

# Examination frequency and population dose from nuclear medicine (NM) examinations in Norway in 2008.

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## Introduction

The largest contribution to the population dose from man-made ionizing radiation sources comes from medical exposure. Part of the medical radiation exposure is from nuclear medicine procedures.

The aim was to estimate the collective effective dose from nuclear medicine examinations to the Norwegian population in 2008 was estimated. The contribution from nuclear medicine to the total population dose from medical exposure was also compared with the contribution from other man-made radiation sources, i.e. conventional radiology and fluoroscopy, interventional fluoroscopy, dental radiology and computed tomography (CT).

## Materials and methods

Since 2004 all nuclear medicine departments in Norway has been obliged by regulations to annually report about nuclear medicine practice to the Norwegian Radiation Protection Authority (NRPA). A questionnaire was sent to all 25 hospitals in Norway with nuclear medicine to collect information about the practice of examinations. The collective effective dose to the Norwegian population from nuclear medicine was calculated using information on the number of NM procedures and the average effective dose per procedure. In the calculations of average effective dose per procedure, information on the average administered activity per procedure and the effective dose per activity was required. This information was derived from the questionnaires and the ICRP Publication 80, respectively.

## Results

The reported total number of examinations performed was approximately 47.000 in 2008. This corresponds to about 9.7 NM procedures per 1000 inhabitants. The five most frequent examinations were bone, heart, kidney, thyroid and F-18 FDG, respectively, and contributed to about 83.7 % of all examinations.

The collective effective dose from nuclear medicine to the 4.8 million Norwegian population in 2008 was estimated to be about 256 man-Sv. This corresponds to an average effective dose per caput of 0.054 mSv from nuclear medicine. The five most frequent examinations mentioned above contributed to about 83.5 % of the collective effective dose, which corresponds to about 214 man-Sv or 0.045 mSv/caput.

## Conclusion

The annual collective and individual effective doses from nuclear medicine in Norway for 2008 were estimated to be 256 man-Sv and 0.054 mSv, respectively. The contribution to the total effective dose to the Norwegian population from nuclear medicine procedures was compared with the total collective effective dose of 1.1 mSv/caput from radiology procedures. Accordingly, the contribution from nuclear medicine was only about 5 % of the contribution from radiology. This can partly be explained by the fact that only approximately 47.000 nuclear medicine examinations were carried out compared to approximately 4.3 million radiological examinations in 2008.