Number 16 June 1989

european medical physics news

Published by the European Federation of Organisations for Medical Physics (E.F.O.M.P.)

Letter from the President

Dear colleagues and friends,
The 1988 EFOMP Council Meeting was held in Milan on 3rd September and I would like to thank our Italian friends for their kind hospitality. The old hospital buildings, in which the University is now established, provided a very pleasant environment for the meeting. Unfortunately delegates from some of our affiliated organisations were not able to attend but I hope that by the reports which are included in this issue of E.M.P. News that all members will be informed about the problems discussed.

Among many other activities the participation of EFOMP in organising meetings and workshops is becoming well established. So I will only mention the 2nd European Congress on NMR in Medicine and Biology, held in Berlin and the Vth Symposium on Clinical Radiation Physics held at Neubrandenberg, GDR. All this involvement is managed by the Scientific Committee. We are looking forward to the 2nd European Congress on Medical Physics, "Medical Physics '90", to be held in Oxford, UK in September 1990, to coincide with the 10th anniversary of EFOMP. Further in the future we plan the Roentgen Centenary Conference which will be organised in close collaboration with DGMP in Wurzburg, FRG in September 1995.

Problems of the education and training of Medical Physicists are of great importance throughout Europe. The recent EFOMP Policy Statement, 'Radiation Protection of the Patient: The training of the Medical Physicist as a Qualified Expert in Radiophysics', prepared by the Education, Training and Professional Committee, is an example of the many tasks handled by committee members. EFOMP will be involved in the activities of the European Community which effect this very special field.

The most recent EFOMP activity is involvement in a survey on the availability of medical physicists in departments of radiotherapy. A questionnaire has been distributed to all affiliated organisations. The results from this study will be discussed in a seminar to be held in the autumn.

EFOMP gives special attention to establishing and maintaining co-operation with other European Scientific Organisations, such as ESTRO and the E.A.R., so we have many facts pointing to a promising future for EFOMP.

We now look forward to the next Council Meeting. It will be held in Paris on Friday 30th June, before the International Congress of Radiology begins. Local arrangements are being made by our French colleagues. I do hope to meet delegates of all our affiliated organisations in Paris for a successful meeting.

H-K. Leetz

Medical Physics '90

Many of you will have attended the very successful conference Medical Physics '87, the first European Congress of Medical Physics held in Innsbruck, Austria, in collaboration with D.G.M.P. and Ö.G.M.P. The second Congress in this triennial series sponsored by EFOMP has been organised in conjunction with the I.P.S.M. and H.P.A., and will take place in Keeble College, Oxford, on 13th and 14th September 1990. Associated with the Congress there will be a substantial technical exhibition HEXPA '90 and an interesting social programme. International contributions to the scientific sessions and the technical exhibition will be particularly welcome.

Parallel scientific sessions for invited and proffered papers, poster, and teaching sessions, will be organised on a series of themes which will cover a wide range of topics on interest to medical physicists. The programme will also include two keynote addresses, the Association Lecture of the HPA and the Federation Lecture of EFOMP.

Accommodation will be available in Keeble College, Oxford, and in local hotels in Oxford. The number of rooms available in Keeble College are limited and will be allocated on a "first come first served" basis, so be sure to register early if you wish to use this accommodation.

To ensure that you receive further details of the Congress including instructions for authors, accommodation information, and registration forms, please complete and return the Congress information request form printed below the notice of Medical Physics '90, which appears on page 13 of this edition of European Medical Physics News.

Individual members of organisations within EFOMP frequently ask "where is the identity of the organisation?". The identity of any organisation is created by the members who participate in its activities. The triennial European Congress of Medical Physics has been arranged by EFOMP to promote Medical Physics and to provide a venue for medical physicists throughout Europe to meet with colleagues from other countries to make friends and to discuss common scientific problems. Your participation in Medical Physics '90 can help develop the Federation. Making your views and ideas known will enable the Officers to make EFOMP more responsive to your wishes.

The 1990 Council meeting of the Federation will take place in Oxford on Saturday, 15th September, immediately after the Congress. Congress accommodation can be extended to include the night of Saturday, 15th September.

I hope to meet you all in Oxford.

John S. Clifton
Chairman, EFOMP Scientific Committee

Scientific Committee Activities

C.E.C. Workshop on Optimisation of Image Quality and Patient Exposure in Diagnostic Radiology, Oxford, 27-29 September 1988

This Workshop, organised by the National Radiological Protection Board on behalf of the Commission of the European Communities, attracted 155 participants from 21 countries. As a contribution to the Workshop the Scientific Committee of the Federation undertook a survey of the implementation of the I.C.R.P. recommendations, the European Community Directive on Radiation Protection of the Patient, and the use of Quality Assurance procedures in member countries. Replies were received from 20 countries in Europe and the results were presented to the Workshop by Professor Clifton. The text of his paper is printed in this edition of E.M.P. News.

Eighty one papers were presented during the three days of the meeting, covering clinical and physical assessment of image quality, optimisation of image quality and patient dose, and patient dose measurement and quality assurance.

The final session was devoted to discussion of a draft document produced by the C.E.C. Study Group setting out suggested Quality Criteria for Diagnostic Radiographic Images. For specific radiological examinations the document tabulates the image criteria considered essential, together with a suggested maximum surface patient dose and an example of good radiographic technique. The C.E.C. intend to use the document together with a questionnaire to conduct a survey to seek opinion on the suitability of the criteria suggested.

The full report of the Workshop will be published by the British Institute of Radiology and should be available by April 1989.

EFOMP forms a Quality Assurance Working Group

During the C.E.C. Workshop at Oxford an informal meeting was held, attended by some forty members interested in Quality Assurance and patient protection.

Professor Clifton, Chairman of the EFOMP Scientific Committee welcomed everyone to the meeting. He indicated that the objective of the meeting was to provide an informal forum for discussion of possible actions members felt that the Federation should take to promote quality assurance procedures, radiation protection of the patient and any other matters particularly relating to the professional status and role of the Medical Physicist.

After a lively and interesting discussion on quality assurance and patient protection it was agreed that:

(1) EFOMP should take an initiative in promoting the use of quality assurance and image quality procedures but this should be done in close collaboration with the Working Group of the C.E.C., and should aim to assist and encourage the implementation of any recommendations emerging from that Working Group.

(2) EFOMP should try and establish closer working links with the C.E.C.

(3) A Working Group should be formed from members present, interested in Quality Assurance and patient protection with the objective of promoting the best standards of professional practice in the field of quality assurance and patient protection.

(4) Members present willing to join the Group were asked to sign a roster. 19 members offered to join the Group.

Discussion of the role of a Qualified Expert in Radiophysics followed and led to the recommendation that EFOMP should press for the Medical Physicists to be recognised as the Qualified Expert as a means of increasing the presence of Medical Physicists in hospitals, particularly in departments of radio-diagnosis. The existence of the policy statement from the Federation on the training of the Medical Physicist as a Qualified Expert in Radiophysics was drawn to the attention of all present.

Linkage to I.E.C. was also discussed and EFOMP asked to encourage this but it was thought that financial constraints would prevent most members of the Federation from attending I.E.C. Committees.

The suggestion was made that EFOMP should ask the E.C. to publish a directive requiring the radiation dose received by staff as a result of exposure to radiography as a condition of employment to be recorded as an **occupational exposure**.

It was a pleasure to note that a number of representatives of manufacturers were present, took an active part in the discussion and expressed interest in knowing more of the activities of the Federation.

Dr. W. Kallinger of Phys. Techn. Prufanstalt für Rad. und Elektrom., Prufstelle Krankenhaus Lainz, Wolkensbergerstrasse 1, A-1130 VIENNA, Austria, undertook to act as a co-ordinator of the Working Group. Any members of the Federation interested in this topic are requested to contact Dr Kallinger for further information.

The Training of the Medical Physicist as a Qualified Expert in Radiophysics

Following the Workshop in Oxford and correspondence by the Education and Training Committee and the Scientific Committee with the European Commission a Symposium is to be held in Luxembourg from 18th to 20th September 1989, to discuss the education and training requirements for the Qualified Expert in Radiophysics. Representatives of EFOMP met with colleagues from the C.E.C. in Münich in December 1988 to plan the Symposium. As a first step it was agreed to update the survey on education and training of the Medical Physicist and a new questionnaire has been sent to all member organisations. The E.C. may be prepared to accept that the Medical Physicist should be recognised as the qualified expert, provided it can be demonstrated that his education and training meets the criteria laid down by EFOMP in the policy statement on the Training of the Medical Physicist as a Qualified Expert in Radiophysics.

Each E.C. member country will be allowed two delegates to the Symposium, one of whom will be a Medical Physicist. Places will also be available for Medical Physicists from non-E.C. countries. Please ensure that your questionnaire has been returned and that the Medical Physics delegate from your country is an EFOMP member. The recommendations of the Symposium could have far reaching effects for the profession of Medical Physics.

