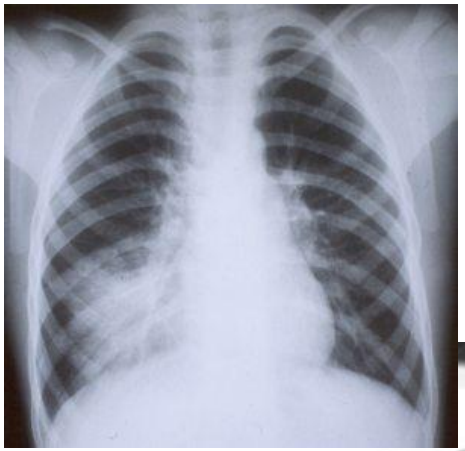
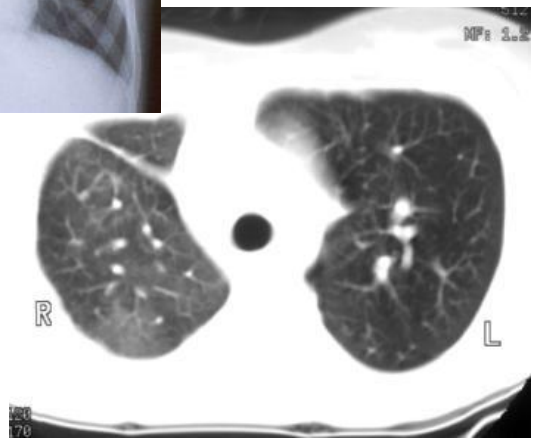
RADIATION PROTECTION OF CHILDREN IN X RAY DIAGNOSTIC

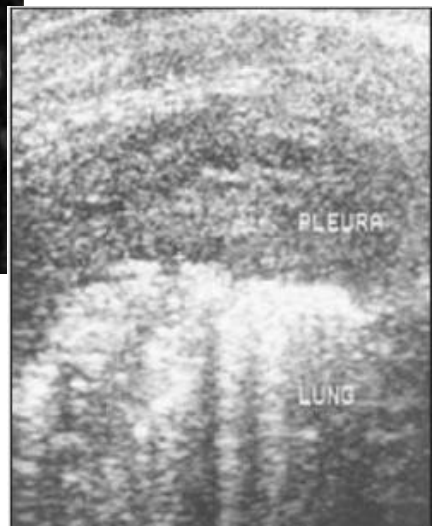
Đurđica Milković and Maria Ranogajec-Komor
Croatian Radiation Protection Association

Cardiopulmonal pediatric diagnostic methods

- Radiography
- CT
- fistulography
- MR
- Ultrasound







Origin of ionizing radiation

X RAY

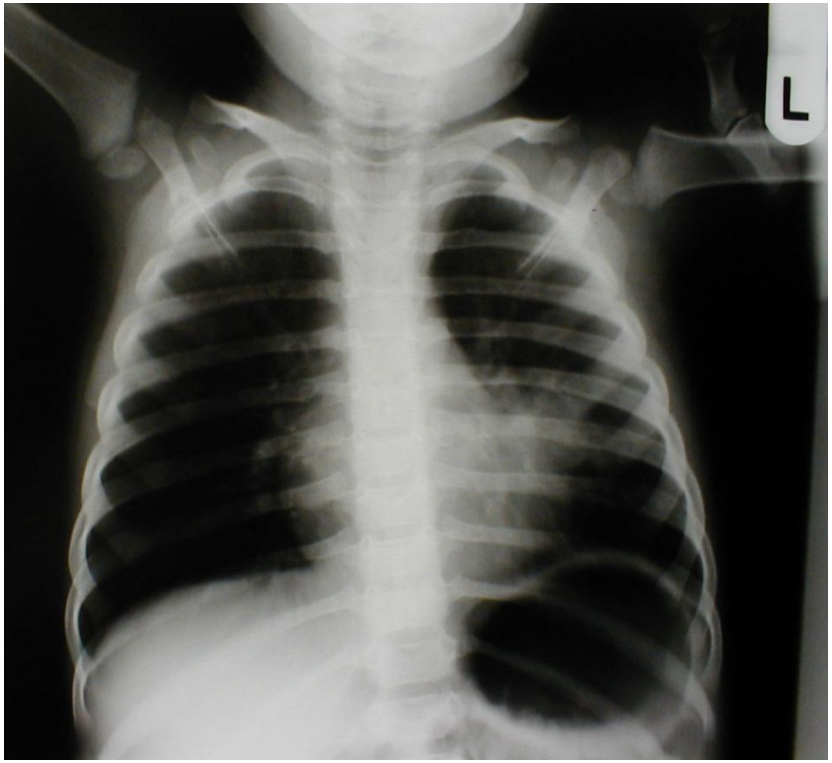
- 90% of exams
- most often respiratory system

