be eligible for immediate re-election to the same office.
 - (b) The Vice-President who shall be the President-elect.
 - (c) The Secretary-General, who shall hold office for one period and shall be eligible for re-election for one further period only.
3. The Officers of Council shall be elected by the Council, normally at a Council Meeting during an international conference and shall take office at the conclusion of the conference.
4. The Council Meetings are normally held during international conferences of the organization. However, additional special meetings of Council may be held if deemed necessary by the Officers of Council or by request from a majority of Council members.
5. A quorum at Council Meetings shall consist of a majority of Council members (or alternates).
6. Each Council member (or alternate) shall have one vote. The chairman shall have both a deliberative and a casting vote.
7. All issues, except those involving a change in the statutes, shall be decided by a simple majority vote among those Council members present. Matters not listed in the agenda may be discussed, but no final decision may be taken at the meeting; they must be decided by mail ballot or referred to the next Council Meeting.
8. The Council shall be guided in all its decisions by the tradition of free international scientific cooperation.
9. The office of the Secretary-General shall be the official centre of the Organization. It shall

be the duty of the Secretary-General to maintain appropriate communication with all national bodies adhering to the Organization and with all other relevant organizations. He shall prepare, in consultation with the other Officers of Council, a preliminary budget and agenda and circulate them at least four months prior to each Council Meeting. He shall circulate the final agenda well in advance of the meeting.

10. Scientific and administrative problems requiring decision in the interim shall be dealt with by mail, the Secretary-General forwarding all pertinent information to all Council members. Postal ballots shall be employed where necessary, in which case the carrying of decisions shall be based on a majority vote of a quorum response to the ballots. The Secretary-General shall specify the date on which the ballots shall be counted.
11. The Officers of Council are empowered to act where prompt action is deemed necessary in their judgement. Such actions shall be reported by mail to all Council members.

V. General Meeting

1. A General Meeting of the Organization shall be held during each major international conference of the organization, preferably before the final Council Meeting.
2. Council shall be responsible for drawing up an agenda for the General Meeting.
3. All members may attend and speak at General Meetings.

VI. Modifications to the Statutes

1. A copy of any proposed modification must be transmitted to the presiding officer of each adhering national body as well as to Council Members.
2. A modification shall be deemed carried by a minimum vote in its favour of two thirds of the Council.

VII. Dissolution

1. If it is proposed to dissolve the IOMP, the presiding officer of each adhering national body must be informed in writing before a

decisive vote is taken at a Council meeting of IOMP.

2. The Council shall have power to dissolve the IOMP provided that at least two thirds of all the members of Council who have voting rights, vote for dissolution in a written ballot, of which all Council members must be notified by post if necessary.
3. If Council decides upon dissolution of the IOMP then all outstanding debts of the organization must be settled forthwith from the existing funds or from contributions from adhering bodies. Any remaining assets shall be distributed among the adhering bodies in proportion to the contributions these same bodies have subscribed to the IOMP during the two years prior to dissolution.

Information Requested of Countries Which Wish to Affiliate with the International Organization for Medical Physics

1. Name or organization.
2. List of present officers with addresses.
3. Brief history of the organization, year founded, etc.
4. Copy of statutes or constitution.
5. List of all members with addresses.
6. Approximate percentage of members who are working in medical physics.
7. Names and addresses of other organizations in the country which have medical physicists as an important part of their membership.
8. Affiliations of your organization with other national or international organizations. List names and addresses.
9. Do you publish a bulletin or newsletter? Sample copies would be appreciated.

For information on affiliation with the IOMP please contact:

Brian Stedeford, Ph.D., Dr.
Dept. of Radiation Physics,
Churchill Hospital,
Headington,
Oxford OX3 7LJ
United Kingdom
Tel: UK (44)-865-64841 Ext. 7158

The IAEA/WHO Network of Second Standard Dosimetry Laboratories – a novel approach to modern radiation metrology

Horst H. Eisenlohr, Ph.D.

