

## SURVEILLANCE OF X-RAY MACHINES IN ISRAEL

A. Donagi, J. Hai, M. Kuszpet

Research Institute for Environmental Health,  
Israeli Ministry of Health.

Ionising radiation is widely used in Israel for medical, industrial and research purposes. Early in 1964 it was recognized by the Israeli Health Authorities that the use of X-ray machines for diagnostic purposes is the main source of artificial irradiation of the population. Table 1 shows the distribution of radiation machines (mostly diagnostic) that are currently under surveillance of the Israeli Ministry of Health.

TABLE 1. RADIATION MACHINES USED FOR MEDICAL PURPOSES IN ISRAEL

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Radiography	350
Radiography + Fluoroscopy	270
Radiography Portable	200
Fluoroscopy Portable	60
Mammography	9
CT	5
Dental	3,400
Panoramic	40
Ortovoltage	20
Co <sup>60</sup>	10
Linear Accelerator	4
Veterinary	25

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In order to assure that X-ray machines are used according to the recommended safety standards for both patients and operators, a nationwide surveillance program of diagnostic X-ray machines has been carried out by the Research Institute for Environmental Health, which is operated by the Ministry of Health and the Tel-Aviv University. According to the Israeli law, all the X-ray machines owners must apply to the Ministry of Health in order to obtain an operating license for the equipment. At present diagnostic X-ray machines are surveyed at least once every two years while dental machines are surveyed once every three to five years. The surveillance procedure includes the following items:

- a) Registration of the diagnostic X-ray machines.
- b) Check of the structural shielding (scattered radiation).
- c) Check of the reproducibility and linearity of the X-ray machine.
- d) HVL measurements.

- e) Check of the X-ray-light field alignment.
- f) Check of inherent filtration.
- g) Instruction of machine operators in appropriate radiation control procedures.
- h) Issue of recommendations regarding personal dosimetry.

All the tests are carried out following BRH's Routine Compliance Testing for Diagnostic X-ray Machines. Furthermore the Institute advises machine owners about the design of structural shielding.

In the last years there has been an increased concern about doses to the patient following X-ray examinations. In order to compare X-ray techniques used in different hospitals in Israel, the NEXT (Nationwide Evaluation of X-ray Trends) program, developed by the BRH was utilized. On the basis of the findings of this project, necessary correction steps were taken in order to reduce the radiation dose to patients. It is planned to extend the NEXT program in the future, in order to compare the dark room conditions among different hospitals. It is believed that the lack of standardization in the dark room conditions is responsible for overdoses to patients. Furthermore, a comparison of X-ray image qualities using appropriate patterns will be carried out.

Following an initiative of the Institute, a special Committee was nominated by the Minister of Health, in order to evaluate the health implications of the irradiation of pregnant women. The Committee recommended that doses below 5 Rem, in any stage of the gestation period do not justify performance of an abortion; while doses over 10 Rem, in the third to twelfth week might justify performance of an abortion. In any event the personnel of the Institute carry out the estimation of the dose to the foetus. This is done either by calculations, using NCRP Report 54 recommendations, or by in-phantom measurements.

Recently, the new recommendations of ICRP 26 were implemented in Israel. At present, doses beyond 150 mR/month are reported to the Institute by the Soreq Personal Dosimetry Service, and the reasons to this overexposure are investigated.