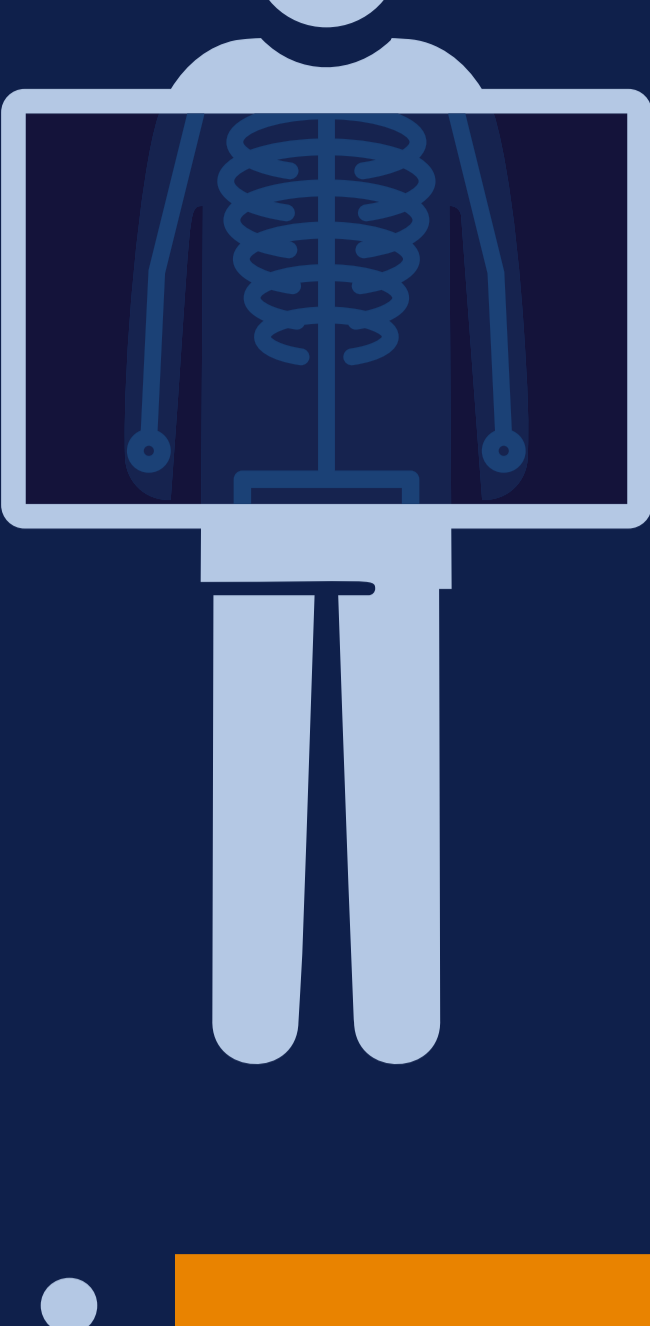
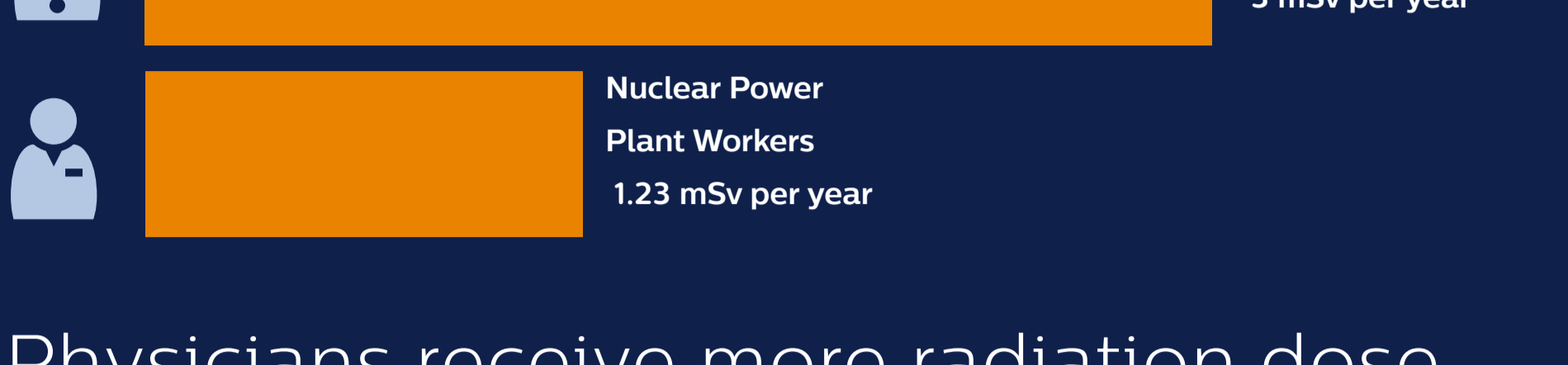


# Radiation hazards in the interventional suite



Radiation exposure is necessary for life-saving procedures, but with it comes some risk.