CT

- heart anomalies and mediastinal tumors
- severe lung conditions

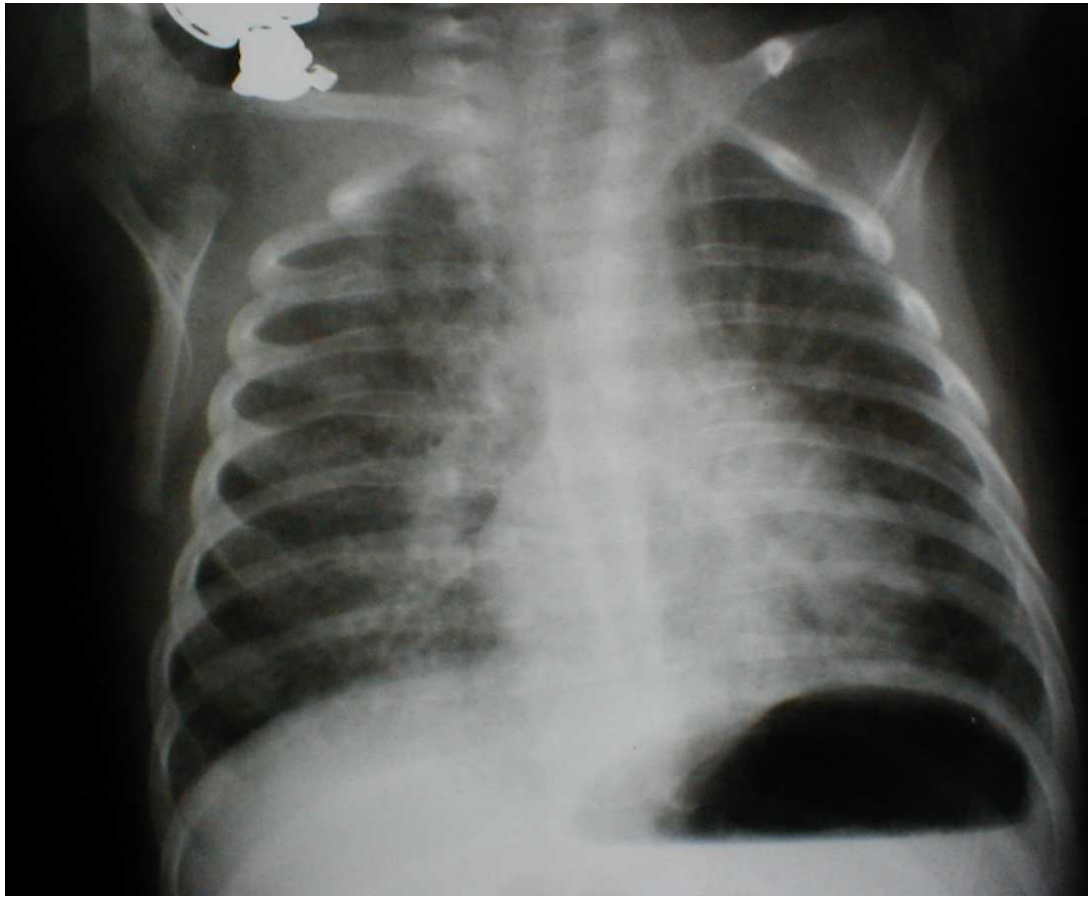
Radiography – Lungs and Heart

- Respiratory symptoms are the No 1 indication for using ionizing radiation
- 95% of artificial radiation exposure in pediatric population