Classification of Ultrasound Equipment

The National Physical Laboratory (U.K.) together with the I.E.C. is investigating the establishment of a classification scheme based on the measurement of the power output of medical ultrasonic equipment. The classification proposed is essentially one of measuring the power output by the temperature rise induced in a water calorimeter and the peak negative pressure. The Federation has sent a questionnaire to contact persons in member organisations seeking their views on the proposed classification. If you have any interest in this subject please contact your EFOMP representative.

Exchange Visits

The Federation has, as one of its objectives, the promotion of exchange visits between Medical Physics departments in Europe. Two components are essential to any exchange: agreement between the laboratories and staff concerned that an exchange visit would be beneficial, and financial resources to support the visitor and his travel. For visitors to the United Kingdom support can often be obtained from the British Council, but application must be made in the country of origin of the visitor. A list of addresses of the British Council offices is presented on page 3 of this edition of E.M.P. News. To make contact with Medical Physics departments in the United Kingdom please contact the Chairman of the Scientific Committee.

Organisations similar to the British Council exist in all European countries. It would help the promotion of an exchange programme if the Scientific Committee held a list of the names and addresses of these national organisations. Would any member who could provide this information please write to the Chairman of the Scientific Committee?

The Chairman of the EFOMP Scientific Committee is:-
Professor J.S. Clifton,
Department of Medical Physics and Bio-Engineering,
University College London,
1st Floor, Shropshire House,
11-20 Capper Street,
LONDON, WC1E 6JA, United Kingdom.

The involvement of Medical Physicists as University Teachers

In some EFOMP member countries medical physicists working in teaching hospitals or other institutions associated with universities have difficulty in being recognised as staff of the university. The Education, Training and Professional Committee investigated the situation so as to be in a position to help achieve official recognition.

Questionnaires were sent to member organisations late in 1987 and by the deadline of March 31st 1988 fifteen replies had been received. Replies to the first group of questions established that all the countries included medical physics in specialty training for Radiotherapy and for Nuclear Medicine and some for Radiodiagnosis. This training was given in lectures by medical physicists. In 3/15 countries a medical doctor was associated with the course and in half the countries there was practical training.

The next group of questions explored the relation between the teacher and the university. In only 3/15 countries were the medical physicists based in the university faculty of science; in 9/15 they were based in the faculty of medicine; in 2/15 they were doubly based and in 3/15 countries other institutions were involved. In 10/15 countries the teachers were specially appointed by the relevant faculty. Great variation was found in relation to the position of the teacher in relation to the faculty. Some medical physicists are granted full professorships, some are associate professors. At the opposite end of the spectrum there are medical physics teachers with no faculty status. The variations occur within countries as well as across national boundaries.

A final group of questions sought to establish data about the number of medical physicists in the member countries, in relation to the population, and the percentage involved as university teachers or professors. Even for countries of similar population there were wide differences in the numbers obtained.

In summary the survey has established that medical physics is included in the training of some medical specialties in all the respondent countries. Medical physicists are always involved in the provision of the training. In a high proportion of the responding countries a course organiser or lecturer has associate professor or higher faculty status. The EFOMP Education, Training and Professional Committee regards this recognition as appropriate to the importance of the duties involved and recommends that all medical physicists who participate in such teaching should have faculty recognition.

British Council Offices in Europe

London
10 Spring Gardens
London SW1A 2BN
Telephone 01-930 8466
Telex 8952201 BRICON G
Fax 01-839 6347

65 Davies Street
London W1Y 2AA
Telephone 01-499 8011
Fax 01-493 5035

11 Portland Place
London W1N 4EJ
Telephone 01-636 6888

Austria*
The Representative
Schenkenstrasse 4
A-1010 Vienna
Telephone 533 26 16/7/8/
Telex 132521 BC VIE A

Belgium and Luxembourg
The Representative
Britannia House
rue Joseph II/Josef II straat, 30
1040 Brussels
Telephone 2 19 36 00
Telex 24743 BCBEL B
Fax 230 8379

Bulgaria
The Cultural Attaché
British Embassy
Boulevard Marshal Tolbukhin 65-67
Sofia
Telephone 885361/2
Telex 22363 PRODROME
(Embassy line)

Cyprus
The Representative
3 Museum Street
PO Box 5654 Nicosia
Telephone 442152, 442371, 442550
Telex 3911 BRICONIC CY

Czechoslovakia
The Cultural Attaché
British Embassy
Jungmannova 30
110 00 Prague
Telephone 22 45 01, 22 45 50
Telex 122097 BCC Z C

Denmark
The Representative
Møntergade 1
1116 Copenhagen K
Telephone 11 20 44
Telex 265451 MONREF G
(commercial line)

Finland
The Representative
Erottajankatu 7B
00130 Helsinki 13
Telephone 640505
Telex 123936 BCHEL SF

France*
The Representative
9 rue de Constantine
75007 Paris
Telephone 45 55 95 95
Telex 250912 BRICOUN F
Fax 010 331 4266 9142

Federal Republic of Germany*
The Representative
Hannenstrasse 6
5000 Cologne 1
Telephone 23 66 77 (3 lines)
Telex 888 1147 BCGK D
+ regional directorates in Berlin, Hamburg and Munich

German Democratic Republic
The Cultural Attaché
British Embassy
Unter den Linden 32/34
East Berlin
BFPO 45 Berlin
Berlin 1080
Telephone 220 2431
Telex 113171 GBBER DD

Greece*
The Representative
Plateia Philikis Etairias 17
Kolanaki Square
Athens 106/73
PO Box 3488
102 10 Athens
Telephone 3633211, 3606011
Telex 218799 BRIC GR
+ regional directorate in Salonica

Hungary
The Representative
Harmincad Utca 6
Budapest V
Telephone 182 888
Telex 224527 BRIT H
(Embassy line)

Italy*
The Representative
Via Quattro Fontane 20
00184 Rome
Telephone 4756641
Telex 622231 BRICON I
+ regional directorates in Milan and Naples

Netherlands
The Representative
Keizersgracht 343
1016 EH Amsterdam
Telephone 22 36 44
Telex 16599 BCAMS NL

Norway*
The Representative
Fridtjof Nansens Plass 5
0160 Oslo 1
Telephone 42 68 48
Telex 79421 BRICO N

Poland*
The Representative
Al Jerozolimskie 59
00-679 Warsaw
Telephone 287401/3
Telex 812555 BRIN PL

Portugal*
The Representative
Rua Cecilio de Sousa 65
1294 Lisbon Codex
Telephone 36 9208/9, 320173, 325725, 325761, 325771, 328750
Telex 42544 BRITCO P
+ regional directorates in Coimbra and Oporto

Romania
The Cultural Attaché
24 Strada Jules Michelet
Bucharest
Telephone 111634/6
Telex 11295 PRODM R

Soviet Union
The Assistant Cultural Attaché
British Embassy
Cultural Section
Naberezhnaya Morisa
Toreza 14
Moscow 109072
Telephone Embassy 2318511
Cultural Section 2334507
Telex 413341 BEMOS SU
(Embassy line)

Spain*
The Representative
Plaza de Santa Barbara 10
28004 Madrid
Telephone 419 12 50
Telex 42769 INSBR E
Fax 010 341 5213947
+ regional directorates/teaching centres in Barcelona, Bilbao, Seville, Valencia, Granada, Palma de Mallorca, Les Palmas de Gran Canaria

Sweden
The Representative
Skarpogatan 6
S-115-27 Stockholm
Telephone 6670 140
Telex 19340 BRITEMB S
Fax 010 46 8663 7271

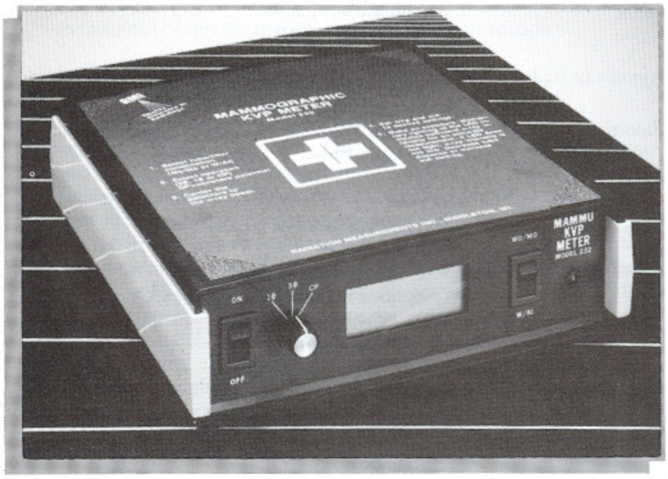
Turkey
The Counsellor for British Council and Cultural Affairs
Kirklangic Sokak 9
Gazi Osman Pasa
Ankara 06700
Telephone 12831 65/6/7/8/9
Telex 42049 IBIK TR
+ regional directorate in Istanbul

