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## **Occupational Cumulative Effective Doses of Radiation Workers in Hamad Medical Corporation in Qatar**

**Abstract:** The number of radiological examinations has increased steadily in recent years. As a result, the risk of possible, radiation-induced consequential damage also increases through continuous, lifelong and increasing exposure to ionizing radiation. Therefore, radiation dose monitoring in medicine became an essential element of medical practice. In this study, the occupational cumulative doses for radiation workers in Hamad medical corporation in Qatar have been assessed for a period of five years. The number of monitored workers selected for this study was 700 (out of a total of 1400 monitored workers) who have been working continuously - with no interruption - with ionizing radiation over the past five years from 2017 to 20201. The aim of this work is to examine the occupational groups and the activities where the higher radiation exposure occurred and in what order of magnitude. The most exposed group was the nuclear medicine technologist staff with an average cumulative dose of 8.4 mSv. The highest individual cumulative dose was 9.8 mSv recorded for the PET-CT Technologist category.

**Introduction:** In order to limit the radiation exposure to workers and the public, the use of ionizing radiation is regulated by laws, ordinances, recommendations and guidelines. To protect radiation workers and the public from the negative effects of ionizing radiation, dose limits that must not be exceeded are set in order to reduce the risk of exposure to a reasonably achievable level.

**Methodology:** In this work the Harshaw TLD-100 from Thermo Fisher Scientific was used, which consists of two lithium fluoride crystals LiF doped with magnesium and titanium for estimating the personnel dose equivalents Hp (10) and Hp(0.07), where Hp (d) is the dose equivalent This Harshaw Reader is designed for large facilities and can read a carousel containing up to 1400 four-element cards in one load at 140 cards per hour. To protect radiation workers and the public from the negative effects of ionizing radiation, dose limits that must not be exceeded are set in order to reduce the risk of exposure to a reasonably achievable level.

**Results:** The average cumulative effective dose of radiation workers at Hamad Medical Corporation (HMC) was assessed over a period of five years. The most exposed group was the nuclear medicine technologist staff with an average cumulative dose of 8.4 mSv. The highest individual cumulative dose was 9.8 mSv recorded for the PETCT Technologist category. All doses were well below the dose limit for radiation workers and did not exceed 15% of the limit. Moreover, all doses were also less than 50% of the investigation level for workers in nuclear medicine.

**Conclusion:** The average cumulative effective dose for radiation workers over the last five years is summarized as a function of the occupational groups. The relative high doses are registered for nuclear medicine in addition to cardiological intervention categories. The cumulative dose in all other categories is less than 5 mSv, which is only 5% of the dose limit recommended by the ICRP and 15% of the investigation level according to HMC policy.

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