Patients and physicians are both exposed to high levels of radiation during fluoroscopic procedures. **Physicians are exposed to scatter radiation and patients are exposed directly from the X-ray machine.**



Physicians receive more radiation dose than nuclear power plant workers per year on average.



Physicians must stand very close to the patient and the source of the radiation.

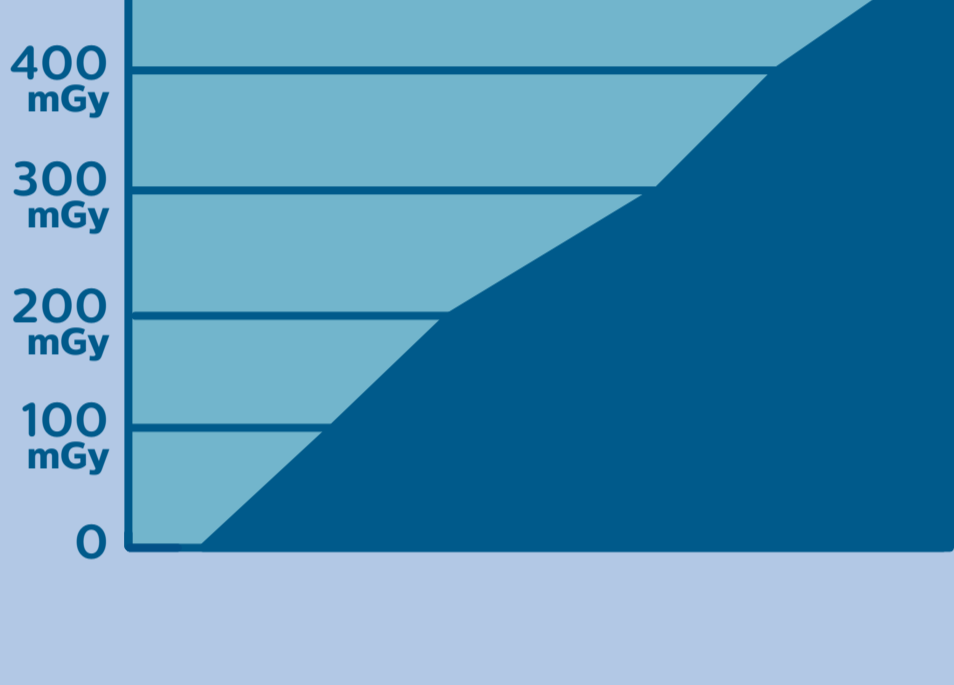
**Physicians receive on average 0.5 mGy per interventional procedure.**

The effects of radiation to the eye lens are permanent, so the damage is cumulative.

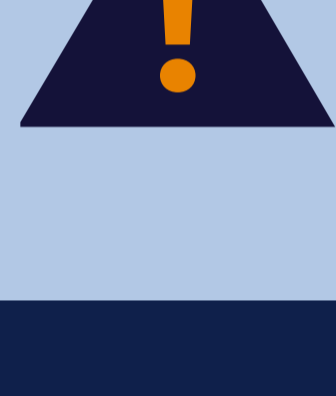
Recent scientific guidance suggests that threshold doses for radiation-induced cataracts is 500 mGy, even if spread out over time.



