

POINT/COUNTERPOINT

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Medical physicists in developed countries should actively help medical physicists in developing countries

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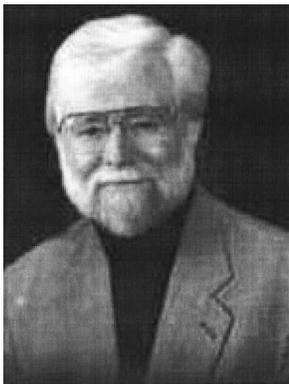
William R. Hendee, Moderator

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OVERVIEW

Every medical physicist has benefited from the guidance and counseling of more senior members of the profession. As a result, the profession of medical physics has evolved to a level where it makes substantial contributions not only to patient care, but also to the ongoing development of new tools and techniques to improve medical diagnosis and treatment. Each of us in the field has an obligation to partially repay the debt we owe our mentors by helping others who need guidance and counseling. Nowhere is the need for help greater than in developing countries in which medical physics and high-tech medicine are just getting started. However, each of us has responsibilities to the institution that pays our salary and expects its patients and clinicians to benefit from our knowledge and expertise. Providing assistance outside the institution takes time and energy away from those inside the institution who need our attention. Two different viewpoints on these conflicting demands on our time and effort are presented in this issue of Point/Counterpoint.



Arguing for the Proposition is Gary Fullerton, Ph.D. Dr. Fullerton is the Malcolm Jones distinguished Professor of Radiology and Director of the Graduate Program in Radiological Sciences at the University of Texas Health Science Center at San Antonio. Dr. Fullerton has served the AAPM on many committees, as Secretary from 1982–1984 and President in 1991. Currently he is Editor of the *Journal of Magnetic Resonance*

Imaging, Secretary General of the International Organization for Medical Physics and Secretary General of the International Union for Physical and Engineering Sciences in Medicine. He is certified in radiological physics by the ABR and is a strong supporter of the development of the medical physics profession in the international arena.



Arguing against the Proposition is Joseph Ting, Ph.D. Dr. Ting is Associate Professor in the Department of Radiation Oncology at the Emory University School of Medicine. He is certified by, and a frequent oral examiner for the American Board of Radiology. He has authored or co-authored several articles on the technical aspects of external beam therapy, and has three patents pending. He teaches both residents in radiation oncology and graduate students in medical physics, and has been a guest speaker at several institutions and conferences, including Sun-Yat-Sen Hospital in Taipei and the International Conference on Medical Imaging, Medical Physics and Precision Radiation Therapy in Guangzhou.

FOR THE PROPOSITION: Gary Fullerton, Ph.D.

Opening Statement

The fundamental but oblique question embedded in this issue is, “Are medical physicists professionals charged with the development and maintenance of knowledge related to their practice or are they laborers with duties related solely to the hourly work and wage they receive?” Professionals from

all walks of life weigh the ethical questions concerning the allocation and application of time to achieve the greatest good for clients. Laborers, on the other hand, need only apply their efforts to the allotted task in the contracted time. Medical physics is, in my view, a profession for which the participants have responsibilities far beyond those of the given workday task.

Presently there are 4500 medical physicists in the USA and more than 16 500 worldwide that are members of the International Organization for Medical Physics. For every medical physicist in a developed country there are two or three practicing in developing countries under less technically advantaged circumstances. There are many reasons that physicists from developed countries should focus on assisting these colleagues. These reasons range from enlightened self-interest to a global concern for humanity.

The ability of medical physicists to practice and provide the diagnosis and treatment of patients depends on two factors: (1) a specialized knowledge of the field that allows safe and efficacious patient care, and (2) a set of well designed and maintained technical tools that make their work possible. These tools range from accelerators to imaging devices and measurement instruments. If the education and training of medical physicists in developing countries are not over time brought to the level of those in the developed countries, then medical physics stands to lose. First, the larger numbers of medical physicists practicing in reduced circumstances are in the majority. The reduced circumstance could become recognized as the worldwide standard for the level of medical physics practice to the loss of medical physicists everywhere. Second, the inadequate application of advanced technologies in developing countries and resultant failures could undermine public confidence in medical physics techniques. Such losses could make high technology medicine politically unpopular and treatments less accessible to patients. This places the future viability of our profession in jeopardy. Medical physicists should defend the integrity of their profession, if they wish to be respected by the patients they serve as well as by other medical professionals.

Evolution and progress are key elements in the practice of medical physics and other components of high technology medicine. The standard of practice today will not be the standard of practice five years from now. Medical physicists must continue to provide new and better ways to diagnose and treat disease or be prepared to turn over their profession to less demanding roles filled by technology specialists. The cost of research and development of new devices remains a major component in the cost of medical physics and the medical specialties that use the physics devices. Growing demands for cost effectiveness require that medical physicists spread the cost of future improvements over a greater fraction of the world population. Medical physics needs to seek the advantages of globalization just as do other purveyors of high technology solutions to human problems.

The application of physics to health care is our profession. The medical physicist should make the fruits of his or her labor available to humanity. Extending commitments to the developing world preserves the future of medical physics

from the rush to improve day-to-day clinical productivity. The difficulty of the decision typifies the ethical dilemma of all professionals.