What we are looking for?

- TBC
- Foreign body
- Asthma
- Cystic fibrosis
- Bronchiectasis
- Tumors
- Emphysema



RADIATION PROTECTION

X-rays are more effective on cells which have a greater reproductive activity

1906. Bergonie i Tribondeau

The children are very sensitive to radiation

INDICATION

- Various studies show that patients have been sent to wrong diagnostic procedures in 35%
- The proper indication is the most important radiation protection factor

➢ After detailed **physical examination** and **patient history**

➢ After indicative **lab tests**

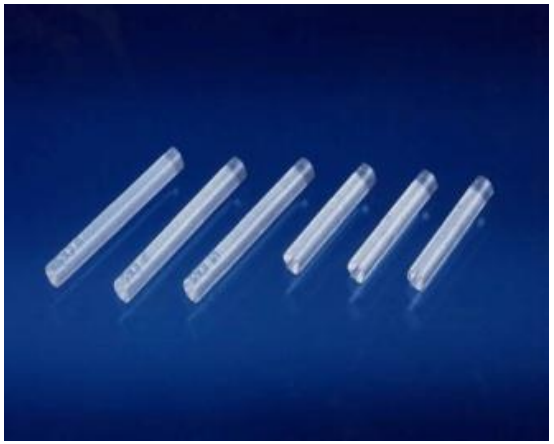
RADIATION PROTECTION

Firts step of radiation protection is the knowledge of doses.

