

## Radiation protection for theatre staff (refer guidelines)

DISTANCE, TIME, SHIELDING principle should be applied

### Monitoring (Refer guidelines)

All full time theatre personnel must be monitored with dosimeters.

In cases where the workload of the x-ray unit is very low, the requirement for the monitoring of workers must be determined individually.

Radiographers are responsible to distribute dosimeters to staff before commencing with fluoroscopy.

Without eye protection wear dosimeter outside the apron at the collar facing the source of exposure.

#### PERSON'S NAME

BIN 113812 Badge No **317541**

Place No: **3/2521** Sequence No: **1**

Wearing Period: 2006-09-25 to 2006-10-22



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### Shielding



The operator shall stand behind a barrier if possible and shall observe the patient during radiographic exposures.

Only persons whose presence is necessary shall be in the theatre during exposures.

People who must move around the room during the procedure should wear a wraparound protective garment.

Any person who cannot remain in the protected area during x-ray examinations shall wear a protective apron of at least **0,25mm** lead equivalence.

Any person standing **within 1 metre** of the x-ray tube or patient when the x-ray machine is operated at tube voltages above 100KV, should wear a protective apron of at least **0.35mm** lead (Pb) equivalence.

Thyroid shields: a lead equivalence of **0.35mm Pb** equivalence is required.

Gonad shields: a lead equivalence of **0.50mm Pb** is required.

Keep **hands outside the primary beam** unless totally unavoidable – **sterilised lead gloves** are available. Leaded gloves 0.5mm Pb is required.



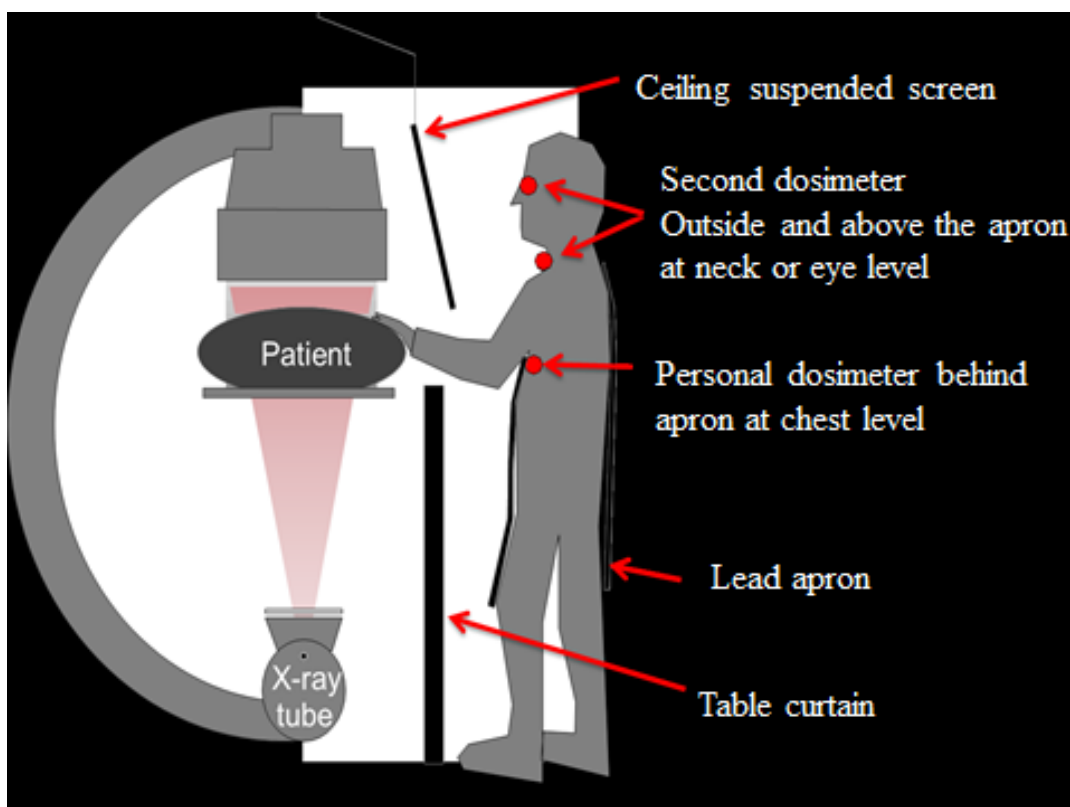
Finger dosimeters can be ordered from the RPS.



Eye protection - lead glass eyewear **0.5mm Pb** for operators within 1 m of the x-ray tube or patient.

**Table and ceiling lead screens** will lower exposure from scattered dose.

Anaesthetist should be placed behind a **lead barrier**.



## Limit fluoroscopy scatter

The radiation source during fluoroscopy is scatter from the patient.

Restriction of the beam lowers scatter radiation.