Rebuttal

Dr. Ting and I agree, "It is inappropriate for physicists to toot around the globe." We differ in my belief that there are many legitimate reasons for American medical physicists to participate in international conferences, cooperative research projects and cooperative educational programs. The professional medical physicist needs to assess benefits and costs to reach an ethical decision concerning international participation. The example of the meetings in China discussed by Dr. Ting is a good one. When I visited China in 1990 there were only 20 MR units in the country; now there are thousands. Chinese patients profit from both the technology and the clinical interpretation skills gathered from the international literature. The idea that IMRT and EPID can be implemented in China, together with the interpersonal interchanges (friendships) that are being developed with the inventors of these techniques, are motivators for change in China. In 1990 China did not have a society of medical physics; today China is a member of the IOMP with more than 400 individual members. In addition, Taiwan and Hong Kong medical physics societies report 150 and 50 members, respectively. My graduate program in San Antonio now receives applications for medical physics graduate study from China that include masters degree training in medical physics at Chinese universities. The meetings that Dr. Ting dismisses for low productivity have been potent harbingers of change in China.

AGAINST THE PROPOSITION: Joseph Ting, Ph.D.

Opening Statement

In recent years, health dollars allocated to patient care in the U.S. have been drastically curtailed. Often, costs of radiation treatments or diagnostic procedures far exceed the dollars recovered from third party payments. Most hospitals and clinical departments are operating under stressed budgetary constraints with no end in sight. With these constraints in mind, it is inappropriate for medical physicists to toot around the globe and support medical physics activities in foreign lands.

A medical physicist who attends a foreign meeting in support of medical physics activities costs his or her employer approximately \$1,000 per day in salary and benefits. Lodging, transportation, and other incidental costs should also be added. Medical physicists who wish to provide aid to foreign countries should obtain separate and dedicated funding from other, government or private, sources.

The total direct and indirect labor costs plus expenses exceeded one million dollars for the U.S. physicists who attended the two most recent medical physics meetings in China (October 1999 and May 2000). Most of these physicists were not reimbursed by the conference hosts for their

expenses or time and effort. Instead, U.S. institutions generously donated one million dollars to those conferences in the form of labor and direct expenses.

I am not suggesting that U.S. medical physicists should not contribute to training foreign medical physicists who will function in important roles in their countries. I have personally trained many foreign medical physicists who have later become important contributors either in America or in their home countries.

I do object, however, to supporting and hosting conferences in foreign lands. Meetings and lectures offer high visibility but low productivity and they are the wrong forum for training and teaching purposes. For example, how many Chinese hospitals and patients will benefit from the IMRT and EPID presentations and discussions that occurred during the two China meetings mentioned earlier?

There are many aphorisms cautioning us to spend money wisely; for example: "A penny saved is a penny earned" and "there is no free lunch." Most of us draw our salaries from our hospital or clinic employers that, in turn, are supported by third party carriers, and indirectly, patients. There is no provision in this support to underwrite medical physics activities in foreign lands. Medical physicists in the U.S. should spend their time attending to challenges on our home front and not compromising their efforts by focusing on medical physics activities in foreign countries.

There are more cost-effective ways than meetings to aid foreign medical physicists and strengthen medical physics programs abroad. They include, for example: Sponsoring foreign medical physicists to spend time at U.S. hospitals; establishing ongoing working relationships with foreign hospitals; formulating joint training sessions; teleconferencing; and providing grants for foreign medical physicists to attend special purpose workshops (not general meetings).

Rebuttal

I have known Dr. Fullerton for over twenty years and I have a great respect for his professional and scientific en-

deavors. However, assumptions and statements made in his "Opening Statement" are false. Here are a few examples:

- (1) "Professionals" are not the only persons who need to consider the allocation of time and effort to achieve the greatest good for clients. "Laborers" who receive hourly wages need to do the same. I do not understand Dr. Fullerton's differentiation of "professionals" and "laborers." We all are workers to achieve the greatest good for our clients. In this case, our ultimate clients are patients.
- (2) I do not believe that there are 16 500 medical physicists who are practicing medical physics in a manner directly impacting the well-being of patients and their diagnostic and treatment outcomes. I do not argue against physicists sharing knowledge with others. But, spending money hosting conferences abroad is not an efficient method to provide aid. Dollars could be better spent by sponsoring foreign medical physicists to study at institutions of excellence in this country.
- (3) The danger of lowering the standard of practice is far fetched. I often tell my children to "look up and never down." Standards of practices will continuously improve and cannot be "reduced" as Dr. Fullerton imagines. It is human nature. Otherwise, we would still be living in caves and cooking with twigs.
- (4) I do not challenge the desirability of a mutual exchange of ideas and inventions with persons from abroad. But sponsoring and attending conferences are not effective forums for such exchange.

Finally, we should stop wasting precious dollars sponsoring and attending meetings abroad. We should not use the excuse of "educating medical physicists" to get a paid trip abroad. We should take "educating foreign medical physicists" more personally and carefully. It is a very serious commitment.