It is now perhaps no longer possible to identify the person, or group of persons, who first articulated the concept of Secondary Standard Dosimetry Laboratories (SSDLs). It is documented, however, that in 1967 staff members of the Dosimetry Section of the International Atomic Energy (IAEA) discussed the idea of promoting regional dosimetry centres for the Latin American countries and the Far East/Pacific region, and the possible role of the Agency in establishing such centres. These ideas became more tangible during preparation of an IAEA expert meeting on Dosimetric Requirements of Radiotherapy Centres, and at the meeting itself which was held in Caracas, Venezuela, in 1968. There it became evident that, in Latin America, thousands of cancer patients were treated with ionizing radiations without appropriate dosimetric control. It was also observed that, in this and other regions of the world, there was no laboratory capable of and equipped for dosimetric calibrations. Through this meeting, the World Health Organization (WHO), which had been invited to send representatives, became interested in the problem. As a result, both the IAEA and WHO took the initiative in propagating the idea of regional dosimetry centres and in assisting developing countries to set up such laboratories.

Between 1968 and 1975, the WHO designated 7 laboratories as Regional References Centres for Secondary Standard Radiation Dosimetry. These laboratories are located in Argentina, Iran, Romania, Mexico, Singapore, Thailand, and Nigeria. In Brazil, another laboratory was recognized as an SSDL by the IAEA. However, the rapidly growing demand for more reliable and accurate dosimetry throughout the world made it clear that the concept of regional dosimetry reference centres, i.e., the idea that about 10 such laboratories should serve all of the developing countries, was inadequate. In fact, there was evidence already in the early seventies that at least another ten countries considered the setting up of dosimetry laboratories for the calibration of dose-meters used in radiotherapy and radiation protection.

At the IAEA, close contacts had earlier been established between its Dosimetry Laboratory and

the national primary standards dosimetry laboratories of several countries, concerning the establishment of a postal dose intercomparison service for radiotherapy centres. In discussions with representatives from the primary standards laboratories, the role of the SSDLs was identified as bridging the gap between the primary measurement system and the user of ionizing radiation. So that the SSDLs could fulfill this metrologic function, it was proposed to establish an international network of SSDLs with its secretariat jointly held by the IAEA and WHO. A number of primary dosimetry laboratories were to be asked to join this network as affiliated members which would render the necessary technical support. This proposal was the central point of recommendations submitted by a group of experts of an IAEA/WHO meeting held in Rio de Janeiro in December 1975. Subsequently, in November 1976, the formation of the IAEA/WHO Network of SSDLs was announced by the two organizations, and Criteria for the Establishment of a Secondary Standard Dosimetry Laboratory have been worked out and disseminated to member states of the IAEA and WHO.

The need for the Network can be demonstrated best by the fact that, within a few months, about 25 laboratories were nominated for membership. To date, the Network comprises more than 40 member laboratories, 30 of which are in developing countries. The Network is supported by 12 affiliated national primary standards laboratories and 5 collaborating international organizations. An advisory Group of 11 experts assists the secretariat of the Network in technical matters. The Agency's Dosimetry Laboratory in Seibersdorf, which is equipped with modern calibration facilities, acts as the central laboratory of the Network, conducting dose intercomparisons among member laboratories and accepting SSDL staff for on-site training. Once a year, SSDLs of a particular region of the world are served by visiting experts for consultation and inter-calibrations using Agency instruments. These visits have proved to be of enormous value to the laboratories visited and they have covered most of the existing SSDLs.

The tasks and functions of an SSDL may differ from country to country. All have in common, however, that they are national or regional laboratories that have been authorized by a government to perform dosimetry calibration measurements at the level of secondary standards. They may also be engaged in measurements of radioactivity and in

work concerned with dosimetric quality assurance. Most operating SSDLs calibrate dosimeters used for radiotherapy and for radiation protection, and some provide a personnel dosimetry service. A few advanced SSDLs do research in dosimetry and perform a postal dose intercomparison service for hospitals in their respective countries which provide radiotherapy. The IAEA anticipates that, within a few years, such services will be organized by many SSDLs, relieving the Agency's Dosimetry Laboratory of the entire burden.

