

Oregon's Radiological Health Program

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This is the first of three articles describing radiological health activities in Oregon, which have emphasized steps to control radiation exposure of the public from diagnostic X-ray procedures. It provides a chronological account, from the first occupational health surveys of static eliminators in 1949 to a 2-year survey of diagnostic X-ray units in 1957-59. Observations concerning the utility of a survey of X-ray units in comparison with immediate registration and adoption of regulations are included. The two other papers will deal further with the survey of X-ray units.

UNDER its broad health powers, the Oregon State Board of Health promulgated its first radiation exposure standards in 1948, using at first a limit of 0.5 r and later of 0.3 rem per week for occupational exposure. In 1949 the board began surveys of polonium static-eliminators and of cobalt-60 and X-ray industrial radiology sources. These activities have continued to date as part of routine occupational health plant surveys.

In 1953 the Atomic Energy Commission began notifying the board of health of all isotope shipments into the State and invited inspection of licensees. Since that date staff members of the board of health have accompanied the AEC inspector on all his visits and have thus become acquainted with each of the 40 isotope users in the State. This cooperative activity has proceeded satisfactorily as a result of close work-

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ing relationships with the regional office of AEC in Richland, Wash.

Another early activity, in 1950, was a survey of shoe-fitting fluoroscopes. More than 80 percent of such units were found to be defective, and regulations requiring all units to meet stringent standards were promulgated in 1951. Periodic check of these machines continued until the summer of 1958 when a special regulation of the board of health outlawed them. No significant resistance to this step was encountered; in fact most of the shoe merchants testifying at a board hearing favored it.

Also in 1950 the Oregon Civil Defense Medical Department was created, and a civil defense advisory board was appointed. Beginning in this same year, training courses in radiological monitoring have been conducted for high school teachers and other personnel. Interest in civil defense and the presence of a full-time medical civil defense officer on the board of health staff served to stimulate interest in radiological health. Coordination of the radiological health program with routine civil defense activities has continued to date.

Beginning in 1953 the division of sanitation and engineering of the board of health has collected and analyzed air for radioactivity from local stations in cooperation with the Public Health Service's community air pollution program. After 1956, sampling stations in Portland and 300 miles distant at Klamath Falls continued this work as part of the National Radiation Surveillance Network operated by the Public Health Service. In addition, the sanitary engineering division has conducted modest surveys of radioactivity in air and water and a few special studies on potentially contaminated local water sources.

The director of the division of sanitation and engineering is a member of the Columbia River Advisory Group to the AEC and has worked with a Public Health Service advisory group on Columbia River problems arising from potential contamination by the Hanford Atomic Laboratories in Richland, Wash. Following a special meeting with the AEC in 1957, standard procedures in the event of accident were agreed upon.

Throughout this early period there was frequent contact between the Oregon State Board of Health and the Public Health Service, as the Service expanded its own radiological health activities. A number of Oregon staff members attended short courses dealing with specific aspects of radiological health given by the Service in Cincinnati and elsewhere.

Radiological Health Law

Initial planning for a comprehensive radiological health law in Oregon began in 1955, when it was realized that States would have to assume responsibility for control of health hazards that might result from large-scale industrial application of nuclear energy and isotopes. Preparation of the law was undertaken by the occupational health section with participation of the division of sanitation and engineering and the State health officer.

Early in 1956, a study was made of laws and regulations dealing with radiation in other States. Particular attention was given to the "model" legislation suggested in "Regulation of Radiation Exposure by Legislative Means," prepared by the National Committee on Radiation Protection (1). Valuable conceptual guidance was found in materials published by personnel of the Public Health Service (2, 3) and by others (4, 5). Proposed legislation in other States, Michigan, for example, also was considered (6-9). Good general information has been published since the original planning of the bill (10-12).

It has been the conviction of the Oregon Board of Health from the beginning that radiation exposure of the public is a health problem and a logical responsibility of the health department, rather than of a special commission or other State agency. With this as its major

provision, the first draft of the proposed bill was written in April 1956 and circulated to interested local radiologists, members of the American College of Radiology, and individuals in the National Bureau of Standards, the Public Health Service, and the AEC. Favorable comments and helpful suggestions were received in reply.