Yugoslavia*
The Representative
Generala Zdanova 34 – Mezanin
Post Fah 248
11001 Belgrade
Telephone 332 441, 327 910
Telex 11032 BRIBEL YU
+ regional directorate in Zagreb

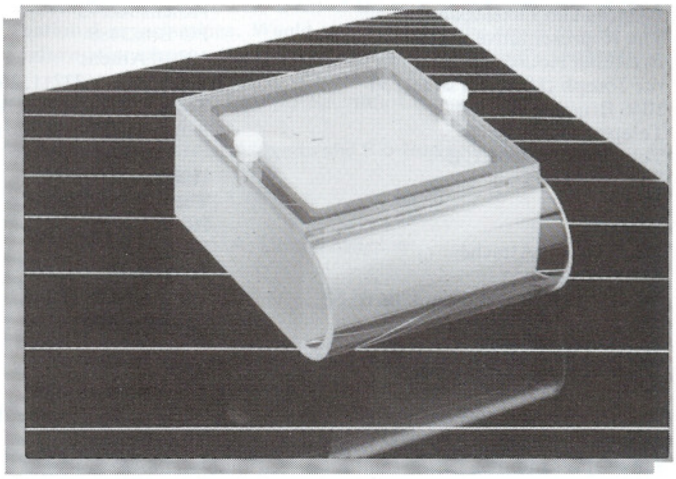
*Scientifically qualified officer at post (1988)

RMI

In the Growing Field of Mammography, We'll Give You an Advantage



RMI's Mammographic kVp Meter is the only device commercially available that measures the full range of 22-60 kVp.



The RMI Mammographic Detail Phantom Model 152D is the quickest and easiest way to check the performance and stability of your mammography unit.

Mammography's rapid rise in popularity means that quality assurance is more important than ever. You want to guarantee that your unit produces the best possible images — consistently, reliably, accurately.

RMI's Mammographic kVp Meter Model 232 and the Mammographic Detail Phantom Model 152D insure just that. They allow you to detect small changes very quickly — changes that can otherwise lead to problems in image quality. They can save you costly maintenance, downtime and retakes.

The Mammographic kVp Meter, for example, is the only device commercially available that measures the full range of 22-60 kVp. Its ability to properly measure in the low range is crucial in mammography.

Excellent accuracy is another factor that has attracted users. Its reliability tests better than 1/10 of a kV. The Model 232 requires only one exposure, and it resets automatically. It is essentially accurate:

- with no orientation dependence
- for changes in distance
- if the x-ray beam is off center
- if the mammographic meter is tilted.

Using the RMI Mammographic Detail Phantom Model 152D is the quickest and easiest way to check the performance and stability of your mammography unit. When something changes, you will know about it — before a problem occurs with your patient films.

Developed and improved during the past several years by RMI in collaboration with medical physicists at the University of Wisconsin — world leaders in kVp quality assurance devices — Model 152D has become the industry standard.

Professional groups agree. A study by the Center for Devices and Radiological Health compared mammographic phantoms with the quality of actual mammograms. The study found the RMI phantom to be the best indicator of image quality.

A prestigious institution recently selected a version of 152D for use in its newly established accreditation program. The American Cancer Society will now refer patients for mammography according to this list of accredited sites.

RMI's Mammographic kVp Meter and Detail Phantom: two unique testing tools for quality assurance in mammography. To learn more about the RMI advantage, write to us or call us toll free at 1-800-443-5852.

RMI

Radiation Measurements, Inc., Box 327
Middleton, WI 53562-0327

1-800-443-5852
In Wisconsin: (608) 831-1188
TLX: 510-601-9035
FAX: (608) 836-9201

National Recognition of Medical Physics as a Health Care Profession

A paper on this subject was presented to the EFOMP Council in September 1988, by the Education, Training and Professional Committee. A digest is presented here so that members may consider the implications of the questions posed and respond to them.

Introduction

In 1984 the E.E.C. issued a document entitled 'Health Care Professions in the Member States of the European Community — Education and Training'. The document was intended to be of interest to health planners and to health economists and it listed Health Care professions if they satisfied the following two criteria in at least one member country:

1 There must be training recognised at national or at least regional level (for example the German 'Lander') leading to a recognised diploma or certificate. Professions that exist at national or regional level, but for which there is no recognised diploma or certificate, are not incorporated.

2 Both the training and function must be specifically directed towards health care. Therefore professions that are found (or even common) in health care, but for which the training and function are not specifically directed towards health care are not incorporated.

Medical Physicists were mentioned by name in the introduction but were specifically excluded from the formal list because they failed to satisfy the second criterion. Some closely related professions were listed, including Audiologists, Medical Physics Technicians and more significantly 'Engineers for Medical Technique'. This group lists its duties as 'checking of functions, inspection of use and running of medical apparatus, maintenance and repair of defects, training and teaching of operators'. In many centres such work is undertaken by Medical Physicists. Engineers for Medical Technique do not require Professional Registration and the summary given of their training suggests that it is similar to that of a Medical Physicist in the U.K. However, the fact that they are formally recognised as a health care profession could influence significantly the thinking of the health planners and administrators in deciding who does what.

Qualifications and Training for Medical Physicists

There are a number of reasons why the present situation does not satisfy completely the two criteria given in the introduction:

1 The formal entry qualification to the profession is academic. A good university degree in physical science is an essential component of the training of a medical physicist. However, graduates in, say physics, also enter a wide range of other professions.

2 Many Universities offer a higher degree in Medical Physics or similar subjects but the courses are not exclusively reserved for students who will work in health care.

3 Member organisations are increasingly providing quite formalised in-service training, for example, the I.P.S.M. Training Scheme in the U.K. It could be argued that this Training Scheme meets all the requirements of 'training specifically directed at health care' but at the present time it is not necessary for a Basic Grade Physicist to complete successfully, or even to be registered on, the Scheme before they may proceed to a post in a hospital department of medical physics that is higher than the training grade.

In attempting to combine academic standards and attainment at the university level with structured in-service training, perhaps directed towards Corporate Membership of an appropriate professional body, the Medical Physics community seems to be failing to meet the rather strict criteria laid down for inclusion in the E.C. list of Health Care Professions. Such recognition as a Health Care Profession would help us to establish a base level of qualification and experience that could be applied to medical physicists who wished to move from one country to another.

The Registration Issue

The possibility of introducing Registration Schemes for Medical Physicists, to regulate professional education and conduct and to provide a sound basis for judgement in professional matters has been discussed for many years. In some European countries such schemes exist already, in others they are at present being considered very seriously. There are a number of valid concerns over the introduction of strict registration. One is that a very rigid career structure could result, with loss of the present broad-based intake, particularly of more mature graduates from many branches of science and industry, that is a feature of the profession in some countries. Another is that physicists who identify as medical physicists but who do not work as hospital physicists might see no merit in a Registation Scheme. Nevertheless, Registration and membership of a nationally recognised Corporate Body as a prerequisite to practising as a hospital physicist beyond the training stage might provide the most straight forward route towards attaining recognition as a Health Care Profession. It is noteworthy that the A.C.M.P. has recently issued a definition of a qualified medical physicist as an individual who is competent to practice independently in one or more sub-fields of medical physics, e.g. therapeutic radiological physics; diagnostic radiological physics; medical nuclear physics; medical health physics. Competence to practice in a sub-field must be certified by the appropriate American Board.

Summary questions

The Education, Training and Professional Committee of EFOMP would welcome contributions to this debate, formally from member organisations and also from individuals. Contributions should be sent to Dr. P.P. Dendy, Department of Physics, Addenbrooke's Hospital, Cambridge, CB2 2QQ, U.K. To assist in formulating comments the following questions are offered:

1 Do you believe it is important that Medical Physics should be formally recognised, at Government level, both within your country and internationally, as a Health Care Profession?

2 Do you have evidence to show that the very strict criteria laid down in the E.E.C. Document have been satisfied in your country either for medical physicists or for any closely related sub-group, e.g. hospital physicists, radiation physicists in health care, etc.? Has the position changed significantly since 30th June 1984?

If you have such evidence please submit relevant documents. If sufficient appropriate evidence can be gathered an approach can be made to the E.E.C. for the position to be reconsidered.

3 If your answer to question 1 is 'yes' but your answer to question 2 is 'no': A strict Registration Scheme is one way in which recognition could be achieved; would you be in favour of such an approach or can you suggest alternative methods of achieving the same objectives?

Medical physics training — History and Developments in Turkey

The history of medical physics in Turkey goes back to 1935 when the German Biophysicist Prof. Dr. Friedrich Dessauer was appointed Director to the Radiology and Biophysics Institute, Faculty of Medicine, University of Istanbul. During his administration Dr. Lion became the first physicist to be associated with hospital Radiodiagnostic and Radiotherapy Departments. In 1940, during the second world war, Dr. W. Reininger was appointed temporarily as a medical physicist and worked until 1950. He left Turkey for the USA and in 1953 I was appointed to the Radiology Institute and Clinic as the first Turkish medical physicist. Since then I have been working as a medical radiation physicist and at present I am Chairman of the Medical Radiophysics branch of the Oncology Institute of the University of Istanbul. My main activities have been in radiotherapy physics, radiation protection and the training of the young physicists and physicians who are entering the radiotherapy, radiodiagnostic or nuclear medicine fields in Turkey.