The SSDLs were set up in order to fill the gap between the primary standards laboratories and the ultimate users of ionizing radiation. In a time of transition to SI units, they fulfill an even more important role in guiding radiotherapists to obtain accurate doses.

Six years after its founding, the IAEA/WHO Network of SSDLs has become a recognized institution. Many national laboratories, professional associations, and international bodies have taken note of its existence. For example, the Organisation Internationale de Métrologie Légale (OIML) has established a Pilot Secretariat dealing with SSDL matters and is preparing a document on the calibration, in secondary standard dosimetry laboratories, of dosimeters used in radiotherapy and related fields. The Network is also represented by its secretary at the regular meetings of Section I (measurement of X and gamma rays, electrons) of the Consultative Committee for the Standards of Measurement of Ionizing Radiations, set up by the International Committee for Weights and Measures (CIPM).

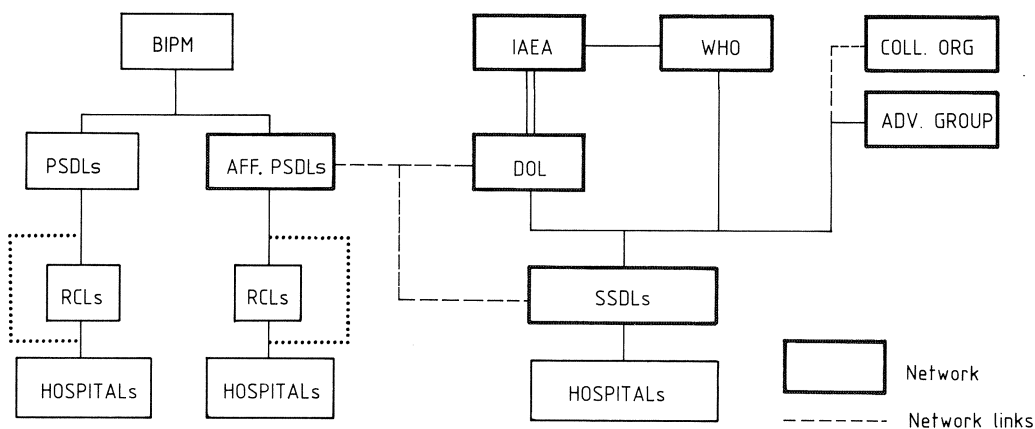
References:

- H.H. Eisenlohr
The IAEA/WHO Network of Secondary Standard Dosimetry Laboratories and its Function within the Metrology System
IJARI, 29, 707-711, 1978
- A.W. Boyd, H.H. Eisenlohr, R. Girzikowsky
Postal dose intercomparison of ^{60}Co dosimetry using TLD among secondary standard dosimetry laboratories
Med. Phys. 9(1), 112-113, 1982
- H.H. Eisenlohr, A.W. Boyd, J.W. Nam
The dosimetry programme of the International Atomic Energy Agency in Vienna
Rad. Prot. Dosimetry, 1(4), 245-248, 1981
- National and International Standardization of Radiation Dosimetry I and II
IAEA Proc. Series, Vienna, 1978
- Calibration of Dose Meters used in Radiotherapy
IAEA Techn. Rep. Ser. 185, Vienna, 1979

Legend

ADV GROUP	Advisory Group
AFF PSDL	Affiliated PSDL
BIPM	International Bureau of Weights and Measures
COLL ORG	Collaborating Organizations
DOL	IAEA Dosimetry Laboratory
IAEA	International Atomic Energy Agency
PSDL	Primary Standards Dosimetry Laboratory
RCL	Regional Calibration Centre (without a country)
SSDL	Secondary Standard Dosimetry Laboratory
WHO	World Health Organization

WORLD DOSIMETRY SYSTEM



Editor's note:

(Dr. Eisenlohr is the Head of the Dosimetry Section, Division of Life Sciences, International Atomic Energy Agency, Vienna. He is the initiator and IAEA secretary of the SSDL Network. In this

later role he has been at the forefront in the development of the world dosimetry system for over fifteen years. Dr. Eisenlohr also serves as the IAEA liaison officer to IOMP.)

