This book addresses the needs of radiation workers irrespective of different groups of health professionals working with medical applications of radiation such as in radiodiagnosis, nuclear medicine, and radiation therapy practices. These practices involve exposure to the individual working in the field who need to be monitored periodically to verify their personal doses. Although radiation professionals are well aware of the personal monitoring, they should know how to manage the personal monitoring devices and maintain relevant documents. This book discusses in detail the practice of personal monitoring and the generalized method for predicting dose levels from the workload the facility is handling.

**Chapter 1: Requirements for Monitoring Radiation Dose**

In this chapter, the authors have presented a detailed literature review of various international protocols and guidelines related to monitoring of doses including ICRP and ICRU. As these protocols (ICRP 60 and ICRP 103) do not address in depth about the risk assessment and management, the authors have brought out a detailed procedure for the radiation monitoring of personnel and environment and have explained its relevancy. In addition, the authors have also emphasized on key reasons for carrying out individual personal monitoring.

**Chapter 2: Dosemeters Available**

This chapter discusses the external and internal dose monitoring in detail. Monitoring of both charged and uncharged particles has been discussed in depth with appropriate detectors of choice. The uses of electronic monitors have been well explained by the authors, and they have also presented few important international standards such as IEC 62387, IEC 61526, and the European Commission Technical Recommendations available for personal monitoring in this chapter.

**Chapter 3: Nuclear Medicine**

Although the topic of the chapter is a generalized one, it is well written in a structured manner, briefly describing the dose-monitoring aspects of nuclear medicine applications. Dose monitoring of extremities, eye, and whole body is explained well along with the details of appropriate dosimeters of choice. The authors re-insist that small sources of radiation such as syringe and vial containing radioactive liquid are potential contributors of radiation dose to the fingers. The authors also suggest adopting some principles to draw the radiopharmaceuticals in order to reduce the dose to finger. This chapter gives some useful key points for adopting such protocol. It is important to note the authors’ observation that the ring dosimeter underestimates the dose due to high-dose gradient, and hence requires dose correction. The authors explained the dose correction methods, substantiating their observations based on the literature.

**Chapter 4: Dosimetry for Personnel Working with X-Ray Equipment**

This chapter discusses the problems involved in dose monitoring for staff practicing with diagnostic X-rays. The authors had explicitly explained the double dosimeter for body monitoring system. As recommended in the ICRP 2000; 2003, the authors have advised to wear two dosimeters ideally, one either adjacent to the eye or at the collar above the lead aprons, and another underneath the apron, which will be the best option for assessment of the effective dose for highly exposed workers. A number of algorithms have been developed to combine reading from collar and under-apron dosimeter over the years to give a better estimation of effective dose. The authors reported the different algorithms for calculating the effective dose with expression \( E = aH_{eb} + bH_{on} \), where \( H_{eb} \) and \( H_{on} \) are the personal dose equivalents measured on the body under the apron and at the neck outside the apron, respectively. This chapter attracts more interest of the readers as it deals with the monitoring of the radiation dose to body and eye.

**Chapter 5: Use of X-Rays in Diagnostic and Interventional Radiology**

In this chapter, the authors describe dose-monitoring techniques for a wide range of X-ray units such as X-ray, mammography,
dental, dual-energy X-ray absorptiometry, interventional radiology, cardiology, and computed tomography. In addition, the authors have also explained the recommendation for dose monitoring in orthopedic medicine, endoscopy, and urology applications. This chapter also highlights the importance of training and education regarding personal monitoring to all the health-care professionals involved in the field.

**Chapter 6: Radiotherapy**

This chapter deals with the requirements of personal monitoring in a variety of radiotherapy units such as external beam radiotherapy, brachytherapy (manual and remote after-loading), permanent iodine seed implants, and intraoperative radiotherapy. The authors’ simple way of explaining the risk of exposure, such as a nursing staff coming into close contact with the patient for 1 h/day who could receive an effective dose of ~10 μSv per patient over a 48 h period which would translate into an annual dose of 0.5 mSv for a workload of 50 patients/year, is highly appreciable. The authors stress many such situations explaining the seriousness of the requirements of personal monitoring for all individuals.

**Chapter 7: Risk Assessments to Predict Likely Personal Doses**

In general dose monitoring, the requirements are based on the risk assessment. This chapter provides detailed information on good practice that needs to be followed to fulfill the requirements of the regulations for ionizing radiation. The authors have tabulated different recommendations regarding various approaches to monitor the dose at different dose levels by quoting the references available in the literature. In this chapter, the authors have referred quite a large number of publications relevant to risk assessment, which deserves wider appreciation. This chapter explains a generalized method for predicting dose levels from workload in detail with a mathematical expression. For all the risk assessment procedures, the authors have described several mathematical expressions in a simple manner.

**Chapter 8: Managing Personal Monitoring**

It is very difficult to manage personal monitoring issues in any hospital. Most of the problems arise due to poor cooperation of staff in safe handling and timely return of the monitoring devices, which results in uncertainty in dose evaluation. In this chapter, the authors have dealt with the management of the missing dosimeter, incidences of unusual dose reading, and overexposures. This chapter will benefit radiation safety officers working in medical institutions, especially the one who is handling the personal monitoring-related issues.

**Concluding Remarks**

In general, the book showers in-depth knowledge and is very appropriate for the professionals involved in radiation safety in medical institutions. The importance and safe use of personal monitoring and available choices for health professionals have been explained in detail. This book gives overall information on the available international protocols in a nutshell along with a brief description of personal monitoring procedures in detail. This book will widely attract the attention of radiation professionals for its simplicity and easy-to-understand way of presentation. Overall, the book is well structured with the presentation of chapters in an organized manner. The entire radiation professional will appreciate the authors’ efforts in bringing out this excellent document.

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