1953 saw the initiation of Medical Physics as a profession in Turkey and it has expanded and developed. In the early 70's many physicists entered the radiotherapy, radiodiagnostic and nuclear medicine departments of the medical faculties, the Ministry of Health hospitals and other relevant centres. By the mid 70's the education and training of medical physicists had developed and expanded but there was no formal regulation or grading structure for medical physicists. There were no high schools or faculties which taught medical physics until the mid 80's. Physicists graduated from the main physics branch of the Faculty of Science and those interested in hospital jobs entered the University or Ministry of Health hospital departments directly. Postgraduate training and education of young medical radiation physicists was carried out in the radiation physics unit of our Radiation Oncology department. The first two years in the unit were a training period, the physicists being called "Basic grade physicists". Further hospital practice and on the job training took three years. After five years training and hospital practice physicists became "Senior physicists". Physicists trained abroad in well known radiophysics departments and with ten years work experience in large radiotherapy clinics may be certificated from our physics unit and become "Chief physicists".

Our physics unit was the biggest and most acceptable department for the education and practical training of medical radiation physicists in Turkey. We used to arrange basic and advanced postgraduate courses and to give training and hospital practice to the physicists and physicians who entered the radiological and biological fields. I had managed several training courses as Director. The training courses continued until 1986 when the Oncology Institute of the University of Istanbul initiated formal postgraduate training and education in the field of medical radiophysics at the Medical Radiation Physics branch of the Oncology Institute. This branch offers two programmes:

a) A Master of Science Degree (M.Sc)
This takes two years and includes practical training. Nine M.Sc. students have just received their Diplomas.

b) A Doctorate (M.Sc.Dr.)
This is comparable to Ph.D. degrees. It takes three years, includes practical training and requires a thesis. After completion of the training oral and written examinations are carried out at the Oncology Institute.

The present status of Medical Physics in Turkey

There are approximately 75 medical physicists, most are working with ionising radiation, a few are engaged with non-ionising radiation. 75% of them work in the fields of radiotherapy, nuclear medicine, radiodiagnostics, radiation protection and calibration measuring instrumentation; 25% in other fields. Medical physics units or departments are sections of University or Government hospitals and are organised and managed by the Director, or Head of Clinic, and the Chief of medical physicists.

Medical physics is included in the training of some medical specialties (particularly Radiotherapy, Radiodiagnostics and Nuclear Medicine). The teachers are based in the faculty of science, physics division and they have the status of Reader in radiation physics and general physics as applied to medicine. The teachers have also been recognised as staff by some University medical faculties. Istanbul University has two medical faculties and an Oncology Institute. There are twelve medical physicists members of staff in the medical faculties. Some of them are Readers and some Chairmen of their subject groups. For example, I am Reader in Radiophysics as applied to radiology, and also Chairman of the Medical Radiophysics branch.

Oncology Institute of Istanbul University — scientific and administrative organisation

There are three main branches in the Oncology Institute:

A Basic Oncology, covering Cancer etiology branch, Cancer biochemistry, Cancer genetics, Oncological biology and immunology, Experimental oncology, Medical radiobiology and Medical radiophysics.

B Clinical Oncology, covering Paediatric oncology, Medical oncology, Haematological oncology, Radiation oncology, Tumour pathology, Oncological cytology.

C Preventive Oncology, covering Epidemiology, Training and Social Services.

Some information about Radiation Oncology and Medical Radiophysics branches:

The Radiation Oncology branch

The Radiation Oncology branch is the biggest treatment centre in Turkey. It has well equipped external and internal radiotherapy machines and radioactive sources. The radiation oncology branch has following sections and equipment:

1. Conventional therapy: There are two superficial and one deep X-ray machines
2. Teletherapy: There are two Co-60 units which have a capacity of around 6000 RHM, an Alcyon II and a Chisobalt B-75.
3. Megavoltage therapy: There are two linear accelerators, a 12 MeV Mevatron and a 20 MeV Saturne; also an 18 MeV Betatron
4. Brachytherapy: there are remote control afterloading units, a Cathetron Co-60 HDR, a Curietron Co-60 HDR, a Curietron Cs-137 LDR and 360 mg radium needles, Sr-90 eye applicators and an Ir-192 application set.

The Radiation Oncology branch is a postgraduate training centre for physicians, physicists and radiation technologists (Radiographers). It offers basic and advanced courses, seminars and scientific meetings. It has a very well qualified radiation therapy staff with 3 Professors, 1 Associate Professor, 1 Assistant Professor, 3 other specialist staff and several training staff.

The Medical Biophysics branch

The Medical Biophysics branch is the biggest and the most experienced such centre in Turkey. It is well equipped with the following radiation measuring devices, ancillary tools and equipment.

1. A Cirsis Treatment planning system.
2. A Theradose RFA 3 radiation field analyser system.
3. Two Ionex dosemeters and one Farmer 2570 dosemeter.
4. Several cylindrical and flat chambers for photon and electron beams.
5. One three dimensional remote control water phantom.
6. One humanite phantom and Mix-D, polystyrene and temex phantoms.
7. Mould room tools, a vacuum machine and a hot wire cutting device.
8. Two therapy simulators and one 125 KV, 1000 mA X-ray machine, one mobile X-ray diagnostic machine.

The Medical Biophysics branch is a postgraduate training and education centre for physicists, physicians and therapy technologists. The Medical Radiophysics staff comprises 1 Associate Professor Dr. in Medical Physics and 6 specialist physicists with M.Sc. degrees, 6 members studying for Master of Science degrees and 12 Radiotherapy technologists.

Dr. S. Kuter

Image Quality — A European Dimension

by Professor J.S. Clifton, M.Sc., F.Inst.P., F.I.P.S.M.

An edited text of a paper presented to the C.E.C. Workshop on the Optimisation of Image Quality and Patient Exposure in Diagnostic Radiology and held in Oxford on 27-29 September 1988.

The Questionnaire

To make an initial assessment of the availability and use of protocols for quality assurance in diagnostic radiology and progress with the implementation of recommendations of I.C.R.P. 26 and the European Community Directive on Radiation Protection of the Patient a questionnaire was sent to each member organisation within EFOMP with a request that it should be completed by a Physicist with a good knowledge of the practice of quality assurance and radiation protection in the country concerned.

The questionnaire was sent to the 23 member countries in Europe and 20 replies were received. Answers were received from all countries within the E.C. with the exception of Italy. Portugal and Greece replied by letter and did not complete the questionnaire. The information provided by letter indicated very limited progress. From the remainder of Europe, Hungary and Yugoslavia failed to reply and Poland answered by letter. As the questionnaire was dispatched in June 1988 with the request for an answer by the end of July 1988, this response is satisfactory and illustrates the very effective collaboration and contact that the Federation has established in Europe. The wide coverage of Europe enables the progress in E.C. countries to be compared with that made in non E.C. countries.

The questionnaire sought responses in answer to the following broad questions, the availability of established protocols for Quality Assurance Procedures for assessment of radiographic equipment, the extent to which these Quality Assurance Procedures are used routinely, progress with the implementation of the E.C. Directive or I.C.R.P. 26, the development of protocols for assessment of image quality and patient dose reduction, their status, and whether results had been published.

Results

The results of the questionnaire are summarised in the tables.

Discussion

The results of the survey provide only a preliminary overview, not a detailed analysis of the activity in any given country. Furthermore, the questionnaire was arranged such that only a "yes" or "no" answer was required. This places a further limitation on the interpretation of the answers to the questionnaire.

From the replies it appears that established protocols for quality assurance procedures to check the performance of radiographic equipment exist in all countries in Europe, although procedures for assessment of tomographic equipment in E.C. countries are not as widespread as might be expected, and assessment of tube output and automatic exposure and automatic brightness controls are not performed in all countries. In general, the availability of Q.A. protocols in non E.C. countries appears to be marginally better than that of E.C. countries.

The extent and frequency of use of these protocols and associated procedures such as reject analysis and assessment of automatic processor performance is set out in Table 1. This clearly illustrates that with few exceptions Q.A. procedures are not used on a regular routine basis. It is also important to note that in some countries these procedures are carried out by staff of state regulatory bodies who visit hospitals, not by the staff of the local radiology or medical physics department. This applies to Denmark where, by law, the equipment must be checked by the Health Department annually, Turkey where the Atomic Energy Authority is the regulatory body, and to Czechoslovakia where checks are performed by the Institute of Hygiene. In the Federal Republic of Germany legislation will come into force in 1990, which will require routine quality assurance to be performed on all X-ray equipment. It is also noteworthy that the relatively simple checks that should be undertaken routinely by staff in the radiology department to ensure that optimal image quality is obtained are only performed regularly in a few countries.