IAEA/WHO Network of SSDLS Member Laboratories			
SSDL Buenos Aires	1969	SSDL Prague	1977
Laboratory for Dosimetry		Laboratoire de référence pour dosimétrie du rayonnements X	
Comision Nacional de Energia Atomica Argentina		Centre de l'Hygiene du Rayonnement	
Avenida Libertador 8250		Centre de l'Hygiene et de l'Epidemiologie	
Buenos Aires		Prague	
Argentina		CSSR	
SSDL Lucas Heights	1977	SSDL Nicosia	
Australian Atomic Energy Commission		Radiation Dosimetry Laboratory	
Research Establishment		Department of Medical Services	
Private Mail Bag		Nicosia General Hospital	
Sutherland 2232, N.S.W.		Nicosia	
Australia		Cyprus	
SSDL Seibersdorf	1977	SSDL Copenhagen	1978
Österreichisches Forschungszentrum Seibersdorf		The State Institute of Radiation Hygiene	
Ges.m.b.H		378 Frederikssundsvej	
Austrian Research Centre Seibersdorf		Copenhagen K	
Lenaugasse 10		Denmark	
A-1082 Vienna		SSDL Cairo	1977
Austria		Radiological Physics Unit	
SSDL Gent	1977	Institute of Measurement and Standardization	
Laboratorium voor Standaarddosimetrie		Academy of Scientific Research and Technology	
Ledeganckstraat 35		Cairo	
9000 Gent		Egypt	
Belgique		SSDL San Salvador	
SSDL La Paz	1977	Nuclear Medicine Service	
Department of Radiological Protection and Safety		Hospital Rosales	
Bolivian Nuclear Energy Commission		San Salvador	
Av. 6 de Agosto No. 2905, Casille 4821		El Salvador	
La Paz		SSDL Quito	
Bolivia		Comision Ecuatoriana de Energia Atomica	
SSDL Rio de Janeiro	1976	Apartado 2517	
Laboratorio de Dosimetria de Padronizacao Secundaria		Quito	
Instituto de Radioprotecao e Dosimetria		Ecuador	
CNEN – Comissao Nacional de Energia Nuclear		SSDL Neuherberg	1977
C.P. 37025		Laboratory for Dosimetry, Institute for Radiation Protection	
22600 Rio de Janeiro		Gesellschaft Für Strahlen- und Umweltforschung	
Brazil		Ingolstädter Landstrasse 1	
SSDL Sofia	1977	D-8042 Neuherberg, Post Oberschleissheim	
Laboratory of Clinical Dosimetry and Ionizing Radiation		Federal Republic of Germany	
Metrology		SSDL Helsinki	
Medical Academy, No. 2, Radiotherapy Department		P.O. Box 268	
8 Belo More Street		00101 Helsinki 10	
1527 Sofia		Finland	
Bulgaria		SSDL Le Vesinet	1977
SSDL Ottawa	1977	Service Centrale pour le Protection contre	
Radiation Dosimetry Division, Radiation Protection Bureau		les Rayonnements Ionisants (SCPRI)	
Health Protection Branch		Boite Postale Nr. 35	
Department of National Health and Welfare		F-78 Le Vesinet	
Brookfield Road		France	
Ottawa, Ontario K1A 1C1		SSDL Accra	1978
Canada		Ghana Atomic Energy Commission	
SSDL Shanghai	1982	P.O. Box 80	
Radioactivity Section		Legon, Accra	
Shanghai Institute of Metrological Technology		Republic of Ghana	
Shanghai		SSDL Guatemala	
China		National Institute of Nuclear Energy	
		Guatemala City	
		Guatemala	

