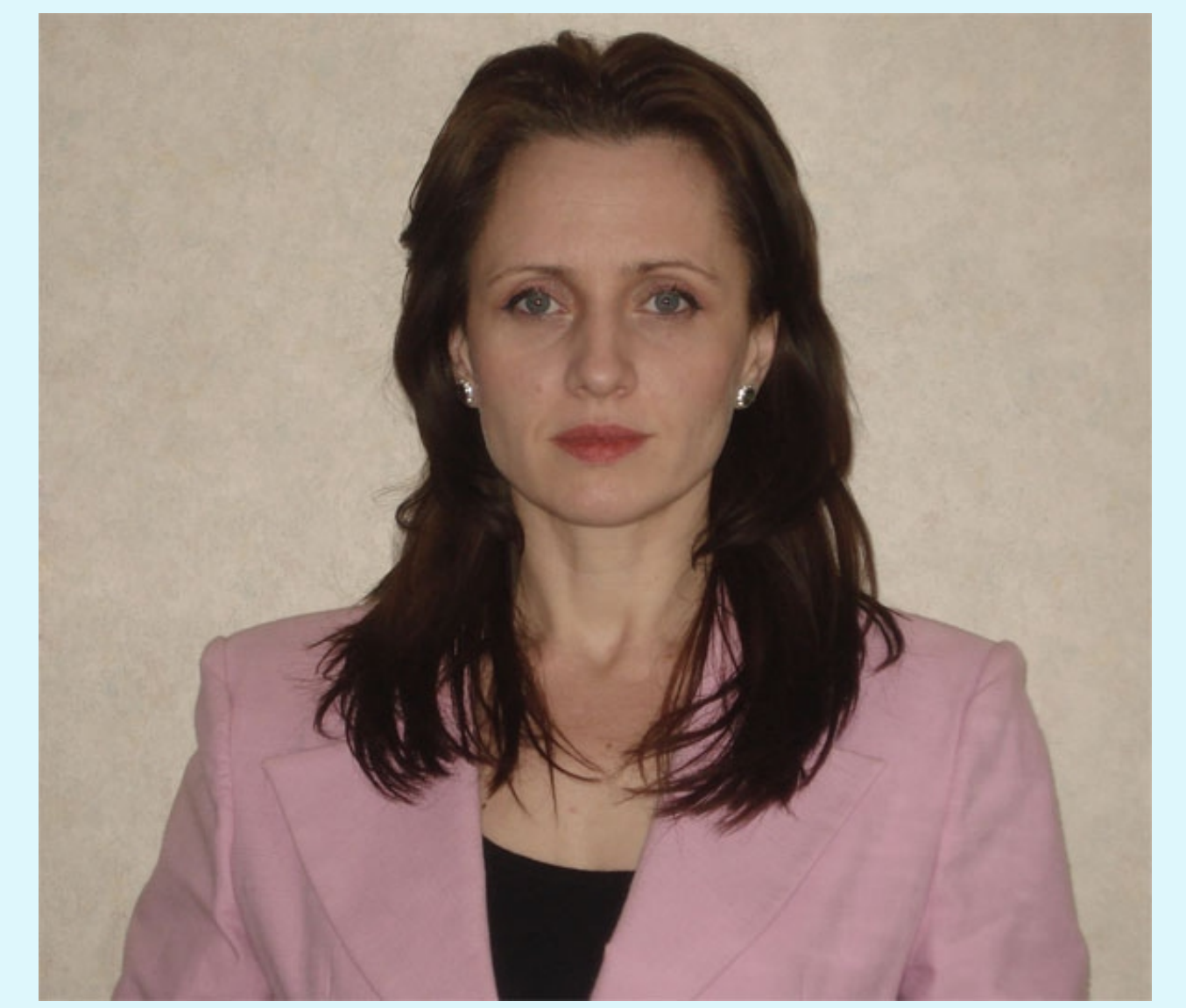


# Aspects Regarding Radiological Protection of Newborn Babies in an Intensive Therapy Unit

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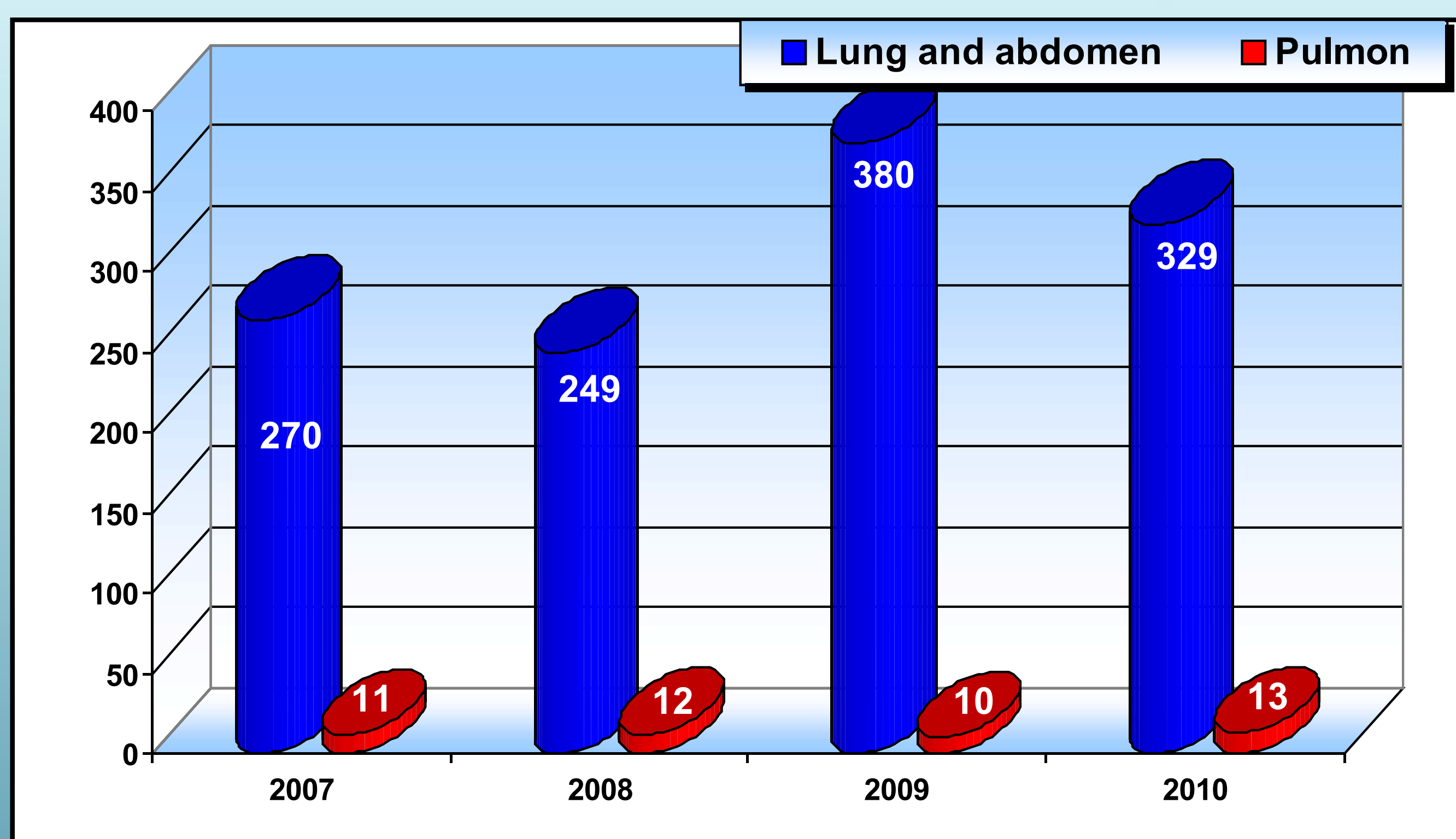
## 1 INTRODUCTION

Ascertaining the newborn babies' treatment needing intensive care depends largely on the radiological diagnosis. Weight at birth, pregnancy age, and respiratory problems might determine a large number of X-ray examinations. Radiological examinations on newborn babies need special care as, at this age, the probability of radio-induced cancer grows while life expectancy also increases. On the other hand, all the organs may be in the radiation beam due to the small size of babies, resulting in an exposure of the whole body when making the radiography.