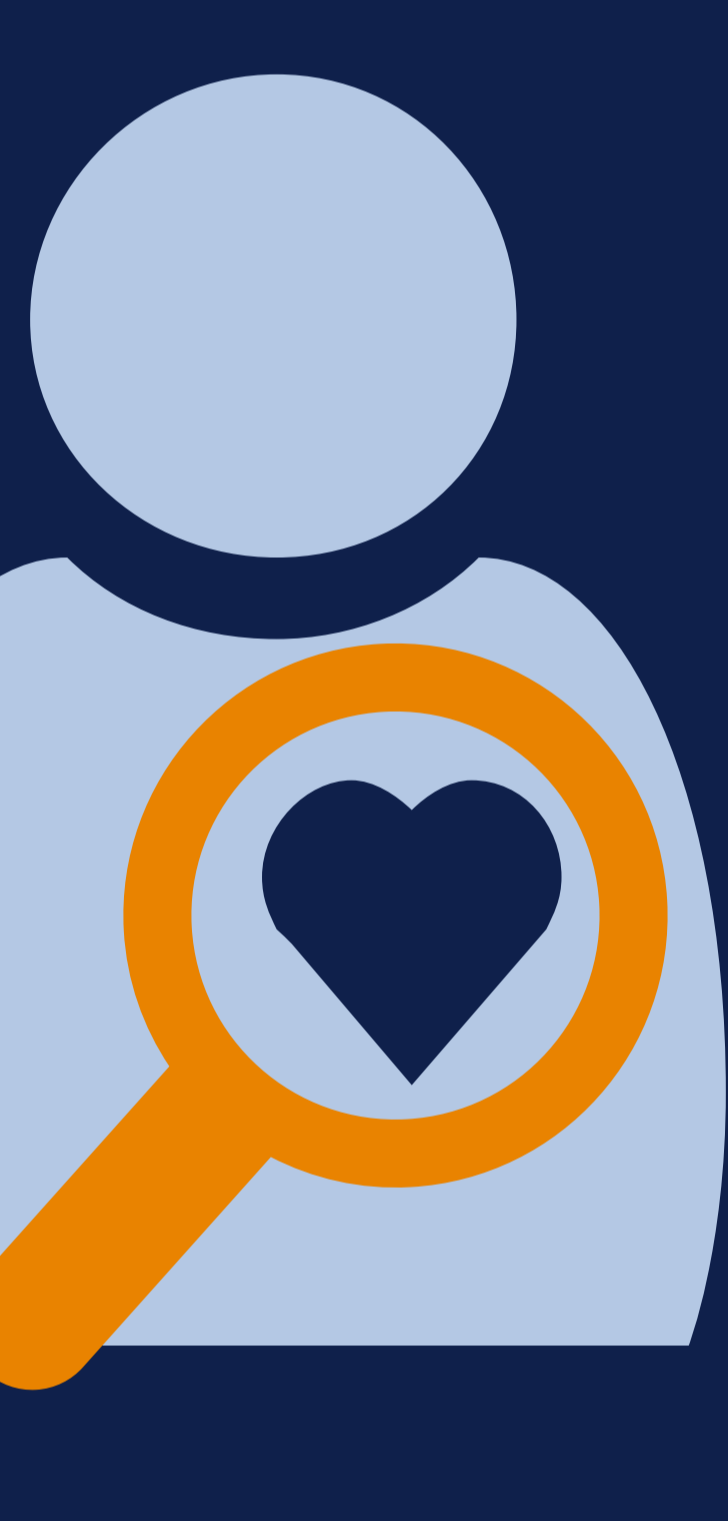
$$200 \text{ procedures per year} \times 0.5 \text{ mGy per procedure} = 100 \text{ mGy per year}$$



This means that physicians can reach the 500 mGy limit in 5 years!



Physicians face a real, permanent eye lens cataract health hazard in only 5 years of working.



On average patients receive about **1,400 mGy** per procedure. An average chest x-ray is **0.02 mGy**.

Fluoroscopy uses high levels of radiation so surgeons can see small items within the body, such as catheters. **This exposure is highly localized (the size of a postcard).**

The radiation dose is greatest to the skin, the entry point into the body.

We can better measure this by using a value called **“Peak Skin Dose.”**



There is a risk of radiation burns to the skin from fluoroscopy at levels of **2000 mGy** or higher. This can happen due to difficult or complex cases. **Although you can burn the skin it is usually a life-saving procedure, so the benefit outweighs the risk of skin injury.**



Radiation skin burn development time in days.

Radiation skin burns are not the same as thermal/heat burns. It takes up to **3 weeks** for the burn to develop, where thermal burns are immediate.

It's important that patients who receive more than 2000 mGy during an interventional procedure have a follow-up exam to ensure there is no skin burn to treat. **Automated dose tracking software can help manage this important patient care issue.**

## Best practices

- Peak skin dose should be used as an indicator for skin burn risks and lens of the eye dose hazards
- Only use equipment designed for high radiation dose procedures
- For equipment intended to be used with procedures > **3000 mGy**, it should be equipped with dose monitoring equipment
- Patient dose should be monitored for health risks during the procedure and should be recorded in the patient's medical record
- Patients should be informed prior to procedures about potential side effects such as burns and followed up if exceeding **>2000 mGy**
- Individuals present in the room during procedures should be adequately trained and use protective equipment
- All staff should wear personal dosimeters under the lead apron and at the neck level