The manner of implementation of E.C. Directive on Radiation Protection of the Patient varies from country to country. The E.C. required that the Directive be implemented but left individual countries free to decide the appropriate procedure and legal framework. Consequently, progress with implementation is difficult to quantify precisely. Nonetheless, it would appear that in 1988 less than 50% of the countries in the E.C. have fully implemented the Directive which was issued in 1984.

Considering image quality and its effect on patient dose, Table 2 shows the present state of development of protocols to measure the physical performance of imaging systems. As might be expected, these protocols are not yet well established. There is clearly widespread interest in the subject but in the main the work is being carried out by individual departments with co-ordination in some countries by Medical Physics organisations. Only the Federal Republic of Germany and the United Kingdom have comprehensive sets of protocols, and only the German protocols have formal state recognition. Denmark has state recognition but only for assessment of image intensifying systems. The availability of suitable test objects to assess image quality is much more universal. A similar pattern exists in non E.C. countries with more of the protocols having state recognition.

Table 1: QA procedures performed routinely

	Reject Analysis	Processor Sensitometry		Basic QA		Full QA		Auxiliary Equipment checks		
		%var.	freq.	%units	freq.	%units	freq.	Intensify-ing Screens	Cassette Leakage/ contact	Viewing Box Clean/ Bright
EC countries										
Belgium	O	10	Yr	<1	W	N		Y	Y	N
Denmark	N	N	N	100	Yr	N		N	N	N
France	Y	15	W/M	O	W/M	O	3M/Yr	Y	Y	N
Germany (FRG)	N	20	D	5	D *	5	M *	N	Y	N
Greece	N	N	N	N	-	on installation		?	?	?
Italy	-	-	-	-	-	-	-	-	-	-
Ireland	O	?	D/W/M	?	M/3M	O	3M/Yr	Y	Y	N
The Netherlands	Y	20	D	<1	Yr	N		Y	y	Y
Portugal	N	N	N			N		?	?	?
Spain	N	N	N	50	Yr	N		N	N	N
United Kingdom	Y	10	D/W/M	>90	D	10	Yr	Y	Y	Y
Non-EC countries										
Austria	Y	15	W	10	M	-	N	Y	Y	Y
Bulgaria	N	?	6M	100	6M	-	N	N	N	N
Czechoslovakia	Y	12	W	15	3M	-	N	Y	Y	Y
Germany (DDR)	N	30	Yr	?	M	?	Yr	Y	Y	Y
Finland	Y	10	D/W	>90	D/M/Yr	<50	?	Y	Y	Y
Norway	Y	20	W	?	M	?	Y	Y	Y	N
Poland	?	?	?	?	?	?	?	Y	Y	Y
Sweden	O	25	W	100	W	>90	Yr	N	N	N
Switzerland	N	-	N	?	M	-	N	Y	Y	N
Turkey	N	?	?	3	on installation					

Yr = yearly M = Monthly W = Weekly D = Daily * = 100% from 1990
Y = Yes N = No O = Occasionally

Table 2: Imaging system assessment protocol

	Protocol		Procedures					Test objects			
	Source	Nat. Recog	Plain	I/IS	Cine	Digit	CT	Mamm	Radig	I/IS	CT
EC countries											
Belgium	ID	N	N	Y	N	N	N	Y	Y	Y	N
Denmark	S	Y	N	Y	N	N	N	N	N	Y	Y
France	MPO	P	Y	P	N	P	Y	Y	Y	Y	Y
Germany (FRG)	S	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Greece	MPO	?									
Italy	-	-	-	-	-	-	-	-	-	-	-
Ireland	ID	N	N	N	N	N	N	N	N	N	N
The Netherlands	ID	N	N	N	N	N	N	Y	Y	Y	Y
Portugal	?	?									
Spain	ID	N	N	N	N	N	Y	N	N	N	Y
United Kingdom	MPO	Y	Y	Y	Y	Y	Y	P	Y	Y	Y
Non-EC countries											
Austria	ID	N	Y	Y	N	N	Y	Y	Y	Y	Y
Bulgaria	N	N	N	N	N	N	N	N	N	Y	Y
Czechoslovakia	S	Y	Y	Y	Y	N	N	N	Y	N	N
Germany (DDR)*	S	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Finland	S/ID	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Norway	MPO	Y	Y	Y	Y	N	Y	N	Y	Y	Y
Poland	?	?	?	?	?	?	?	?	?	?	?
Sweden	S/ID	Y	Y	Y	N	Y	Y	Y	Y	Y	N
Switzerland*	S/MPO	Y	Y	Y	N	N	N	N	Y	Y	N
Turkey	S	Y	Y	Y	N	N	N	N	Y	Y	N
Yugoslavia	-	-	-	-	-	-	-	-	-	-	-

* 1989 Y = Yes N = No P = Partial S = State MPO = Medical Physics Organisation D = Individual Department

Table 3: Comparative Image Quality Assessments

	Radiologist Assessment	Subjective v.Physical	Image Qual. v.Pat. Dose	Dose Measurement	Published Results
EC countries					
Belgium	N	N	Y	TLD	N
Denmark	N	N	N	TLD	N
France	Y	Y	Y	IC+TLD	Y
Germany (FRG)	Y	N	Y	IC	Y
Greece	N	N	N	-	N
Italy	-	-	-	-	-
Ireland	Y	Y	N	-	N
The Netherlands	Y	Y	Y	IC	Y
Portugal	?	?	?	?	?
Spain	N	N	N	TLD	Y
United Kingdom	Y	N	Y	IC+TLD	Y
Non-EC countries					
Austria	Y	N	Y	IC+TLD	Y
Bulgaria	N	N	Y	IC+TLD	Y
Czechoslovakia	Y	Y	N	TLD	Y
Germany (DDR)	Y	Y	N	-	N
Finland	Y	N	Y	IC	Y
Norway	N	N	Y	IC+TLD	Y
Poland	?	?	?	?	?
Sweden	Y	Y	Y	IC+TLD	-
Switzerland	Y	Y	Y	IC+TLD	-
Turkey	N	N	N	IC	-

Y = Yes N = No IC = Ion Chamber

Measures to compare physical and subjective tests of image quality and the relationship between image quality and patient dose are still under development. Table 3 indicates that there is a range of on-going research in this area — an essential interest if patient dose is to be kept as low as is reasonably achievable without loss of image quality. Some results have been published but this research effort by individual departments needs to be co-ordinated if rapid progress is to be made.

Conclusions

The interest in the Quality Assurance procedures is widespread, and almost all countries have established protocols for the assessment of the performance of radiographic equipment. However, the routine use of the procedures is very limited, and the application of simple checks on associated equipment which would help to ensure consistent image quality are performed infrequently or not at all. The more widespread use of these protocols and procedures can only lead to an improvement in image quality.

The implementation of the E.C. Directive on Radiation Protection of the Patient is far from complete and non uniform in its application. There is a widespread need for education and training to enable the objectives of the Directive to be attained. The dual requirements of improved image quality and patient dose reduction have resulted in attempts to develop physical measures of image quality and to compare physical and subjective assessments. An increasing volume of this work has been published but there is now a need to co-ordinate this effort if maximum benefit is to be obtained both for the patient and in terms of cost effective use of resources.

The Neubrandenburg Symposium on Clinical Radiation Physics under the Patronage of EFOMP

The Clinical Radiation Physics and Radiological Techniques Section of the Society of Medical Radiology of the G.D.R. held its fifth International Symposium on "Clinical Radiation Physics" at Neubrandenburg, a district capital 150 km north of Berlin from 25-28 April 1988. Participants from Austria, Bulgaria, Czechoslovakia, Federal Republic of Germany, Hungary, Poland, U.S.S.R., Sweden and the U.K. were welcomed by Dr Tautz (Berlin-Buch). The President of EFOMP, Professor Leetz (Homburg-Saar), was the guest of honour and presented a short history of the Federation. Professor Rassow (Essen) was an invited EFOMP delegate. The themes of the scientific programme, which included about 60 papers and round table discussions, were:

1 Problems in the field of Quality Assurance in medical radiology
2 New methods and engineering developments
3 Specific topics in Clinical Radiation Physics
4 Trends in treatment planning

1 Quality assurance

The level of quality control in each field of medical radiology (x-ray diagnostics, radiation therapy and nuclear medicine) were presented by speakers from various countries.

A notable paper was that of Roberts (Birmingham) describing ten years experience with a routine programme of measurements of the parameters affecting image quality with diagnostic x-ray equipment. Her experiences were of special relevance to radiation physicists in the G.D.R. as a routine programme for consistent and regular testing of x-ray equipment is being prepared for the whole country.