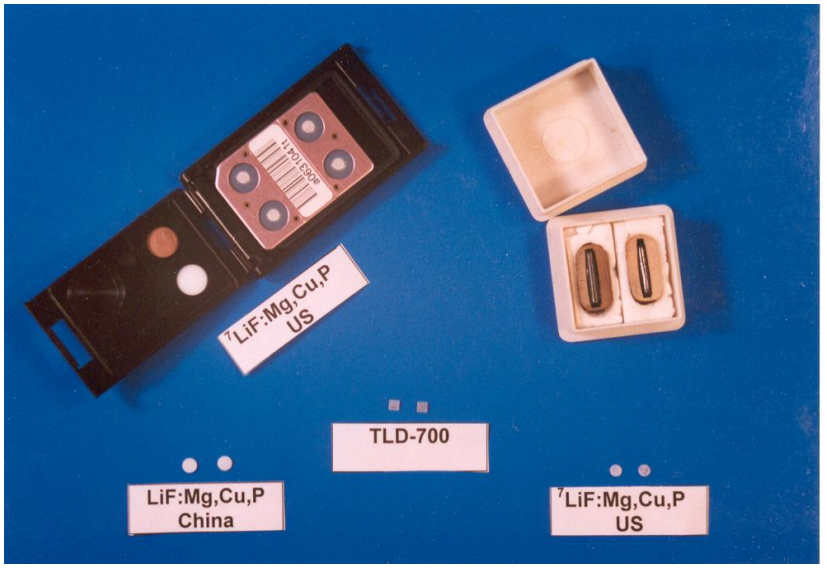
Dosimetry: TL and RPL dosemeters

DOSIMETER SYSTEMS

RPL



TLD



Detectors and dosimeters

SURFACE DOSES AT X-RAY EXAMINATION OF CHEST IN CHILDREN

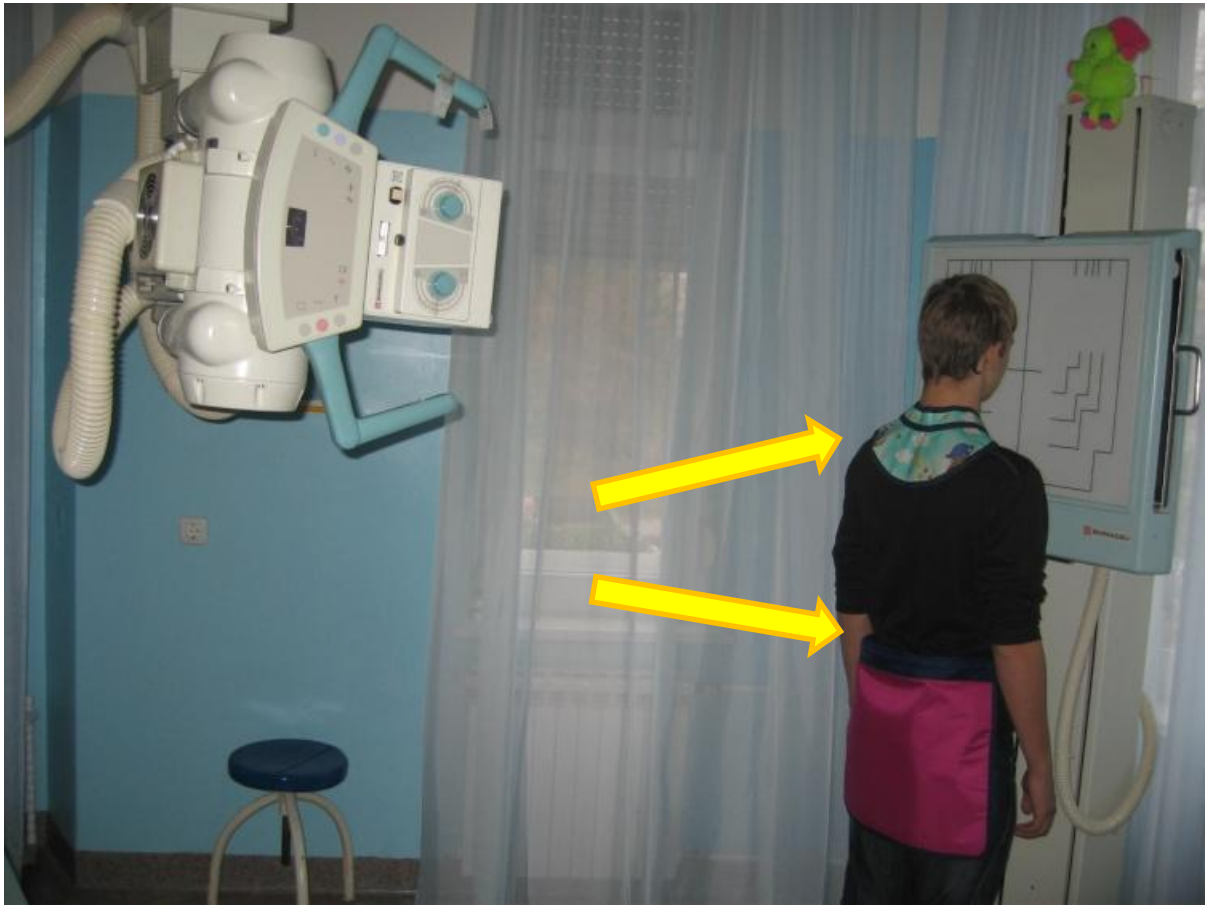
Age *(year)*	**Dose** *(mSv)* Back	Sternum	Thyroid gland	Axila	Eye	Gonad
0-3	0.12	0.07	0.08	0.05	0.08	0.07
3-6	0.17	0.15	0.12	0.10	0.05	0.04
6-9	0.31	0.29	0.27	0.13	0.04	0.02
9-12	0.36	0.26	0.16	0.17	0.03	0.02
>12	0.33	0.25	0.20	0.18	0.07	0.03
Mean value	0.26	0.20	0.17	0.13	0.05	0.04
Standard deviation	0.11	0.09	0.07	0.05	0.02	0.02