In conformance with the model legislation, which was the basis for the Oregon law, the first draft called for registration of all radiation sources. Following a review of the bill by the State medical society, which obtained a specific statement on the draft from the Oregon Radiological Society, this provision was dropped. Initially the radiologists consulted favored registration, but after further discussions they reconsidered their recommendation. The board of health agreed that the requirement was probably not indicated at the outset.

The medical society suggested that a 2-year "study" of the radiological health hazards be made before promulgation of any regulations in Oregon. In retrospect this turned out to be a sound step. By "study" was meant more than a committee review of the expected problem. It meant an actual field survey of a substantial sample of all sources of exposure, including diagnostic X-ray units.

A leading local radiologist provided continuing assistance in the development of the legislation and, later, in the survey of diagnostic X-ray units. Through him, early cooperation was obtained from the medical society and also from the Oregon radiological group. Liaison with the Oregon State Dental Association was established through the efforts of a local radiodontist who had already initiated considerable interest in dental X-ray hazards in Oregon. Support of the proposed legislation was also obtained from a special committee on radiological health appointed by the chairman of the Portland Chamber of Commerce Health Affairs Committee, himself a radiologist, at the time the board of health began work on the bill.

We cannot stress too much the importance of maintaining close working relationships with local professional societies if a radiological health program is to operate smoothly and successfully. This does not mean that all steps will be readily approved or welcomed by them,

but if they are represented in planning and kept fully informed of proposed activities, solutions can often be worked out that are likely to be supported by the professions as a whole. In November 1956 an ad hoc advisory committee composed of advisers mentioned previously plus a representative of industries using radiation devices and the physician in charge of nuclear medical activities at the local medical school was organized to advise the board of health on radiological health matters.

A final draft of the bill was enacted into law in January 1957. The strong support of the professions represented on the advisory committee was a major factor in its acceptance, with only minor revisions and clarifications, by the legislators. Briefly, the Oregon radiation law contains the following provisions.

The State board of health is authorized to promulgate regulations and standards required to control any harmful effects of radiation in Oregon after completing a 2-year study of radiation exposure. All sources of radiation, except certain small quantities of material exempted by the law's definition of "radiation," are covered. Provision is made for enforcing the regulations through court injunctions and penalties, if necessary. The act also requires the State board of health to appoint a radiation advisory committee of five experts.

The Oregon radiation law, it should be noted, does not state specific exposure limits or technical requirements. These are to be included in regulations, thus allowing greater flexibility.

Because of financing problems, appropriation provisions for the proposed program were submitted in a separate bill, which unfortunately did not pass. However, even without this bill, substantial achievements had been realized: the radiological health problem had been recognized in Oregon, a study authorized, and provisions made for establishing standards.

The State board of health appealed to the Surgeon General of the Public Health Service for assistance. In response several consultants from the Division of Radiological Health visited Oregon, and in February 1958 a trained radiological health officer of the Service was assigned to assist with the program. Immediately after the statute became effective on July 1, 1957, the ad hoc advisory committee was ap-

pointed as the official Radiation Advisory Committee specified in the law. Much credit for the success of the radiological health program must go to the members of this committee.

The Survey

It was immediately recognized by the Radiation Advisory Committee and members of the health department that conducting a 2-year study of radiation exposure would be a sufficiently large and technical undertaking that expert assistance would be essential. This would be particularly true for a survey of diagnostic X-ray units since professional acceptance and support would have to be developed before individual cooperation could be obtained. This impression was amply confirmed by experience in the succeeding months.