SSDL Trombay Radiological Standards Laboratory Division of Radiological Protection Bhabha Atomic Research Centre Trombay Bombay 85 India	1976	SSDL Oslo State Institute of Radiation Hygiene P.O. Box 55 N - 1345 Osteras Norway	1977
SSDL Teheran Pahlavi Medical Centre, Taj Pahlavi Cancer Institute P.O. Box 14/1154 Teheran Iran	1973	SSDL Rawalpindi Pakistan Institute of Nuclear Science & Technology Post Office Nilare Rawalpindi Pakistan	
SSDL Teheran (AEO) Radiation Protection Department, Atomic Energy Organization of Iran Polour Avenue, Elizabeth Boulevard Teheran Iran	1977	SSDL Manila Radiation Health Office, Department of Health Manila Philippines	1976
SSDL Baghdad Institute of Radiology & Nuclear Medicine Elwyiah Baghdad Iraq		SSDL Lisbon Departamento de Radioterapia Instituto Portugues de Oncologia 1093 Lisboa Portugal	1982
SSDL Baghdad Health Physics Department Nuclear Research Institute Tuwaitha, Baghdad Iraq		SSDL Bucharest Institute of Hygiene and Public Health Str. Dr Leonte Nr. 1-3 R-76256 Bucharest 15 Romania	1969
SSDL Tel Aviv Research Institute for Environmental Health Nuisances Sackler Building, Tel Aviv University Ramat-Aviv Israel	1978	The Senior Special Pathologist Connaught Hospital Freetown Sierra Leone	1978
SSDL Seoul The National Institute of Health 5, Nok Bun-dong, Seo Dae Mun-ku Seoul Republic of Korea	1980	SSDL Singapore Radiotherapy Department Outram Road General Hospital Singapore 3 Singapore	1970
SSDL Kuala Lumpur The Ismail Atomic Research Centre Tingkat 14, Benganan Oriental Plaza Jalan Parry Kuala Lumpur Malaysia	1979	SSDL Khartoum Radiation and Isotope Center P.O. Box 846 Khartoum Sudan	1977
SSDL Mexico Radiotherapy Department Institute of Oncology, General Hospital SSA Dr Balmis No. 148 Mexico, D.F. Mexico	1970	SSDL Stockholm National Institute of Radiation Protection Karolinska Sjukhuset 1041 Stockholm Sweden	1978
SSDL Lagos Department of Radiation Biology and Radiotherapy College of Medicine of the University of Lagos Private Mail Bag 12003 Lagos Nigeria	1975	Laboratoire de dosimétrie de la Division du controle des radiations, de l'Institut fédéral de recherches en matière des reacteurs CH-5303 Würenlingen Switzerland	1981
		SSDL Bangkok Division of Radiation Protection Service Department of Medical Sciences Yod-se Bangkok-1 Thailand	1973

SSDL Bangkok (AE) 1977
Office of Atomic Energy for Peace
Bangkok
Thailand

SSDL Ankara 1978
Ankara Nuclear Research and Training Centre
Dosimetry Section
Fen Fakültesi Arkasi Besevler
Ankara
Turkey

SSDL Leningrad 1978
Laboratory of the Northwest Centre
for Metrology and Standardization
Moskovski Prospect 19
Leningrad
USSR

SSDL Belgrade 1977
Boris Kidric Institute of Nuclear Sciences - Vinca
Radiation Protection Laboratory
Dosimetry and Radiation Protection Section
P.O. Box 522
1101 Beograd
Yugoslavia

Central Network Laboratory
IAEA Dosimetry Laboratory
c/o IAEA Dosimetry Section
P.O.B. 100
A-1400 Vienna
Austria

in 1958. Membership is now about 2000. Members are about equally involved in three main areas of activity: research and development, consultation and service, and teaching.

Through their research and development activities members make important contributions to medical practice, especially in the treatment and diagnosis of cancer. Many are engaged in research on the fundamental physics of diagnostic imaging and the other techniques listed above, and on such diverse problems as the application of information theory in diagnosis: physics of the circulation: image perception; trace element analysis; and many other areas of medical importance.

Typical consultation and service activities of members include participation in the planning of radiation treatment for individual patients and in recording and interpreting diagnostic data obtained with x-rays and radionuclides. Other services include design of hospital radiation facilities, specification and calibration of equipment, development of instrument and radiation standards, and supervision of safety and quality assurance programs.