The routine measurements made on x-ray tubes included the assessment of kVp, tube filtration, radiation output and focal spot size. The measured parameters were broadly classified as "good", "normal" or "poor". At the commencement of the programme, 37% of units tested showed a poor kilovoltage calibration (difference > 5 kVp) but now about 17% were classified as such. The image intensifier input dose for modern units should always be less than 1 μG/s but nearly half (47%) of the units measured greatly in excess of this and were in the category "poor". The deviation from normal of other parameters measured was smaller. As a consequence of the quality assurance programme the number of units in the category "poor" has been decreasing over the years. There was little doubt that the programme was cost-effective and effective in reducing collective dose to the population from diagnostic radiology.

Schmidt (Nurnberg) described how, in the F.R.G., Quality Control has been regulated by Rontgen-verordnung (1.1.1988) and DIN 6868. A future problem is the efficacy of the legislation throughout the whole country.

Results from Quality Control measurements for Computed Tomography using simple phantoms were presented by Rockstroh (Berlin-Buch). Homogeneity, Hounsfield-values for water and air, noise, artefacts and spatial resolution were all factors tested daily.

Rassow (Essen) discussed Quality Control of operational performance characteristics of medical linear accelerators as the model for all radiotherapy equipment. The International Electrotechnical Commission (I.E.C.) has prepared a standard and a report. The standard addressed the specification of test methods and conditions and the obligation of the manufacturers to declare the actual performance values of their equipment in a standardised format. A translation of this standard is published as draft standard DIN 6847, part 4. The aim of this standard is the simplification of acceptance and routine tests.

Schmidt (Vienna) described the use of light emitting diodes for checking the radiation energy and field homogeneity of irradiation equipment as a simple and fast method of testing performed by technical assistants.

The work of Lehmann (Dresden) and Frantz (Berlin-Buch) referred to a system for control and protocols for radiation treatment equipment. The individual parameters checked were irradiation energy, dose rate, field parameters, collimation, wedges, radiation shielding, table parameters, rotation and velocity, actual irradiation time and irradiation technique.

Salewski (Halle) discussed draft checklists for Quality Control in radiotherapy. Checks were made in every therapy department in the G.D.R. for a year for low-voltage x-ray therapy, x-ray deep therapy, 137Cs and 60Co irradiation equipment, medical linear accelerators, simulators and contact irradiators.

In the G.D.R., checklists were prepared for Quality Control in nuclear medicine based on the recommendations of the W.H.O. and the I.A.E.A. At present the checks for the different equipment in nuclear medicine are made in all nuclear medicine departments and cover dose calibrators, in vitro gamma counting system, single and multiple-probe counting systems for gamma-radiation measurements in vivo, rectilinear scanners, scintillation cameras and SPECT-systems. Ullrich (Bad Saarow) discussed some problems for nuclear cardiology.

In 'round table discussion', problems surrounding the practical enforcement of a general Quality Control regime were considered. It was strongly recommended that questions of Quality Control should be taken into consideration during the development of medical equipment. It was noted that support staff have an important function for the daily checks.

2 New developments

In an important session Rassow (Essen) presented a paper on a new effect for dosimetry use called infra-red thermoluminescence. A photodiode (sensitive to 1000 nm) is used as the detector instead of a photomultiplier tube. A comparatively simple read-out system can be used with many small detectors in a parallel array, giving potential for more economic clinical dosimetry.

The aims of the Scandinavian countries' "Computer-aided radiation therapy" programme (CART) were reported by Walstram (Stockholm). An integrated system for diagnostic information includes C.T., N.M.R., PET, Ultrasound, Digital Radiography and Nuclear Medicine images. There is provision for obtaining patient contour data, for radiotherapy dose planning, for simulation with fixation, for treatment verification with patient dosimetry and for treatment machine control. Laboratory results and a clinical register are also provided. The project has revealed many technical problems and manufacturers are involved in resolving them.

There is growing interest in studies of the composition of the human body. Models normally describe the composition differentiated between fat and fat-free mass. Mattson (Gothenburg) summarised methods for indirect determination of protein by means of in-vivo measurements of the total body content of calcium (n, γ-processes). The body cell mass is often estimated from the amount of total body potassium (K-40) while the total body fat can be calculated by measuring total body carbon.

With an increasing level of toxic elements in the environment such as lead, cadmium and mercury, there is a growing need for in-vivo measurements using x-ray fluorescence analysis. The possibility of tracing x-ray contrast agents (iodine) and cytostatic compounds (platinum and cisplatin) provides new alternatives for biokinetic studies and control of uptake and retention.

Gwiadowska (Warsaw) described a new small medical electron accelerator LIMEX (4 MeV) having similar qualities to Co-60.

Methods to produce compensators for body inhomogeneities, using CT images, were discussed by Leitner (Graz): the patient supports use PUR-foam.

3 Specific topics in Clinical Radiation Physics

During this session, work in progress in clinical medical physics was discussed. The papers dealt specifically with x-ray diagnosis and nuclear medicine.

Phase analysis of nuclear medicine multigated cardiac studies has grown in popularity. The essence of the Fourier analysis is that each pixel describes a periodic time series. With Fourier analysis phase amplitude images were calculated. This method is also used for image series in cardiovascular x-ray technique and was described by Fischer (Berlin).

Keller (Ilmenau) described how, with the help of fluoroscopy, organ movement velocities can be determined with high accuracy.

Special anti-scatter grids and screen film are necessary for optimal mammography with regard to image quality and radiation protection of patients.

For internal dosimetry, Ertl (Berlin-Buch), described how biokinetic data are used as the basis for calculation. For the newly developed cerebral blood-flow agent Tc-99m-HM-PAO (hexamethyl-prophylene-amineoxime) retention measurements in both volunteers and small animals (mice) were performed up to 72 hours. Whole body profiles as a function of time were measured with a whole-body counter. The profiles indicated no great changes of the initial distribution of Tc-99m-HM—PAO over the whole body. Total urine output was collected over the measuring period. The mean value observed for urinary excretion at 72 hours was 44.4%. From whole body profiles in man only the total body retention and the retention in the brain could be calculated. For this reason biokinetic data were collected from organ measurement in mice. The biokinetic animal data were transferred to man in the form of cumulated activity for the various organs. The mean absorbed dose for selected organs was calculated using the concept of absorbed fraction (MIRD method). Except for the thyroid gland the absorbed doses for all selected organs are in the range form 2.8 μGy/MBq for the tests to 7.9 μGy/MBq for the lungs. The highest dose of all organs studied was received by the thyroid gland (25 μGy/MBq). The absorbed dose to the brain derived from human data is greater by a factor of about 2 than the dose derived from animal data.

4 Trends in radiotherapy planning

C.T., ultrasound and N.M.R. present considerable advantages in the determination of target volume. Treatment planning can be improved by beam position systems and integrated C.T. radiography; matters considered by Merkle (Berlin-Buch).

Melzer (Leipzig) showed how variations in the size and structure of the target volume can be ascertained by use of C.T. during radiotherapy and require field corrections.

In relation to biological irradiation planning, Tschechonadskij (Moscow) criticised the N.S.D.–C.R.E. system and tried to improve the clinical relevance by modifications of models with tissue specific parameters.

Kriester (Jena) theoretically proved the superiority of hyper-fractionated irradiation for tumour remission with the help of the linear quadratic dose-effect model. Trends in hyper-fractionated whole body irradiation with low dose rates were discussed by Schmidt (Vienna) for future general recommendations.

A personal computer can be used for simple irradiation techniques and can be helpful in an emergency during a breakdown in an irradiation planning system.

Welker (Berlin-Buch) showed that different lung densities are dependent upon the breath phase and must be taken into consideration during the determination of patient cross-section. The age, but not the sex of the patient, the size of the tumour in the lung and the patient position, including patient supports, have an influence on lung density.

Knowledge of electron energy distribution is essential for electron therapy in the range greater than 10MeV. Geske (Jena) demonstrated a newly developed energy monitor. The importance of three-dimensional irradiation planning for electron therapy was considered by Leitner (Vienna) both for pencil beam and Monte Carlo methods. Another speaker advocated a combination of 9 MeV-gamma radiation and 10 MeV electron radiation for treatment of the parasternal region.

Source applicators for afterloading gynaecological treatment with asymmetric radiation fields were discussed by Guenther (Jena).

Wiener (Berlin-Buch) described a system of movable beam shaping blocks. These devices have essential advantages for individual dose distributions and can be altered during irradiation by a special regime. In future the method can be a part of dynamic radiation planning system.

5 Conclusion

This was a very enjoyable meeting. During a party for the guests the President told a story: A small boy ran to his father in an agitated state and cried "Daddy, come quickly, the neighbour's animals are out in our field eating the clover". His father replied, "Don't cry — milk them". Prof. Gurvic (Moscow) replied on behalf of the guests: "We are not sure if you liked our milk, but your clover was delicious". The author of this article acknowledged the kind reply.