SURFACE DOSES AT X-RAY EXAMINATION OF CHEST IN CHILDREN

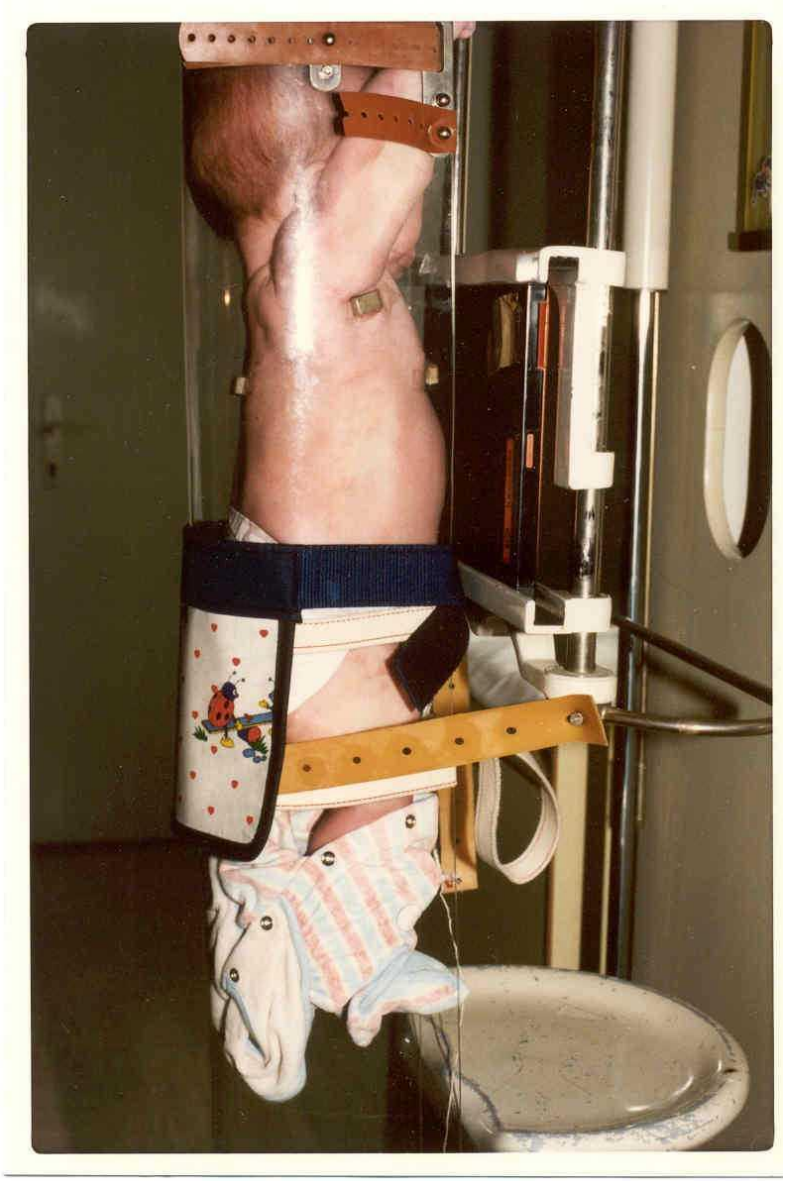
The large standard deviation has been caused by a series of factors:

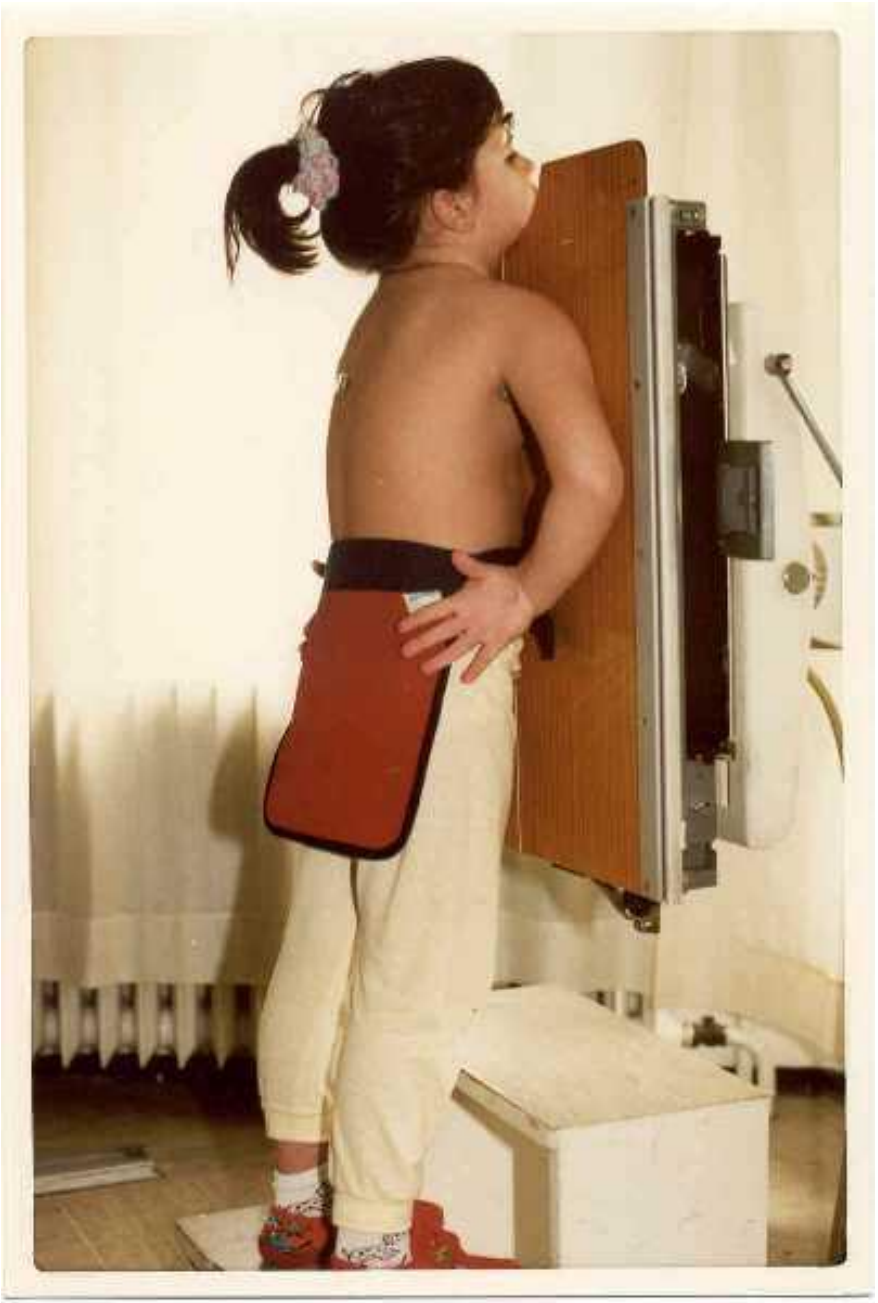
- the irradiation conditions
- different X-ray equipment
- patient's physical characteristics
- work methods etc.