Medical physicists play an important teaching role. An essential part of the training

Continued on page 14



American Association
of Physicists
in Medicine

INTRODUCTION

The Medical Physics profession is primarily concerned with the use of physical and mathematical techniques in the diagnosis and treatment of disease. Early in this century medical physicists played a vital role in the development of radiation therapy. Today they also work actively in the physical aspects of diagnostic radiology, nuclear medicine, radiation safety, diagnostic ultrasound, nuclear magnetic resonance, and thermography. Medical physicists are also involved in areas such as audiology, ophthalmology, endocrinology, physiology, cardiology, physical therapy, general medical instrumentation and the application of computers to medicine.

The rapid growth of medical physics and the need for scientific communication between its practitioners brought about the establishment of the American Association of Physicists in Medicine (AAPM)

PROGRESS IN MEDICAL RADIATION PHYSICS

Volume 1

edited by **Colin G. Orton**, *Wayne State University School of Medicine*

"This introductory volume is well worth reading. It gives extensive references and will fill a useful place on library shelves. It is to be hoped that subsequent volumes will maintain the same level of interest."

—*Hospital Physics Association*

CONTENTS: Progress in neutron dosimetry for biomedical applications, *J. J. Broerse* and *B. J. Mijnheer*. Tissue inhomogeneity corrections in photon-beam treatment planning, *J. R. Cunningham*. Anthropomorphic phantom materials, *D. R. White* and *C. Constantinou*. Applications of computed tomography in radiotherapy treatment planning, *M. Goitein*. Positron imaging: some practical considerations, *R. J. Nickles* and *S. J. Gatlley*. Modern optical methods for the storage of radiographs, *U. Killat*. Index.

404 pp., illus., 1982

\$45.00



233 Spring Street, New York, N.Y. 10013

of physicians specializing in diagnostic radiology, radiation therapy, and nuclear medicine is received from AAPM members, who also teach courses for medical students, technologists, nurses, and graduate students. Many members have faculty appointments in medical and graduate schools of colleges and universities. Many medical schools offer M.S. and Ph.D. programs in medical physics. A list of current graduate programs in medical physics is available as Report No. 5 from the AAPM Executive Secretary.

Members of the AAPM, through activities such as those outlined above, play an important role in promoting the delivery of high quality health care to the public.

Purposes of the AAPM

- To promote the application of physics to medicine and biology.
- To encourage interest and training in medical physics and related fields.
- To prepare and disseminate scientific and technical information regarding medical physics.

Membership

Full membership is open to individuals who are primarily and professionally engaged in the application of physics to medicine and biology in medical, research or educational institutions and who meet academic and experience requirements. Junior membership is open to individuals who are preparing to meet the requirements for full membership. A Corporate Member category is open to corporations or institutions interested in the objectives of AAPM. Members in good standing who are over 65 years of age may become Emeritus Members. The AAPM also honors a few outstanding individuals by making them Honorary Members.

Organization

The Board of Directors includes one representative from each regional chapter, twelve elected members, the President, the President-Elect, the immediate Past-President, the Secretary, and the Treasurer. The officers are elected annually by the membership from the present and previous Board membership. Chapter representative Board members are elected by their regional chapters. The Editor of Medical Physics, the representative to the American Institute of Physics (AIP), and the Execu-

tive Secretary are non-voting ex-officio members of the Board.

Councils, Committees, and Commissions

AAPM has three councils: Education, Professional, and Science. Each of these councils has a number of committees.

Educational Committees are concerned with: Training of Medical Physicists, Training of Radiologists, Continuing Education, Technologist Liaison, and Public Education.

Professional Committees are concerned with: Professional Information and Clinical Relations, Insurance, Legislation and Regulation, and Ethics.

Scientific Committees are concerned with: Biological Effects of Radiation, Diagnostic Radiology, General Medical Physics, Nuclear Medicine, Radiation Protection, and Radiation Therapy.

