

PROTECTION FROM IONIZING RADIATION—PUBLIC HEALTH ASPECTS

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The use of ionizing radiation has become so widespread that two conferences were held in 1962 to discuss the administrative and public health aspects of protection against ionizing radiation.

The first conference was held in Düsseldorf in Germany from 25 June to 4 July, under the auspices of the World Health Organization (WHO), and the second was the meeting of the WHO Expert Committee on Radiation in Geneva from

11 to 17 September, held to discuss public health responsibilities in radiation protection.

At the Conference in Düsseldorf, the representatives of 37 countries were present. South Africa was represented by Prof. S. F. Oosthuizen, Chairman of the Radiation Hazards Commission. The proceedings of the Düsseldorf Conference do not appear to have been published as a single report as yet, but Professor Oosthuizen brought back copies of the long

papers read by 20 members of the Conference, and the reports on legislation in their countries by the representatives of the 37 countries which took part in the proceedings.

The members of the Radiation Hazards Commission of South Africa were privileged to receive copies of all the papers and reports, which form quite a library on the subject, from Professor Oosthuizen.

The Expert Committee on Radiation of the WHO, which met in Geneva issued its Fourth Report recently.* This is very valuable and concise, but is not nearly as comprehensive as the Proceedings of the Düsseldorf Conference.

The Fourth Report deals with the public health aspects and not primarily with prevention of the radiation hazard. The Düsseldorf Conference also dealt with the matter from this angle but provides a great deal of information and discussion on where the responsibility lies, i.e. which Ministry in each country should be responsible for the public health aspects of the prevention of the radiation hazard.

The Fourth Report points out that the public health service in every country has responsibility for creating favourable conditions and improving the standards of health for its population. In recent years, to this responsibility has been added protection against the increasing use of ionizing radiation in one form or another. It is the duty of the health authorities to protect the public from excessive exposure to radiation, in spite of the benefits derived from ionizing radiation in various directions.

Absorption of ionizing radiation in tissues produces various effects. The greatest concern to health authorities, in this respect, are cancer and genetic changes.

One of the great responsibilities of the health authorities is the reduction of unnecessary radiation exposure as the result of diagnostic and therapeutic radiology. These sources of ionizing radiation make the largest contribution to the dose received from all man-made sources of radiation. It is the responsibility of the public health authorities to identify and measure all sources of radiation exposure of the population, and to evaluate and assess the biological hazard to the exposed population groups.

In South Africa this problem becomes more complicated because different racial groups are subjected to varying amounts of radiation, as far as the medical radiation sources are concerned. The rural Bantu population is not subjected to the same amount of medical radiation as the urban European population. Only a very small proportion of the Bantu population is X-rayed. The majority might only have a chest X-ray examination, and very few would have, say, barium-meal examinations.

The Fourth Report stresses that it is the duty of the public health authorities to see to the development and application of methods of control and also to conduct programmes of professional and public information and education on the health impact of radiation sources.

Here again, the difficulties in South Africa are much greater than in the European countries. How is one, for instance, to conduct programmes of professional and public information in the Bantu territories?

The International Commission on Radiological Protection has recommended standards to provide guides to the national health authorities. This international conference considered that the health authorities themselves should undertake research into radiation.

Now the method of control requires the cooperation of various governmental agencies involved in the radiation field, since not only the medical uses of ionizing radiation, but also the use of radioactive materials, the methods of treatment and the disposal of radioactive waste must be controlled. Investigation into the extent and effects of fall-out in the countries where this is applicable is indicated. Fortunately, this is not a problem in South Africa, because the nuclear bomb tests have been carried out in the Northern Hemisphere and radioactivity following these explosions does not cross the equator to the south. Radioactive particles circulating

with the prevailing winds are brought down by atmospheric conditions in the Northern Hemisphere in due course.

The Düsseldorf Conference stressed the necessity of striking a reasonable balance between the absolute indifference to the dangers of radiation that exists in some quarters and the possibility of overstressing the dangers.

The Fourth Report stresses 'that it is the responsibility of the health agency to provide a single focal point for evaluation of the total health impact of all sources of radiation and to ensure that adequate measures for health protection are taken'. The part to be played by the health services of each country is emphasized, but in some countries these are not under the same authority. This is the case at present in the Republic, where the Atomic Energy Board is responsible for radioactive isotopes and radium. It still has to be decided which Ministry or authority should undertake the responsibility for the medical uses of diagnostic and radiotherapeutic radiology, who should be responsible for industrial safety in dealing with industrial uses, and who should be responsible for research, or whether all the departments concerned should be under one Ministry.

Who should be responsible for the safe transport of radioactive materials? Should it be the Ministry of Transport? Who should be responsible for radioactive materials in foods and drugs, luminous watch-dials, fluoroscopy, and shoe-fitting units. The Expert Committee discussed the relative importance of programmes of radiation protection and gave first priority to the 'much needed control of X-ray machines'.

The Radiation Hazards Commission in the Republic has given this aspect priority, since it feels, too, that this is the most important part of the radiation hazard.

The Fourth Report stresses throughout the necessity for the control of X-ray machines, for licensing and registration by the authorities, and for the establishment of the right of inspection and access. The necessity for the training of staff in research is stressed.

The organization of the services required to meet the public health responsibilities for radiation protection is fully discussed. The Report also discusses the qualifications which the head of the organization should have: 'He should have technical training in radiation protection and a public health background. It may be necessary to engage an experienced public health worker and provide him with supplementary academic training in the field of radiation . . . One possibility may be the appointment of someone who can serve as a university faculty member and, at the same time, provide the necessary programme direction'.

To start by engaging or appointing a public health worker and then train him in the field of radiation, is not the best approach and is putting the cart before the horse. One feels that an expert in diagnostic radiology who has a knowledge of public health matters would be the ideal person.

It must be pointed out, too, that the person who is required to inspect X-ray machines must have different qualifications to the field workers or the inspectors of isotope sources. One cannot get the same man to do both types of inspections.

The inspector of medical X-ray installations should be able to judge whether the results obtained, either in small hospitals or in private practice, justify the radiation hazard. He must be able to judge the quality of the films and be competent to advise whether under the prevailing conditions X-ray examination of a pregnant woman or a child or the carrying out of hysterosalpingography is justified.

The medical profession, I believe, would accept such advice only from a qualified radiologist.

It is curious that in the numerous papers and reports at the Düsseldorf Conference only one country, i.e. France, stressed what should be expected of the inspectors in the different aspects of the radiation hazard. The Fourth Report does not refer to this either and yet for efficient control it must be obvious that inspectors must be trained in the different disciplines.

The Fourth Report is important, since it touches on the radiation hazard from a different angle to the usual books and reports written on the subject. It is not for the individual radiologist, although it would do radiologists a great deal of

* Expert Committee on Radiation (1963): *Public Health Responsibilities in Radiation Protection*, Wld Hlth Org. Techn. Rep. Ser. 254. Geneva: WHO.

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good to read it and thus learn what is involved and what is expected from the Radiation Hazards Commission, but it is for the health administrators and the public health organizers of services of this description. Every medical officer of health and head of a medical service should read this report, as well as Government departments and Atomic Energy Board officials occupied in research on radiation hazards, such as

radioactive waste disposal. The bodies interested in the work of the Radiation Hazards Commission should be familiar with the recommendations and discussions in this Report.

I am indebted to Prof. S. F. Oosthuizen for copies of the papers read at the Düsseldorf Conference, and to the Editor of the *South African Medical Journal* for the copy of the Fourth Report of the WHO Expert Committee.