

Choosing An X-Ray Apron

The Top Four Considerations

A Universal Medical White Paper



Scatter Radiation

During diagnostic imaging and interventional procedures involving radiological technology, physicians and medical staff are exposed to scatter radiation, the energy transmitted beyond where the radiation is directed. As the number of diagnostic tests and interventional procedures involving radiation has increased markedly over the past 20 years, exposure to scatter radiation is a top safety concern in hospitals and medical facilities.

Protection from radiation exposure is essential to alleviating health risks and ensuring that staff can continue to perform their duties. The dangers of excessive radiation exposure include acute and chronic health consequences. Acute effects include erythema and dermatitis, with large whole-body exposure causing nausea, vomiting, diarrhea, weakness and death. The long-term negative consequences for health can be somatic, including cancer and bone marrow suppression, or genetic, which may lead to congenital defects in offspring.¹ Because of these dangers, medical staff are required to limit their doses of radiation. Exposure to radiation is measured by dosimeters that must be worn by staff who come into close proximity to radiation sources. When a physician or technician reaches or exceeds their monthly quota of radiation, they are restricted from performing procedures involving radiation.

In a national survey, the highest monthly dose of interventional radiologists were 3.8 mSv under the apron and 20.2 mSv over their apron.² For reference, an individual is exposed to about 3 mSv annually from natural background radiation.³ X-ray aprons are therefore essential to protecting physicians and staff who work near radiation sources. X-ray aprons have thus become a ubiquitous feature of medical facilities that offer radiological services. They can be easily slipped on and off and shield 90 to 96 percent of the direct beam radiation.

Elements of X-Ray Aprons

Choosing an x-ray apron may sound straightforward, but there are almost as many customizable apron options as there are healthcare professions in need of them. Selecting the most appropriate apron is essential to ensuring protection and comfort while satisfying cost requirements. Basic apron differentiators include:

Core material

Lead radiation shields have been the predominate choice for x-ray deflection since radiation protection was first developed. Lead is still used as a primary core material in x-ray aprons and offers excellent radiation protection. There are, however, other core materials that have proven to be viable alternatives to lead. A 2008 study found that non-lead aprons provide similar protection to scatter radiation as lead aprons⁴.

Coverage

X-ray aprons come in various styles with various amounts of coverage. There are front-only aprons, front and back aprons, wrap around aprons, collared aprons, skirt aprons and vest aprons.

Style

Aprons come in various styles with strap, buckle or velcro closures.



Four Factors for Choosing the Optimal X-ray Apron

Which apron will work best for you will depend on four important factors

Procedure Time

How long will you be wearing your apron? The length of radiology exposure is a huge determining factor for choosing an x-ray apron. For longer procedures, you should consider the weight of your x-ray apron. Heavy aprons may increase discomfort in the back and joints, and some medical staff cannot tolerate the load for the length of time required to complete the procedure. When purchasing protection for such long procedures, consider aprons with non-lead material. These aprons are typical about 20 percent lighter than traditional lead aprons⁴. They may also be disposable.

Proximity

What body parts are at risk of being exposed to scatter radiation during the procedure? For many diagnostic tests, the medical staff remains facing toward the radiation source. In these cases, front-only protection is adequate. If at any time, however, their back is turned to the source then front-back or wrap-around aprons should be used. Interventional procedures often require more coverage than diagnostic procedures. For these, front and back protection should be used, as scatter radiation can reflect off objects in the procedure room. Thyroid collars should also be used if there is any risk that the neck will be exposed to radiation.

Type of Procedure

Radiology is used in both diagnostic imaging and interventional procedures. The first two criteria come into consideration when choosing an apron based on the type of procedure. ***Diagnostic imaging*** is generally of shorter duration and persons performing the test can generally separate themselves from the source of radiation. Because of this, a less expensive, but heavier, lead apron may suffice. The style will depend on their orientation to the source of radiation.

Radiation exposure is much higher for ***interventional procedures*** than for most diagnostic procedures. Physicians who perform fluoroscopically guided procedures are close to the patient and x-ray tube. Therefore, they are exposed for longer periods of time and need a lighter-weight non-lead apron that provides more extensive coverage.

Fit

To ensure protection, it is imperative to assure that the x-ray apron fits properly. An apron that is too large or too small will not provide optimal protection. You should be sure to have an appropriately sized apron for everyone on staff.



Cost Considerations of X-ray Aprons

X-Ray aprons vary markedly in cost, depending on the core material and the style. Lead aprons are less expensive than non-lead aprons. Front style aprons are less expensive than front-back style aprons. The above criteria not only help you choose the best apron for safety, but also the best apron for price. You should not allow cost considerations to override safety considerations, however there is also no reason to kill a mosquito with a canon.

An x-ray technician who wears her apron for minutes at a time, is able to retreat behind a physical barrier and who never has her back to the x-ray tube, does not need a collared vest made of lightweight non-lead material. On the other hand, this type of apron is essential to the safety of surgeons who perform radiological interventional procedures.

Utilize the above criteria to guide you through the purchasing of x-ray aprons for your particular medical needs. Procedure time, proximity, procedure type and fit should all be considered before you make a decision. These four criteria will help you choose the apron of the right core material, coverage and style. They will also guide you to the most cost effective apron choice. Remember, deciding on an x-ray apron is a matter of safety for those who work in the medical field. Without the proper shield, radiation exposure can cause serious negative health consequences, as well as create obstacles to a medical professional's ability to work.

References

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