The AAPM has an Executive Committee, a Finance Committee, and a Nominating Committee as well as committees for: Awards and Honors, Membership, Program, Publications, Regional Organization, Rules, and International Affairs.

AAPM has only one Commission. It is the Commission on Accreditation of Educational Programs for Medical Physicists. The purpose of the Commission is the review and accreditation of educational programs for medical physicists in the United States at the pre- and post- doctoral levels.

Radiological Physics Center

Located at M. D. Anderson Hospital and Tumor Institute, Houston Texas, the Radiological Physics Center (RPC) was established by the AAPM in 1968. The RPC reports to the Radiation Therapy Committee of the Science Council. The RPC is supported by a grant from the National Cancer Institute (NCI). Through its full-time staff, the Center supplies physics capability for cooperative clinical trials in the treatment of cancer by radiation therapy. The RPC staff visits participating therapy centers and reviews dosage measurements and calculations to insure reliability of physical data entered into interinstitutional clinical trials.

Chapters

Delaware Valley
Great Lakes
Mid-Atlantic

Northwest
Ohio River Valley
Penn Ohio

Missouri River Valley
Midwest
New England
New Jersey
New York*
North Central

Rocky Mountain
San Francisco Bay
Southeast
Southern California
Southwest
Upstate New York

Western CRP
Radiological Physics Department
West Coast Center Foundation
50 Francisco Street
San Francisco, CA 94133
(415) 981-4590

Northwest CRP
Radiation Oncology
University of Washington Hospital RC-08
Seattle, WA 98195
(206) 543-9987

*CRP-Coordination Program, 6900 Wisconsin Ave., Suite 307, Chevy Chase, MD 20015. (301) 654-0870

Regional Calibration Laboratories

As an outgrowth of the work of a task group of the Radiation Therapy Committee of the Science Council, several Regional Calibration Laboratories (RCLs) have been established in cooperation with the National Bureau of Standards. The RCLs provide calibration of ionization chambers for the accurate measurement of ionizing radiation.

* Radiological and Medical Physics Society of New York (RAMPS)

Radiological Physics Centers

In 1975 the National Cancer Institute (NCI) established six Centers for Radiological Physics (CRPs). An AAPM office* coordinates the activities of the CRPs under a contract with NCI. The CRPs provide physics review of NCI support projects around the country and technical information and education to the radiological communities they serve.

The Centers for Radiological Physics are located at:

Northeast CRP
Medical Physics Department
Memorial Hospital
New York, NY 10021
(212) 794-7413

Mideast CRP
Radiation Oncology
Allegheny General Hospital
Pittsburgh, PA 15212
(412) 359-4171

Midwest CRP
Department of Medical Physics
University of Wisconsin, 1530 MSC
Madison, WI 53706
(608) 262-6572

Southern CRP
Physics Department
M. D. Anderson Hospital
Houston, TX 77030
(713) 792-3240

Placement Service

The AAPM operates a Placement Service through which information on prospective employers and applicants is regularly exchanged.

Meetings

The principal scientific meeting of the AAPM is held each summer. Manufacturers of equipment of interest to medical physicists participate and exhibit at this annual meeting. The AAPM also meets each fall with the Radiological Society of North America (RSNA). Regional chapters and AAPM committees hold meetings, workshops, and symposia either separately or in conjunction with related professional or scientific groups.

AAPM conducts summer schools for members and other interested scientists on such topics as: Physics of Clinical Nuclear Medicine (1977); The Teaching of Medical Physics (1978); the Physics of Medical Imaging: Recording System Measurements and Techniques (1979); Tissue Imaging and Characterization with Computerized Tomography and Ultrasound (1980); Physical Aspects of Hyperthermia (1981); Advances in Radiation Therapy Treatment Planning (1982); and Physics of Nuclear Medicine (1983). The proceedings of these summer schools are published as monographs by the AAPM.

Publications

The official scientific journal of the AAPM is MEDICAL PHYSICS, which is published bimonthly. The AAPM Newsletter is also published six times a year. The AAPM is one of the sponsoring organizations for the publication of Physics in Medicine and

Biology (PMB) published in Great Britain by the Institute of Physics. The AAPM publishes many monographs and reports. A current list with prices can be obtained from the Executive Secretary.