Dr. sc.techn. M. Tautz

The developing Role of EFOMP

This report was originally requested by the United Kingdom Institute of Physical Sciences in Medicine. The EFOMP Officers feel that it is useful for it to be made more widely available.

The European Federation of Organisations for Medical Physics (EFOMP) was inaugurated in May 1980, following an exploratory gathering in 1979 and much informal correspondence.

One of the principal objectives, agreed at the inauguration, was to seek the development and recognition of Medical Physics as a profession in all countries in Europe. To achieve this objective the Federation has sought and encouraged the formation of Medical Physics organisations in countries where previously they did not exist. It has been particularly successful in achieving this objective. In 1980 14 national Medical Physics organisations existed who were able to become founder members of the Federation, there are now 24 national organisations in the Federation. Only the Soviet Union, Iceland, Rumania and Albania have yet to join and positive negotiations are in progress with the Soviet Union and Iceland.

In 1984 a major initiative of EFOMP, addressing its constitutional objectives, was to publish two Policy Documents entitled 'The Roles, Responsibilities and Status of the Clinical Medical Physicist' and 'Medical Physics Education and Training: The present European Level and Recommendations for its Future Development'. These documents have proved of great value to the smaller Member Organisations, enabling them to defend and enhance the role of the Medical Physicist. The documents are also well known and frequently referred to by the officials of the European Community. Production of these documents was co-ordinated by separate Education and Professional Committees. The Federation also sought to meet another defined objective by establishing contact with relevant International organisations operating on the same level. Thus the I.A.E.A. and the W.H.O. European Regional Offices were involved. The I.A.E.A. was interested in the work done by the Education Committee in producing the policy document on 'Training' and commissioned further investigations. This commissioned work enabled a reasonable number of Education Committee meetings to be held and demonstrated the benefit of face to face interaction.

To monitor progress another review of training programmes for Medical Physicists is being conducted by the present Education, Training and Professional Committee (ET&PC). The need to establish common standards of training for Medical Physicists within Europe is recognised by the Federation and constitutes a major objective. There are other strong reasons for pursuing this aim. These arise from the complex interactions of the I.C.R.U. and I.C.R.P., activated in the E.E.C. by E.C. Directives. At present EFOMP is negotiating directly with E.C. officers about appropriate methods of training for 'Qualified Experts in Radiophysics'. Federation involvement in this task is due, in part, to the fact that Member Organisations co-operated with the ET&PC in producing, in 1988, another Policy Document entitled 'Radiation Protection of the Patient: The training of the Medical Physicist as a Qualified Expert in Radiophysics'.

The Federation has been consulted about the E.C.'s recognition of 'Health Care Professions' and is seeking views from the Member Organisations. These discussions have implications for the possible licensing of medical physics in Europe. For Member Organisations who happen to be within the E.E.C. the work referred to above should be of vital interest. There is need for careful and 'politically' aware input to be made and the international organisations can best deal with a single authoritative voice which speaks for Medical Physics within Europe.

EFOMP has, of course, a wider remit and its scientific activities form a major part of its work. Collaborations in Scientific Meetings with the Member Organisations in Eastern Europe have been particularly successful. There are currency problems in seeking to use Eastern capitation fees effectively and one way is for members from Western Europe to travel to participate in meetings in Eastern Europe. The formal involvement of EFOMP provides a way in which such scientific meetings can first be announced widely and then followed up, perhaps with the provision of sponsored speakers. The

Federation is seeking to encourage exchanges of young scientists between its Member Organisations and it has run two successful workshops on Quality Assurance in Diagnostic Radiology, at Trieste.

Finance has been a long term problem for EFOMP. Immediately following inauguration the Federation received a donation of some of the profits of 'Physics in Medicine and Biology' to enable it to begin to publish 'European Medical Physics News', its biennial newsletter. The Federation is now entirely financially independent and must exist on capitation fees plus income from any meetings and publications. Member Organisations have required that capitation fees be kept to a minimum and during its early years the Federation was discouraged by its guiding Councils from arranging independent scientific meetings which could have generated income. The Federation therefore sought to present the scientific contribution of Medical Physics by organising symposia, and by chairing sessions, in European meetings organised by the E.A.R., the E.N.M.S. and similar bodies. Whilst helping to 'raise the profile' these events do not provide any income for EFOMP.

By 1986 the first major review of the Constitution was accepted and it sought to address some organisational problems. At the same time the work of the Professional and Education committees was combined so that common elements could be more readily addressed. It was also agreed that the Scientific Committee be permitted to organise Scientific Meetings on behalf of the Federation. In some cases these can be expected to generate income and scientific publications.

Since 1986 the Scientific Committee has been active in the organisation of Scientific Meetings on behalf of the Federation. This has lead to an involvement in the European Congress of Magnetic Resonance in Medicine and to the introduction of the triennial European Congress on Medical Physics. The first in the latter series was held in Innsbruck in 1987, the next, Medical Physics '90, will be in Oxford, in 1990. The meetings in this series are recognised by I.O.M.P. as regional meetings and they will be held in association with the scientific meetings of Member Organisations. The meeting in 1990 will be special because it will mark EFOMP's tenth birthday; the event will be shared with the UK I.P.S.M.'s Annual Meeting. There is a lively programme of involvement in scientific meetings planned for future years, in fact as far ahead as 1995, when the anniversary of Roentgen's discovery of X-rays will be celebrated in Wurzburg.

A lesson learned by EFOMP is that relatively small committees, of individuals selected from a nominated pool, do not permit direct input from each Member Organisation. Furthermore, EFOMP contact persons in the Member Organisations often prove more responsive than some nominated committee members. The committee structure is being changed so that all Member Organisations can nominate a member directly to each committee. The present EFOMP funds will not permit such large committee meetings and under the new system meetings of a core group will be funded from the EFOMP budget. It will, additionally, be possible for Member Organisations to send their delegates to committee meetings, supported by their own funds. Thus the larger organisations will be able to make particular contributions of expertise to the Federation; they will have an opportunity to contribute financially beyond the basic capitation fee and to be closely associated with the important committee activities.

New Publications from the I.E.C.

The following publications have been announced by the International Electrotechnical Commission. Further information may be obtained from Sandra Woods, Information Services, Central Office of the I.E.C., 3, rue de Varembe, P.O. Box 131, 1211 Geneva 20, Switzerland. (Phone (41–22) 34 01 50)

601–2–7 Particular requirements for the safety of high-voltage generators of diagnostic X-ray generators. 121pp. Sfr 139

Applies to generators and sub assemblies operating between 10kV and 400kV, excluding equipment for reconstructive tomography and battery operated equipment.

601–2–8 Particular requirements for the safety of therapeutic X-ray generators. 72pp. Sfr 100

Applies to generators operating at tube voltages from 10kV to 400kV. Includes reference to safety aspects relating to radiation quality and quantity.

601–2–10 Particular requirements for the safety of nerve and muscle stimulators. 35pp. Sfr 51

Applies to equipment which normally functions by the application of electric currents by electrodes in direct contact with the patient and which is used for the diagnosis and/or therapy of neuro-muscular disorders. The standard does not cover equipment to be implanted or to be connected to implanted electrodes; equipment for the stimulation of the brain; equipment for neurological research; equipment worn on the body; cardiac pacemakers; stimulators intended for use during surgical procedures; equipment for averaged evoked potential diagnosis; equipment for electromyography; equipment for cardiac defibrillation and equipment intended only as a transcutaneous nerve and muscle stimulator for pain relief.

601–2–11 Particular requirements for the safety of gamma beam therapy equipment. 59pp. Sfr 84

Applies to equipment intended to deliver gamma radiation beam(s) at normal treatment distances greater than 5cm using a sealed radioactive source or sources.

601–2–12 Particular requirements for the safety of lung ventilators for medical use. 31pp. Sfr 45

601–2–14 Particular requirements for the safety of electroconvulsive therapy equipment. 35pp. Sfr 51

601–2–16 Particular requirements for safety of haemodialysis equipment. 57pp. Sfr 80

866 Characteristics and calibration of hydrophones for operation in the frequency range 0.5 to 15 MHz. 58pp. Sfr 84

Relates to piezoelectric hydrophones or receivers which generate electrical signals in response to water-bourne acoustic signals and designed to measure pulsed or continuous ultrasonic fields generated by medical equipment, or other equipment, working in the same frequency range.

886 Investigations on test procedures for ultrasonic cleaners. 13pp. Sfr 23

Ultrasonic cleaning is now widely used. The document considers the problems of assessing the effectiveness of ultrasonic cleaners and of defining a standard test procedure.

878 Graphical symbols for electrical equipment in medical practice. 59pp. Sfr 71

The publication is divided into five sections: general symbols, symbols to identify the classification of equipment; safety symbols; specialised symbols for ionising radiation equipment; and specialised symbols for display, communication and recording. It brings together all I.E.C. symbols for electromedical equipment and indicates which have already appeared in I.E.C. standards such as publications 417 or 601–1, or in ISO 7000.