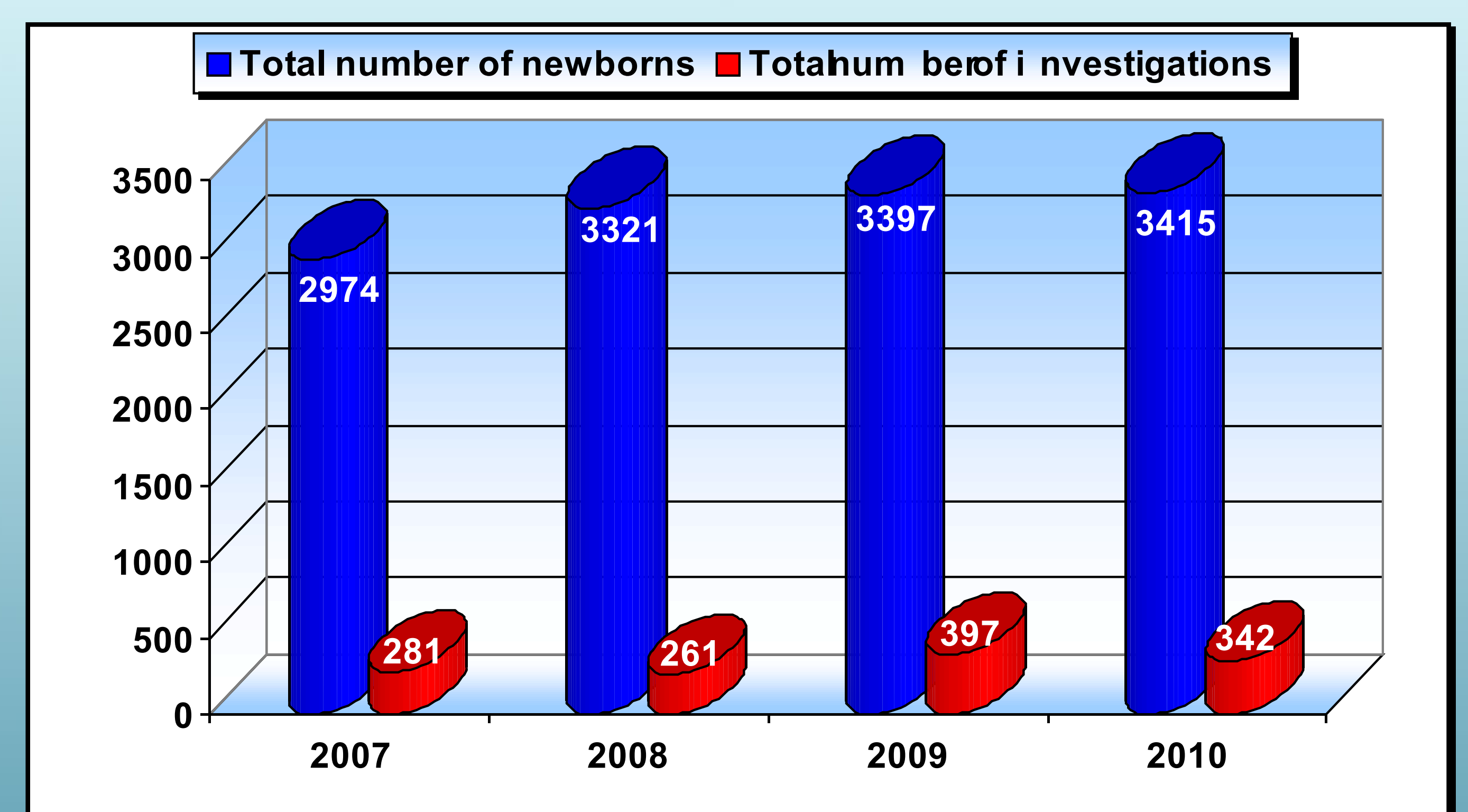
## 2 MATERIAL AND METHOD

This study has been carried out in an intensive care unit of a maternity ward between 2007 and 2010. It recorded the frequency and distribution of radiological examinations as well as the patients' ESD during the most important radiological procedures. We used a multi-functional device RMI 242 in order to test the radiological systems quality. The examinations were made with an X-ray mobile device Polymobil 10, with a total filter of 3.4 mmAl.