Affiliations and Liaisons

AAPM is a member society of the American Institute of Physics (AIP), a federation of leading societies in physics. AIP publishes AAPM's monographs, reports and journals. AAPM headquarters are located in the AIP building in New York.

AAPM is a charter member of Alliance for Engineering in Medicine and Biology. It also contributes to the support of the National Council on Radiation Protection and Measurements (NCRP). The AAPM is affiliated with the International Organization for Medical Physics (IOMP). The AAPM maintains liaison with more than 20 related scientific organizations.

Inquiries should be addressed to:

Executive Secretary
American Association of Physicists in Medicine
335 East 45 Street
New York, New York 10017

Currently Available AAPM Publications

Available on order from AAPM Headquarters, 335 East 45th Street, New York, NY 10017

Report Series Booklets

1. *Phantoms for Performance Evaluation and Quality Assurance of CT Scanners*—\$2.00 each
2. *Optical Radiations in Medicine*—\$2.00
3. *Quality Control in Diagnostic Radiology*—\$3.00 each
4. *AAPM Survey of Medical Physics Training Programs*—\$1.00 each
5. *Scintillation Camera Acceptance Testing and Performance Evaluation*—members \$1.50, nonmembers \$3.00
6. *Protocol for Neutron Dosimetry Task Group #18*—Free (Order copies from Dr. Peter Wooton, Medical Radiation Physics RC-08, University of Washington, Seattle, WA 98195)
7. *Pulse Echo Ultrasound Imaging Systems: Performance Tests and Criteria*—members \$1.50, nonmembers \$3.00

Brochures

The Medical Physicist Free (no charge up to 10 copies; \$0.15 per copy thereafter)

Articles

Code of Practice for X-ray Therapy Linear Accelerators—\$0.50 or free with any other order

Available on order from American Institute of Physics, Back Numbers, 335 East 45th Street, New York, NY 10017:

Monographs

1. *Biophysical Aspects of the Medical Use of Technetium-99m*, edited by James G. Kereiakes and Karen R. Corey, \$7.50 each
2. *Practical Aspects of Electron Beam Treatment Planning*, edited by Colin G. Orton and Farideh Bagne, \$7.50 for AAPM members (\$10.00 for nonmembers).
3. *The Physics of Medical Imaging: Recording System Measurements and Techniques*, edited by Arthur G. Haus, \$25.00 for AAPM members (\$35.00 for nonmembers).
4. *Quality Assurance in Diagnostic Radiology*, edited by Robert G. Waggener and Charles R. Wilson, \$10.00 for AAPM members (\$20.00 for nonmembers).
5. *The Biological Risks of Medical Irradiation*, edited by Gary D. Fullerton *et al.*, \$15.00 for AAPM members (\$21.00 for nonmembers).
6. *The Medical Physics of CT and Ultrasound: Tissue Imaging and Characterization*, edited by Gary D. Fullerton and James Zagzebski, \$25.00 for AAPM members (\$35.00 for nonmembers).
7. *Recent Advances in Brachytherapy Physics*, edited by Douglas R. Shearer, \$15.00 for AAPM members (\$25.00 for nonmembers).

Back number prices: Single copies: \$17.00.

Medical Physics is published bimonthly by the American Institute of Physics for the AAPM Second class postage paid at Woodbury, NY and at additional mailing offices.

Subscription Prices (1982)	U.S.A. and Poss.	Foreign (incl. Can.) & Mex.)	Optional air freight Europe, Mideast, N. Africa	Asia and Oceania
AAPM members	On Membership		\$15.00	\$20.00
Members of IOMP, AIP, and Affiliated Societies	\$37.50	\$43.50	\$52.50	\$ 57.50
All others	\$80.00	\$86.00	\$95.00	\$100.00

Gammex is proud to help support this new communication vehicle of the International Organization of Medical Physics



6685 N. Sidney Place, Milwaukee, WI 53209
(414) 228-7400 Telex # 260371