

# Comprehensive analysis of the practice in one radiography department

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# Purpose

- **To perform comprehensive study of patient dosed, clinical image quality, x-ray system performance and rejected films, and to implement optimisation measures.**

# Materials

- The study was performed in a small diagnostic imaging center with one film-screen radiography room and one film processor.



# Method



- Quality control of the system and calibration of the kerma-area product (KAP) meter was performed at the beginning of the study.
- Dosimeter DIAMENTOR M4-KDK (PTW Freiburg) was used to measure simultaneously kerma-area product (*KAP*) and air kerma *K1* in the center of the transmission chamber, allowing then to calculate the Entrance surface air kerma (ESAK) for each patient.

# Method

- All necessary anthropomorphic and exposure data were recorded for each patient.
- Films from chest, lumbar spine and pelvis radiography were reviewed by the local radiologists applying the European image quality criteria.
- Analysis of the rejected films was performed at the level of radiographers and radiologists.

# Results

Examination	Typical unit values, mGy			Diagnostic reference levels,	
	MIN	MAX	AV	Bulgaria	EU
Chest	0,2	1,1	<b>0,4</b>	0,9	0,3
Lumb.Sp AP	1,1	10,3	<b>4,6</b>	10	10
Lumb.Sp. LAT	2,7	15,7	<b>8,2</b>	30	30
Pelvis	1,5	4,3	<b>2,8</b>	10	10

# Results

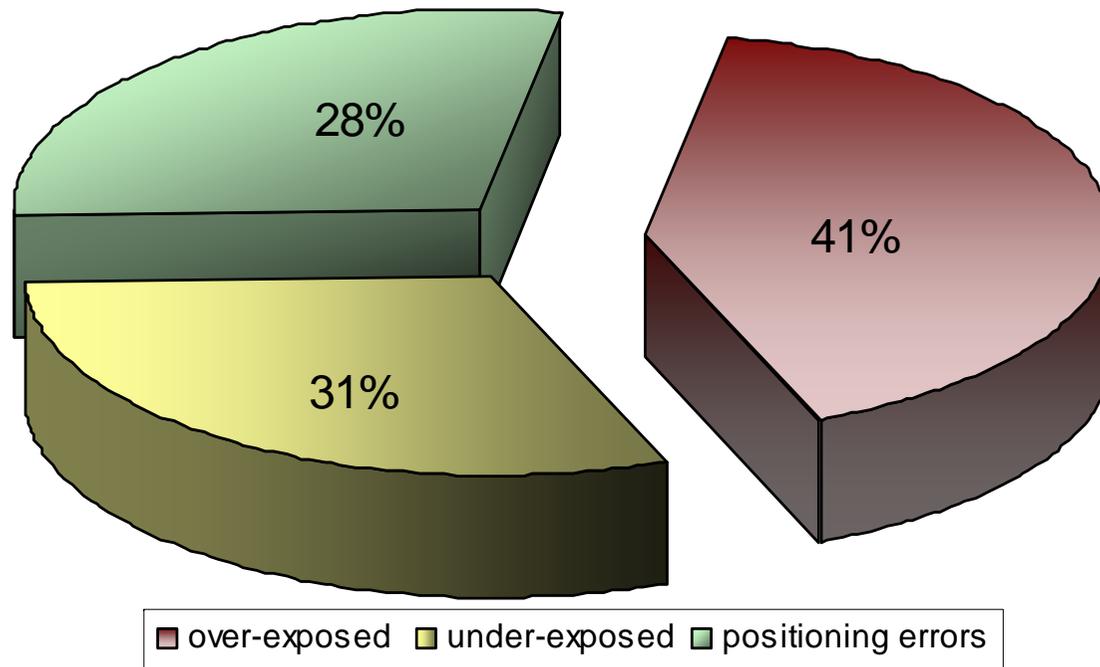
- **The mean doses for lumbar spine and pelvis radiography were lower than the corresponding national diagnostic reference levels (DRL), but the mean dose for chest radiography was higher than the DRL, mainly due to the soft beam technique used for this examination (60 – 75 kV)**

# Results

- **Clinical image quality evaluation of chest radiography demonstrated potential for dose reduction by applying higher voltage to improve visualization of structures hidden behind ribs, heart and diaphragm.**
- **Reduced visualization of the fine structures in lumbar-pelvis area can be improved by better beam collimation.**
- **Image quality is limited by the unstable high voltage generator performance, demonstrated from the quality control.**

# Results

- Reject rate of 5 % was found mainly due to the over- or under-exposed films (72 % of all rejections) and due to positioning errors in 28%.



# Conclusion

- **Optimisation measures were applied to reduce doses, but most of the errors can be eliminated only by replacement of the old x-ray system.**
- **The comprehensive study of patient dosed, clinical image quality, x-ray system performance and reject films analysis is very effective tool in finding the best optimisation measures**