CISPR 23 Determination of (radio interference) limits for industrial, scientific and medical equipment. 25pp. Sfr 39

The International Special Committee on Radio Interference is a special committee of the I.E.C. The report reviews the committee's position on limits for protecting telecommunications from interference and clarifies the ways in which the C.C.I.R. (International Radio Consultative Committee) and the C.I.S.P.R. should collaborate in their studies on these limits.

601–1 Medical electrical equipment — General requirements for safety. 349pp. Sfr 200

In January 1989 the I.E.C. announced a second edition of I.E.C. 601–1. This represents a complete revision and update. A new edition of the part 1 document leads to problems in using the part 2 documents on particular types of equipment. It is suggested that there should be a two year transitional period, during which time both the first and the second editions may be used for testing purposes.

Contents

Pages 13 and 14 absent from scanned copy

Non-contact skin emissivity: measurement from reflectance using step change in ambient radiation temperature *T Togawa*

A Comparison of myocardial thallium-201 image quality after dipyridamole versus exercise stress *J P Bourke and T Hawkins*

The error due to fat inhomogeneity in lumber spine bone mineral mass measurements *T J Farrell and C E Webber*

Platelet thermophysiology: a new field of investigation dependent upon an improved sub-ambient platelet aggregometer *P M Trenchard and D M Jeffery*

Technical note

Limb volume measurements in peripheral arterial disease *L H Cheah, A Parkin, P Gilson, S Elliot and A J Hall*

Abstracts of proceedings

IPSM Annual conference: selected abstracts

Book reviews

Encyclopedia of Medical Devices and Instrumentation. Founders of British Physiology: a biographical dictionary 1820-1885. Frequency Analysis. Principles of Renal Physiology. Electronic Communication Aids Selection and Use. Numerical Methods, with Applications in the Biomedical Sciences.

Forthcoming events

Forthcoming Meetings

ESTRO Teaching Course: Computers in Radiotherapy — Selection of Equipment and Quality Control.
29–30 June, 1989, Paris, France.
ESTRO Secretariat, University Hospital St.Rafael, Department of Radiotherapy, Capucijnenvoer 35, B–3000, Leuven, BELGIUM.

XXVIII Congrès de la Société Française des Physiciens d'Hopital.
7–8 July 1989, Tour de la Caisse d'Épargne, Lyon, France.
Secretariat du XXVIII Congrès S.F.P.H., Service de Radiothérapie, Centre Hospitalier Lyon-Sud, 69310, Pierre-Benite, FRANCE.

Image Processing and its Applications — (I.E.E.)
18–20 July, 1989, University of Warwick, United Kingdom.
Conference Services, I.E.E., Savoy Place, London, WC2R 0BL, UNITED KINGDOM.

8th Annual Meeting of ESTRO.
3–7 September, 1989, London, England.
ESTRO Secretariat, University Hospital St.Rafael, Department of Radiotherapy, Capucijnenvoer 35, B–3000, Leuven, BELGIUM.

Engineering for Health — (B.E.S.)
3–6 September, 1989, Bristol, United Kingdom.
Ms. J. Upton, The Royal College of Surgeons, 35/43 Lincoln's Inn Fields, London, WC2A 3PN, UNITED KINGDOM.

20th Scientific Meeting of D.G.M.P.
13–16 September, 1989, Homburg-Saar, F.R.G.
Prof. Dr. H-K. Leetz, D.G.M.P.-Tagung 1989, Institut für Radiologische Physik der Universitätskliniken, D-6650 Homburg-Saar, F.R.G.

46th Annual Conference — (I.P.S.M.)
13–15 September, 1989, Aberdeen, Scotland.
The General Secretary, I.P.S.M., 2, Low Ousegate, York, YO1 1QU, U.K.

8th Congress of the Polish Society for Medical Physics.
Including an International Conference on Education in Medical Physics and Biophysics
20–22 September, 1989, Poznan, Poland.
Mr. O.A. Chomicki, Polish Society of Medical Physics, Ceglowska 80, Szpital Bielanski 01-809, Warszawa, POLAND.

Beijing International Congress on Radiation Physics.
8–11 October, 1989, Beijing, China.
Dr. J. van Dem, Department of Radiotherapy, University Hospital St. Rafael Capucijnenvoer 35, B-3000 Leuven, BELGIUM.
(Phone 32 16 21 21 98).

Co-operating Commercial Organisations

CGR MeV, Siege Social et Usine, Rue de la Miniere, B.P.34 – 78530 Buc, France.
Mecaserto, Z.I. du Mandinet — Centre Evoloic, Lognes 7720 Torcy, France.

Member Organisations in: Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Federal Republic of Germany, Finland, France, German Democratic Republic, Greece, Israel, Italy, The Netherlands, Norway, Poland, Portugal, Republic of Ireland, Spain, Sweden, Switzerland, Turkey, United Kingdom, and Yugoslavia.

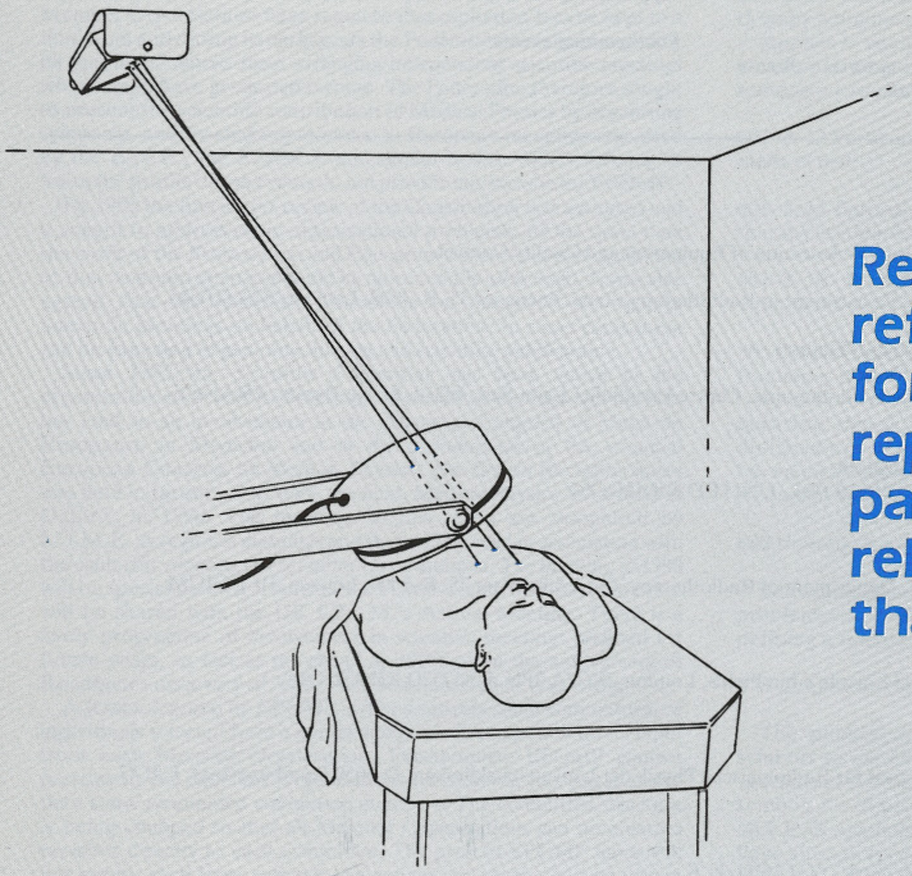
E.M.P. News circulation — approximately 4000 copies.

Please send, as soon as possible, material for the next issue of European Medical Physics News to: Dr. E. Claridge, Department of Medical Physics and Biomedical Engineering, Radiotherapy Building, Queen Elizabeth Hospital, Birmingham, B15 2TH, England.

General correspondence concerning the Federation should be addressed to the Secretary General, Dr. P. Inia, Clinical Physics KCL, P.O. Box 850, 8901 BR Leeuwarden, The Netherlands.

Printed by the Bocardo Press Ltd, Didcot, England.

Gamma Camera Laser System



NEW!

Reliable laser reference for precise repositioning of patient-to-detector relationship for thallium studies

The problem:

Accurately reestablish the same detector position relative to the patient in timed sequential gamma camera studies.

The solution:

Our gamma camera laser reference system projects three intense dots on the detector head when optimally positioned. The position of the dots is marked. After the initial study, the detector is removed and the three dots fall upon the patient's chest. Their position is marked. When the patient returns for the four hour redistribution study, the marks on his chest are aligned with the laser beams. The detector is brought back into position and aligned with the laser marks on the detector head.

Another first from Gammex — an aid to nuclear medicine studies, and the technique is simple, efficient and accurate.

Gammex, inc.

Patient Alignment Systems

Milwaukee Regional Medical Center
P.O. Box 26708 • Milwaukee, WI 53226, U.S.A.
(414) 258-1333 • (800) GAMMEX 1 • TELEX: 260371