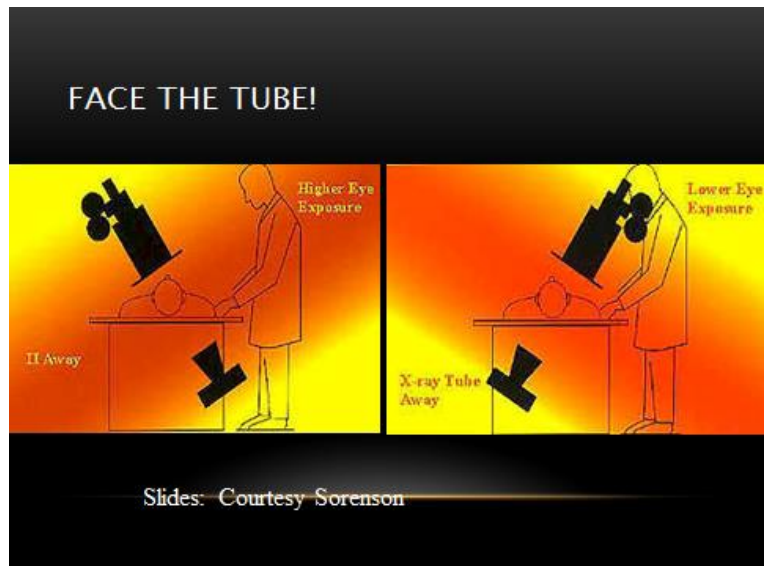
Collimate the beam!

## Distance

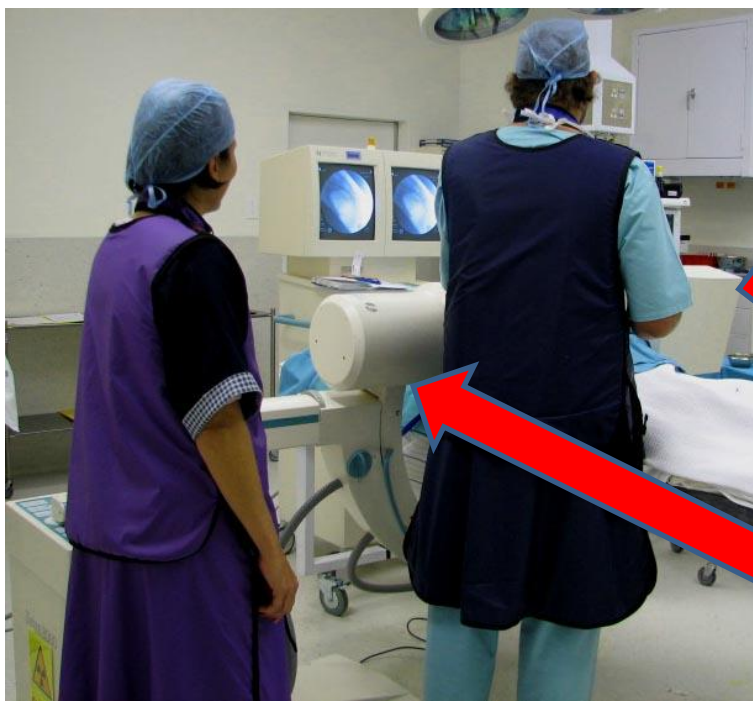
Placement of the staff in relation to the image intensifier influences the dose.

Dose on the image intensifier side is lower than on the tube side (factor of 5) during lateral projections.

During oblique projections the operator must face the tube to lower dose to the eyes.



When the C-arm is in a horizontal position.



Tube side  
Higher dose

Image Intensifier side    Lower dose

## **Time**

The screening time must be kept to a minimum

- Only screen when the surgeon observes the monitor
- Center before screening – no panning
- Select pulsed fluoroscopy

Fluoroscopy machines are equipped with a timer and an alarm which sounds at the end of every five-minute fluoroscopic use

## **Radiation protection in theatre- recommendations and reminders**

Know your equipment using the equipment's features appropriately will help reduce dose to patients and staff now your equipment.

Exposure factors: higher kV settings- lower mA.

Table top transmission must be kept to a minimum- silicone pads for patient comfort will require more penetration and increase the radiation dose.

Communication: warn in a loud voice before exposure starts.

Quality control testing of fluoroscopy equipment enables safe and stable performance (refer advanced section.)

Minimise distance between anatomy and image intensifier.

Provide lead aprons for those remaining in area not behind lead shields.

Without eye protection wear dosimeter outside the apron at the collar facing the source of exposure.

Pulsed fluoroscopy results in intermittent and thus lower exposure.

Tube at least 30cm from patient to prevent skin injuries.

Only persons whose presence is necessary shall be in the theatre during exposures.

Placement of the staff in relation to the image intensifier influences the dose. Dose on the image intensifier side is lower than on the tube side (factor of 5) during lateral projections. The surgeon must also be positioned at the image intensifier side of the C-arm during the lateral views.

Full body lead protection of 0.35 mm lead equivalent is mandatory for the surgeon close to the patient.

The assisting permanent staff in the theatre must be positioned at the furthest distance possible from the x-ray source and must wear a full body protective apron of 0.25 mm lead equivalent.

### **Radiation occurrence** (Refer Guideline)

Details of any radiation occurrence or suspected radiation occurrence must **immediately be reported** to the Director: Radiation Control on form RC010.

Radiation incident for occurrences of **4 mSv** and higher.

### **10 Pearls of radiation protection** <http://rpop.iaea.org>

Study the radiation protection principles for fluoroscopy in order to protect staff against radiation.

<http://rpop.iaea.org/RPOP/RPoP/Content/Documents/Whitepapers/poster-patient-radiation-protection.pdf>