In early 1958 the newly assigned radiological health officer from the Public Health Service and the director of the occupational health section of the board of health began detailed planning for the survey of diagnostic X-ray units. Using Federal funds, the State provided a single full-time assistant who had attended one of the short courses in radiological health given by the Public Health Service. With National Bureau of Standards Handbook 60, "X-ray Protection," as a basis, field procedures were formulated and trial runs initiated. After refinement, the forms and techniques were discussed with the Radiation Advisory Committee, which suggested a review by a board-certified radiological physicist, who is a specialist engaged by radiologists to check their units. The consultation was of real value technically. It also served to assure the radiologists and other professional groups that our plans were reasonable and supported by the necessary technical competence.

Conferences were then held with biostatisticians of the board of health in regard to choice of sample, and a routine method for conducting the survey was worked out. Dr. Stahl took part in all early field surveys and personally checked most of the physicians' and radiologists' units. The field staff was given special training concerning routine X-ray practices and medical and dental terminology and received detailed advice as to interpretations of

radiation hazards and relative magnitude of various exposures before they conducted surveys without supervision.

Before the fieldwork was started, several meetings were held with representatives of X-ray equipment distributors in the area. Such dealers play an important role in maintaining X-ray equipment. They are well informed on the practical problems of diagnostic radiology and can offer much valuable advice on what will or will not work successfully in practice.

The results of the study confirmed previous impressions that radiation exposure can be materially reduced by use of equipment and techniques recommended by many radiologists. (Results will be presented and discussed in detail in a later paper.) What is perhaps more important, however, the survey allowed us to develop good working relationships with various professional groups. When obtaining data, we offered suggestions on radiation protection equipment and techniques. In other words, although no regulations were in force, the survey effected some of the benefits of a control program because of its educational value. There is considerable evidence that this voluntary approach will produce as good results as, perhaps even better than, would be obtained by compulsory registration and regulation of X-ray equipment alone. A registration program, of course, if properly interpreted to the professions, need not preclude a voluntary survey with its educational benefits.

Regulations

As specified by the Oregon law, regulations can be promulgated by the board of health after completion of the survey in August 1959. As background, we give the following summary of regulations in other States, based on information readily available (6, 7, 9). Because changes in this field are occurring rapidly, the figures are not precise.

Of the 13 States requiring registration of radiation sources, 6 or 7 specify registration of all diagnostic X-ray units. Thirty-four States have advisory groups on radiation and are presumably considering diagnostic X-ray exposure along with other possible sources. Seven

States have comprehensive radiation codes specifying limits on exposure for all types of personnel, and a number of others have set such limits as part of existing occupational health or other codes. Only New York, Michigan, Pennsylvania, and California have regulations covering the equipment to be used in diagnostic X-ray work. Several States forbid chiropractors and certain others to use X-ray for diagnosis.

The board of health and its advisory committee on radiation are considering various possible regulations. The general outlook is briefly as follows. There is an undeniable need for regulations regarding radioactivity in air and water, transportation of radioactive material, sale of objects containing radium and radioisotopes, and contamination of food. It would seem reasonable to set uniform occupational exposure standards that will include exposure of personnel in medical and other professional offices. Such regulations may not require continuous monitoring but instead specify frequent spot checks to determine average doses.

On the basis of our field experience, regulation of mechanical devices used with X-ray machines does not appear technically feasible or particularly desirable. Only a few of the many steps that can be taken to reduce radiation exposure of patients are amenable to simple regulation. Most require continuing, active cooperation by the user of the unit, which cannot be guaranteed in practice by rules or standards, but must depend on education and understanding of the hazard. Limits on occupational (and nonoccupational) exposure do not automatically assure the use of protective devices.

On the question of compulsory registration of radiation sources, Oregon is cautiously examining the advantages and disadvantages. The most commonly advanced argument for registration is that it provides a complete and up-to-date listing of all radiation-producing units and also provides the opportunity for bringing the accepted standards to the attention of their owners. We do not believe, however, that 100 percent registration can be accomplished without legal action, and such action is incompatible with present circumstances in Oregon. Further, Oregon officials feel that compulsory

registration may engender animosity and make those who refuse to register inaccessible to further contacts.

