

X-ray Survey Program in Mississippi

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THE X-RAY safety program of the Mississippi State Board of Health probably began when I attended a medical X-ray safety course sponsored by the Public Health Service in Cincinnati. After returning from this school, our State health officer and I met with interested groups, such as the State radiological society, State dental association, and executive groups of the Mississippi Medical Association, and proposed a statewide X-ray inspection plan to them. It was through these meetings that the Mississippi State Board of Health received a somewhat skeptical signal to go ahead with the broad survey proposed. I use the term "skeptical" because I think none of these groups believed that we would be able to complete such a vast program in X-ray safety evaluation, especially since the radiological health staff consisted at that time of only one person. No one strongly supported our program, but neither did anyone want to go on record as opposing this public health and safety measure.

We obtained on loan from the Public Health Service a set of inspection equipment and first inspected X-ray equipment in the county health departments on the principle that we should sweep under our own doorsteps before asking anyone else to sweep under theirs.

For the first survey outside the health department, we chose dentists because (a) their machines are simple and easy to inspect; (b) the time required for inspection is much less than that for a medical diagnostic unit; (c) the den-

tal units were more concentrated; and (d) we needed experience not only in inspecting machines but in dealing with personalities and gaining confidence in the inspection program.

The data from a pilot survey based on 106 of these inspections of dental units in Jackson, Miss., were presented at an executive session of the State dental society. We pointed out the dose rates to patients, extent of the operator's exposure, and related data, first as revealed in the initial inspection and then as they appeared after we had properly placed filters and collimators in the machines. The results convinced the executive committee that a statewide dental X-ray safety program was needed, and it wholeheartedly endorsed our proposal for equipment inspection.

By that time another person had been employed to assist in the inspection program, and we decided to develop a similar inspection program in hospitals and among physicians. To allay any anxiety that physicians might feel about the program, we met with medical groups, presenting results of previous inspections, and proposed a statewide survey. The physicians agreed to cooperate if we would continue to conduct the program as previously, without use of news media. They believed that publicizing the inspections might needlessly alarm patients.

In addition, to obtain a general idea of how physicians felt about an X-ray safety program, 100 pilot letters were mailed to physicians selected at random throughout the State to explain our service and ask if they desired a radiation safety survey. As a result of the letters and the meetings with medical groups, we re-

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ceived more than 600 requests for a survey.

The unit set out to perform X-ray inspections on the basis of requests. However, when we left a county after performing all the requested inspections, often more machines remained un-inspected than inspected. To conserve time and increase efficiency, we therefore decided to go into a town, call the physician's secretary, and ask whether or not the physician had X-ray equipment. If so, we said that we would stop by to perform a radiation safety survey. We were cordially received in the majority of cases.

By now our program was being discussed at various medical meetings throughout the State, physicians telling others that such a service existed. Following regional meetings, groups of 20, 40, and 50 physicians at a time began to request the service. At one time, the inspection unit had a backlog of more than 1,100 requests. The Mississippi State Board of Health was presenting a direct service to physicians throughout the State instead of presenting the usual request for them to cooperate in solving another of the many public health problems. Moreover, the unit not only performed inspections but also what we refer to as radiological repairs. These repairs consist of adding the required filtration to X-ray units when found necessary, repairing frayed cables when they present a hazard, installing collimators, tightening nuts and bolts, and intercepting oil leaks before they present a burn-out hazard to the tube.

The most beneficial part of the inspection program, although the most time consuming, was the discussion of X-ray safety with the various physicians, dentists, and technicians. We early discovered that such discussions are the only realistic approach in teaching the proper use of cones and other safety equipment. We found much evidence for the need of such personal teaching. Several so-called X-ray technicians, for example, removed the filter when they took an X-ray because they thought that aluminum prevented X-rays from leaking out of the tube when the machine was off. The vice president of a large X-ray company told us that in the year after our inspection program was initiated his company had sold more safety equipment than in the previous 10 years.

The first goal of our program was the completion of X-ray evaluation of every known

X-ray machine in the State operated by a licensed practitioner. We hoped this evaluation would (a) help make the equipment as safe as possible; (b) educate through explanation, demonstration, and evaluation; and (c) determine exactly the source of most of the medical radiation exposure of the Mississippi population.

Exactly 22 months after initiation of the plan, the Mississippi State Board of Health completed the first round of the survey. We had inspected 2,281 X-ray and other units, an average of more than 100 units per month, and accomplished the purpose of the program. Only one physician in the State refused to allow us to check his equipment when we called on him, and he, too, later requested a survey.

During the 22-month program two men performed all the inspections, traveling as a team in order to share responsibility, increase morale, and decrease expenses. We found that two men as a team could inspect more units than working separately and much more cheaply.

Of the dental machines inspected, 83 percent did not meet the simple criteria established by the Mississippi State Board of Health. Of the medical radiographic units inspected, 86 percent did not meet the criteria for safety, and more than 90 percent of the fluoroscopes did not measure up to the simple requirements. Many fluoroscopes were found to exceed 25 r./min. at the panel top; two exceeded 100 r./min.

Over 82 percent of the total exposure to medical X-ray occurs in hospitals and large clinics, we discovered, and only about 18 percent is attributable to the X-ray equipment of private physicians.

Although only one-third of the 1,677 practicing physicians in Mississippi own X-ray equipment, the number of units averages almost one per practicing physician. The average is a little more than one per dentist. In the 145 classified hospitals in the State the average is 3.9 X-ray units per hospital.

A recently completed second survey has shown a marked decrease in X-ray machine deficiencies noted during the first survey. More than 85 percent of the dental machines and 70 percent of the medical units now meet the safety criteria established by the Mississippi State Board of Health.