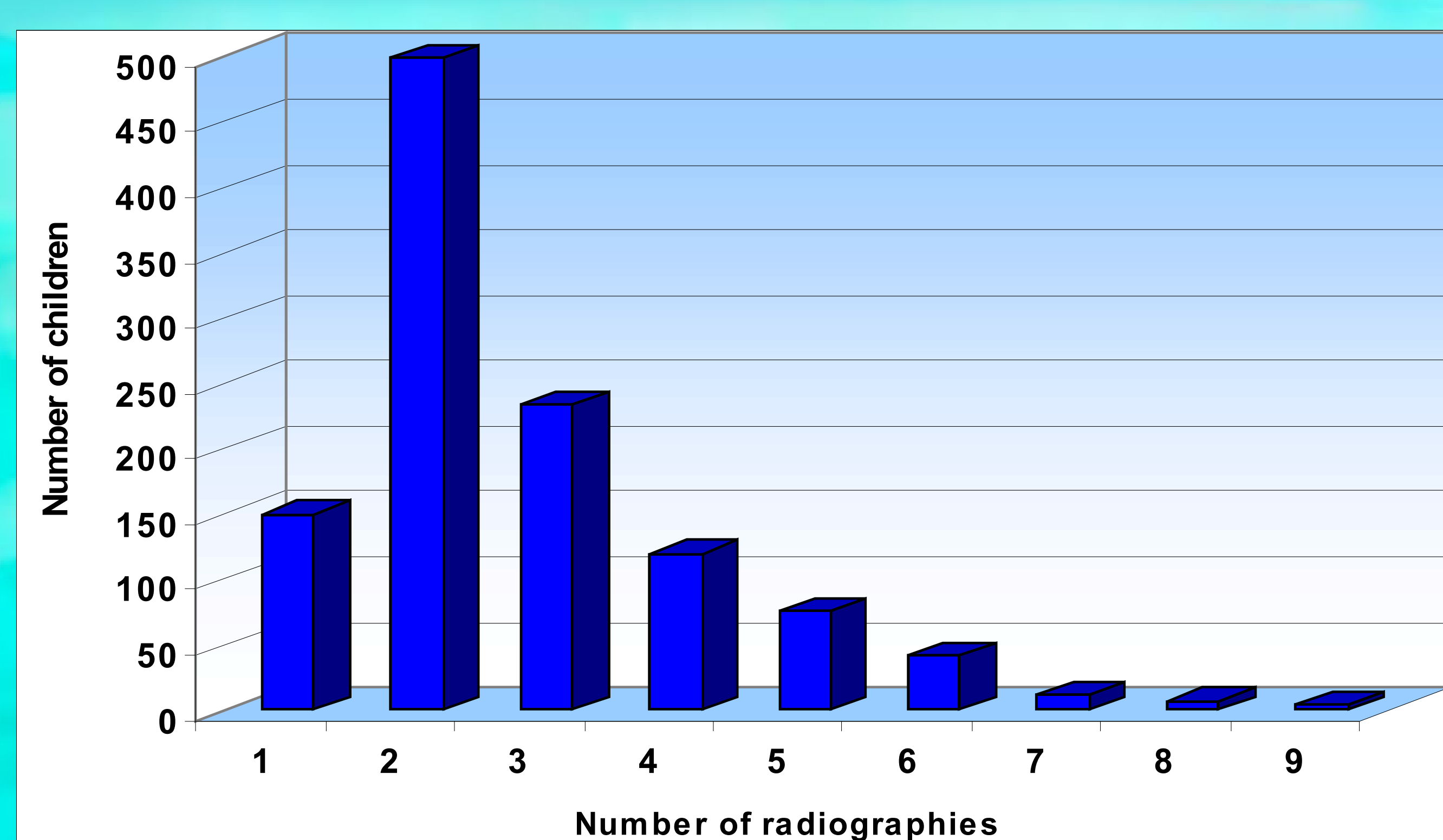
## 3 RESULTS



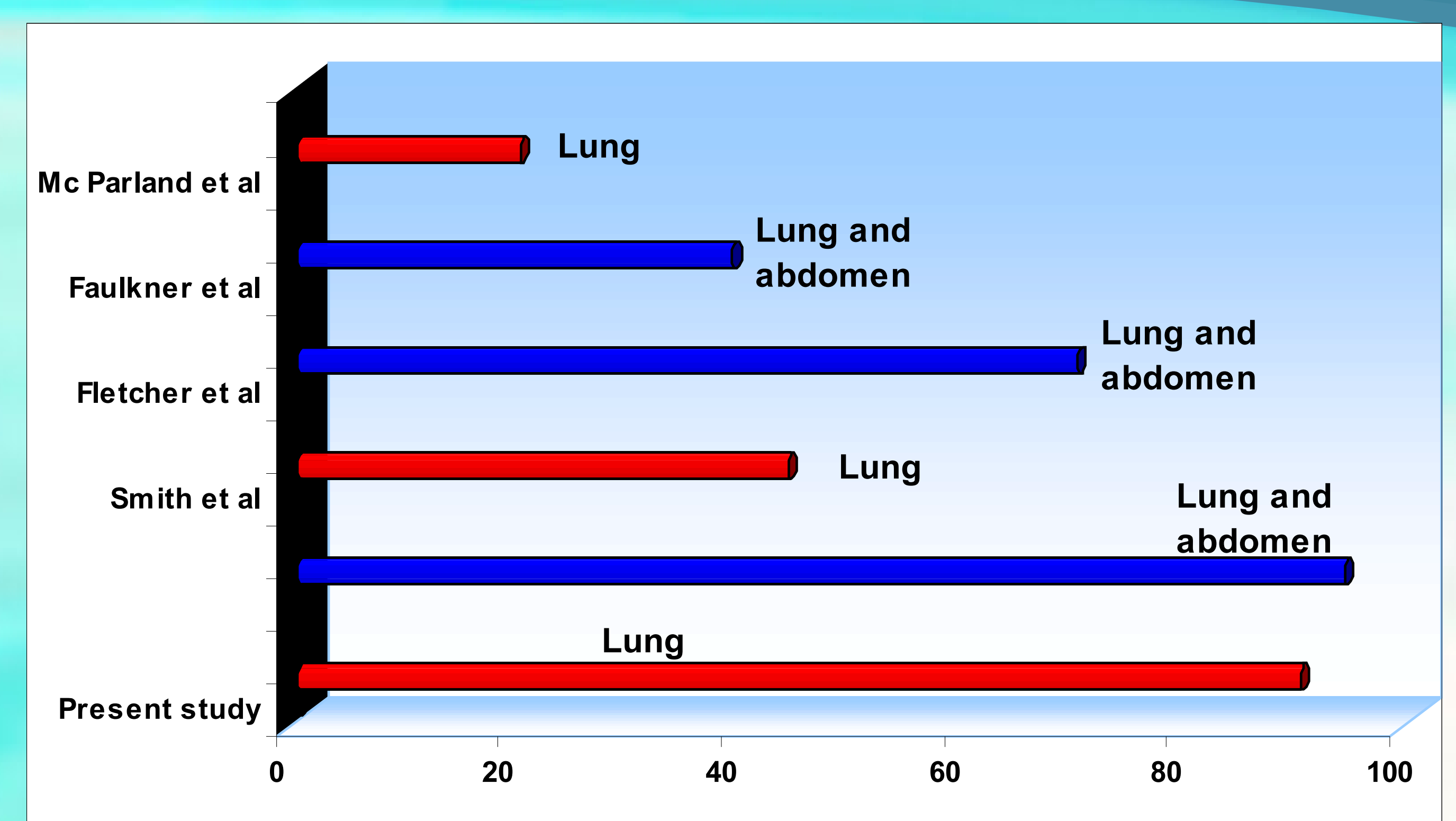
Graph 1 The frequency of radiological examinations and their distribution on types of procedures



Graph 2 The number of radiological investigations related to the number of newborns



Graph 3 The distribution of radiographies per child



Graph 4 Comparison between ESD in this study and ESD in other published studies

<sup>1</sup> Smith W.L., Gresham E., Berg R., et al. A practical method for monitoring diagnostic radiation dosage in the newborn nursery. *Radiology*, 132, 1979.  
<sup>2</sup> Fletcher E.W., Baum J.D. & Draper G., The risk of diagnostic radiation of the newborn. *British Journal of Radiology*, 1986.  
<sup>3</sup> Chapple C.L., Faulkner K. & Hunter E.W., Energy imparted to neonates during x-ray examinations in a special care baby unit. *British Journal of Radiology*, 1994  
<sup>4</sup> McParland B.J., Gorka W., Lee R., Lewall D.B. & Omojola M.F. Radiology in the neonatal intensive care unit: dose reduction and image quality. *British Journal of Radiology*, 1996.

	kV		ms		Sensitivity class	
	Used	Recommended	Used	Recommended	Used	Recommended
Lung	52 - 57	60 - 65	12 - 14	< 4	200-400	200-400
Abdomen	53 - 58	65 - 80	4 - 18	> 20	200-400	600-800

Table 1 Comparison of exposure factors used in this study with those recommended.

(Kettunen A., Radiation dose and radiation risk to foetuses and newborns during x-ray examinations, Helsinki: Radiation and Nuclear Safety Authority (STUK), ISBN 951-712-861-4, 2004)

The average of the entrance surface dose in lung examinations was greater than both the EU (80 µGy) reference value and the reference value of NRPB (50 µGy) ( $p < 0,001$ ).

## 4 CONCLUSIONS

The decrease of radiological examinations could be explained by the fact that both the radiologist and the neonatal physician tried to get relevant diagnosis information avoiding useless exposures. We found higher values of ESD in pulmonary radiographies due to lower kilo-voltages that are being used, smaller film focus distances, and the fix filtering of devices, without the possibility of using added filters.