We have found it possible to locate at least 90 percent of all radiation sources in the State without registration, through the use of professional society listings and the classified telephone directories. Like other States, we are kept informed of shipments of radioactive materials by the AEC and the Radium Corporation of America, and the occupational health program routinely surveys other industrial and some laboratory radiation sources.

Promulgation of uniform occupational exposure standards would probably have widespread effect. Violating these standards, for example, might provide support for legal action in the event of possible late-appearing injuries. Adherence to them, on the other hand, would constitute considerable protection against such claims. The existence of standards would doubtless become widely known among X-ray technicians, labor unions, and others who would encourage adherence to them. Occupational exposure regulations are not likely to be regarded as interference with the normal practice of any of the professions concerned.

Coordination of Activities

In the spring of 1958 a plan for coordination of all radiological health activities of the Oregon Board of Health was formulated. The main goal was to define possible hazards and delineate the exact responsibility of the several sections of the health department in investigating each. A working understanding was developed without difficulty among occupational health, civil defense, and sanitation and engineering programs, which has facilitated solution of many practical problems such as use and location of the single laboratory counter, calibration sources, and other instruments.

In addition, the health department is coordinating its activities with those of other agencies that have an interest in radiological hazards. At present, these include the State Departments of Agriculture, Aeronautics, Education, and Labor; the State Industrial Accident Commission; the State police and the fire marshal; and the Port Authority. Contact will be or

has been established also with Federal agencies: the Public Health Service, the Department of Defense, the Interstate Commerce Commission, and the AEC, for example.

Advisable under any circumstances, such interagency coordination is particularly necessary if the health department is given primary responsibility for radiation health problems arising from all sources. Industrial development, using nuclear energy or radioisotopes, of course, is an entirely different matter and should be separated from surveillance of radiation hazards, we feel, to insure objective appraisal of potential health problems.

Informal personal contacts, as well as meetings of small groups, are effective in achieving the desired coordination. Unwieldy new administrative organizations should be avoided.

Professional education, as already indicated, is basic to a radiological health program. In addition to the work with X-ray technicians, dentists, and physicians in connection with the survey of X-ray units, we have held lectures and demonstrations for X-ray technicians, physicians, veterinarians, radiologists, and others.

Education of the public is also essential. To avoid misunderstanding, however, great care must be taken in framing statements for public use, particularly those dealing with highly technical matters. A statement that is misinterpreted could seriously impede radiation control activities.

Summary

Major accomplishments in the development of a radiological health program in Oregon include enactment of a law giving the board of health broad responsibilities for control of all sources of radiation and for conducting a 2-year survey of diagnostic X-ray units. Close liaison with various State and local professional groups, achieved with the aid of an active Radiation Advisory Committee of outside experts, has proved of great assistance.

Regulations are to be promulgated by the board of health after completion of the survey. An undeniable need is recognized for regulations concerning environmental contamination, occupational exposure, and acci-

dents involving radioisotopes. No decision has been reached concerning uniform registration of sources.

A formal plan clearly specifying responsibilities and areas of activity has been established for coordination of the work of various sections of the health department. Both professional and public education, considered basic in a radiological health program, have received attention.

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Institute on Chronic Disease Control

A 2-week institute on chronic disease control will be held June 13-24, 1960, at the University of Michigan School of Public Health. Co-sponsors of the institute are the directors of chronic disease teaching programs of schools of public health, the Association of State and Territorial Chronic Disease Program Directors, the Michigan Department of Health, and the Public Health Service.

Lectures, seminars, and discussions on health promotion, prevention, early detection, multiple screening, home care, institutional care, and rehabilitation, in such chronic diseases as heart disease, cancer, diabetes, glaucoma, and cerebral vascular disease, will be included in the program.

The institute is designed primarily for public health physicians in chronic disease control programs, but selected public health nurse consultants, nutritionists, and health educators who plan and administer such programs at State and local levels also are eligible to attend.

Attendance will be limited and applications for participation must be received not later than May 15, 1960. Additional information may be obtained by writing to the Director of Continued Education, School of Public Health, University of Michigan, Ann Arbor.