

# 10 Pearls: Radiation protection of **staff** in fluoroscopy

Reducing patient dose always results in staff dose reduction

## 1. Use protective devices!



Advisable skirt type lead apron to distribute weight

0.25 mm lead equivalence but with overlap on

front to make it 0.5 mm on the front and 0.25 mm on the back  
(Provides >90% protection)



Lead glass eyewear with side protection



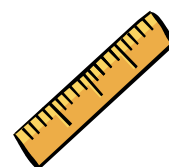
Thyroid protection

## 2. Make good use of time-distance-shielding (TDS) principle

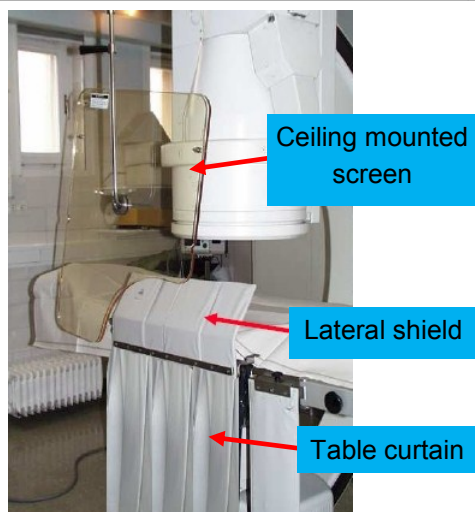
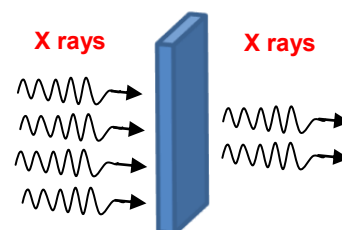
Minimize time



Maximize distance as much as clinically possible



Use shielding



Ceiling mounted screen

Lateral shield

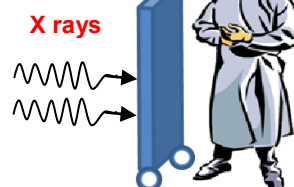
Table curtain

## 3. Use ceiling suspended screens, lateral shields and table curtains

They provide **more than 90% protection** from scattered radiation in fluoroscopy

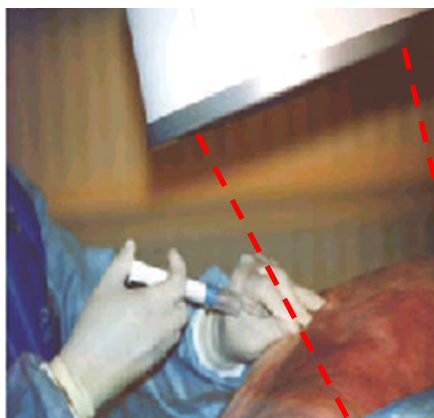
Mobile floor shielding is advisable when using cine acquisition

Mobile floor shield



## 4. Keep hands outside the primary beam unless totally unavoidable

Hands inside the central area of the primary beam will increase exposure factors (kV, mA) and doses to patient and staff



### Related Poster!

10 pearls! Radiation protection of **patients** in fluoroscopy

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

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RPOP  
Radiation  
Protection of  
Patients

<http://rpop.iaea.org>

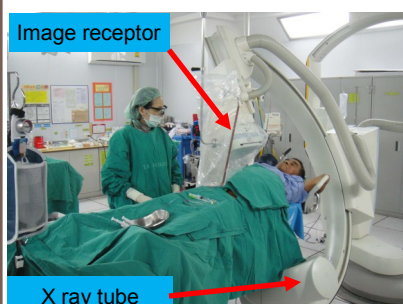


ISEMIR  
Information System on Occupational Exposure  
in Medicine, Industry and Research

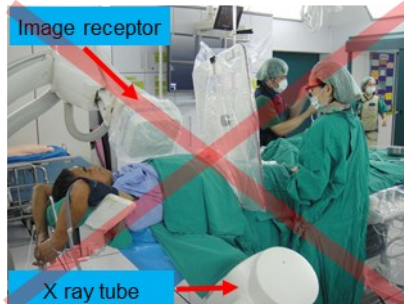
<http://www-ns.iaea.org/tech-areas/communication-networks/norp/isemir-web.htm>

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**Right!**



**Wrong!**

5. Only 1-5% of radiation falling on the patient's body exits the other side

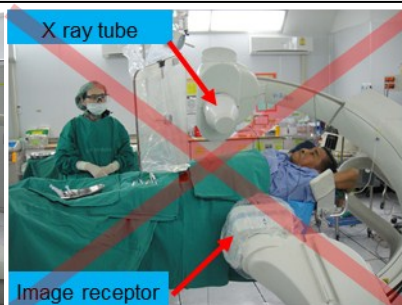
Stand on the side of the *transmitted* beam (i.e. by the *detector*), which contains only 1-5% of the incident radiation and its respective scatter

6. Keep X ray tube under the patient table and not over it

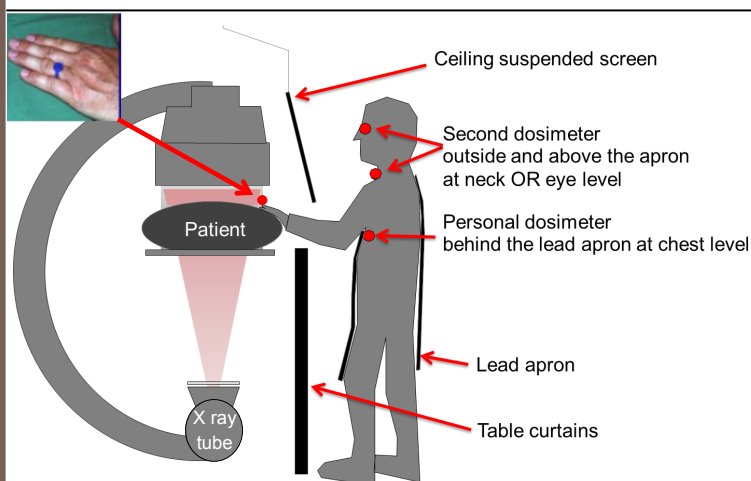
Undercouch systems provide better protection from scattered dose



**Right!**



**Wrong!**



\*Image adapted from ICRP Publication 85

7. Use personal dosimetry

Use at least **two** dosimeters

- One **inside** the apron at chest level
- One **outside** the apron at neck or eye level
- Additional finger ring dosimeter for procedures requiring hands close to primary beam

Real time dosimetry systems are useful

8. Update your knowledge about radiation protection



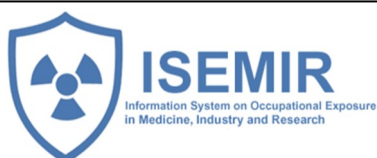
9. Address your concerns about radiation protection to radiation protection specialists

## 10. REMEMBER!

- Quality control testing of fluoroscopy equipment enables safe and stable performance
- Know your equipment! Using the equipment's features appropriately will help reduce doses to patients and staff
- Use injector devices



<http://rpop.iaea.org>



<http://www-ns.iaea.org/tech-areas/communication-networks/norp/isemir-web.htm>

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