PROTECTION



BABY FIX

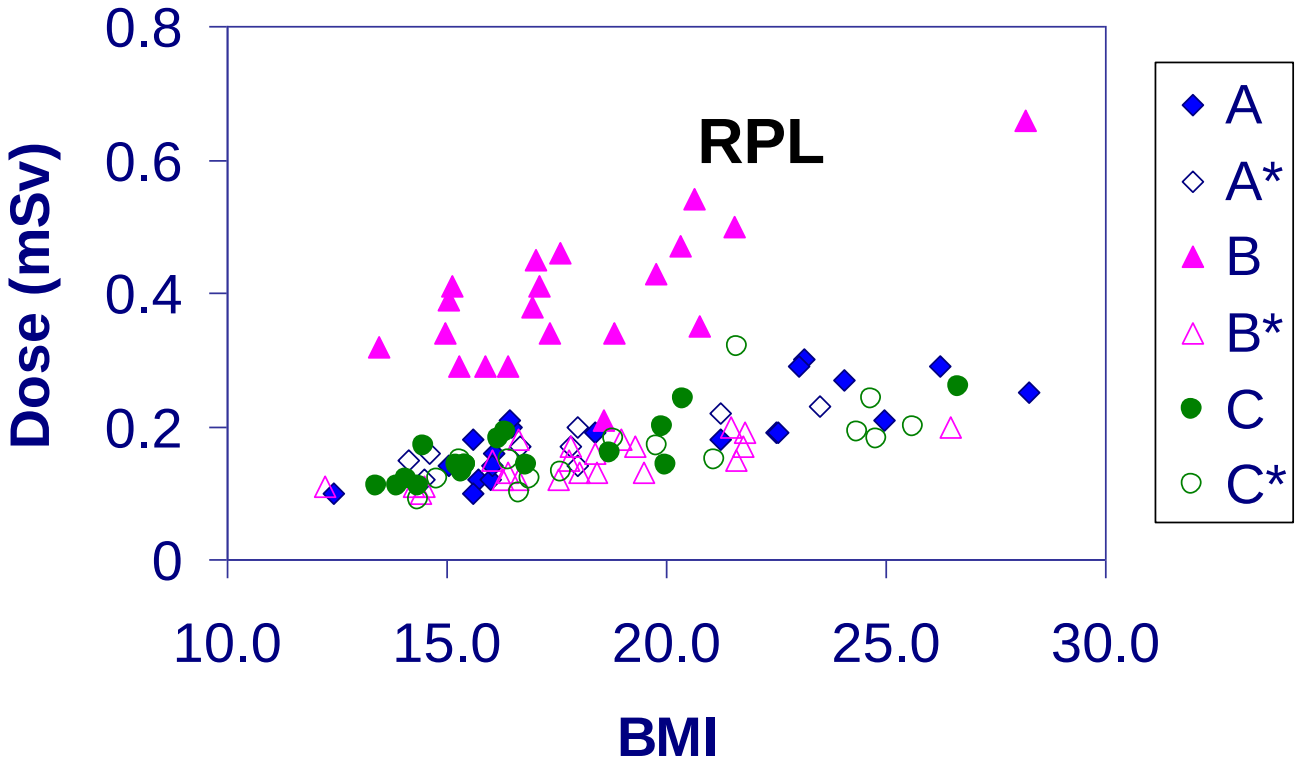




STAFF

- Proper education
- Continuous education
- Internal quality control

X-RAY DIAGNOSTIC OF CHEST



Doses measured by RPL on back of children patients during chest diagnostics as a function of BMI by technicians A,B,C

Technician B - Average dose before education: 0.35 mSv ▲

- Average dose after education: 0.14 mSv △

SUMMARY

This study on children patients during X-ray diagnostics of chest has showed that:

- Dosimetry measurement in every day X-ray diagnostic is useful to show the possible deficiency in radiation protection measures,
- The dose on patients depends also on the human working method. Adequate education of technicians (in addition of standard radiation protection methods) can improve the radiation protection of patients.
- The proper indication is the most important radiation protection factor.

Thank you - Köszönöm