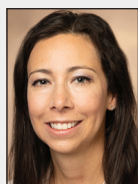


Shielding Without Sacrifice

Scatter radiation innovations to protect the team and optimize workflow in the lab.

With Nadia Sutton, MD; Kenneth Rosenfield, MD; and Evan Shlofmitz, DO



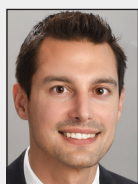
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to recognize the need for better ways to protect. That said, all parties must be on board: Administration, cath lab directors, physicians, and staff all need to understand the imperative to maximize protection from radiation scatter and work together to achieve that common goal. If various factions don't "buy into" this mandate, even the most advanced system won't work. I have witnessed this firsthand, where a novel protection device was used for a short period of time, but because of a slight inconvenience, change in routines, and delays associated with setup, adoption was short-lived. Without buy-in on the part of staff, the devices will collect dust in the corner.

Dr. Shlofmitz: All must be on board with helping each other with best practices; that's how you are going to get full participation and maximize your protection. We have had Radiation Medical's innovative Radiation Dynamic Smart Shield system in our lab for about 6 months now, and our cath lab management, physicians, and staff have jumped in with both feet to work to maximize our protection from scatter. But beyond the shared responsibility piece, it must fit certain criteria.

Dr. Sutton: We all have seen the debilitating effects of scatter radiation in colleagues, including physicians and staff. The rate of health consequences is rising, underscoring the need to better protect the lab. We are now seeing initiatives from Society for Cardiovascular Angiography & Interventions on occupational health and safety, multisociety position statements, increased discussion at meetings, and innovations in personal and advanced protection. In your mind, what is still needed to achieve the safest work environment?

Dr. Rosenfield: First and foremost, every institution must create and embrace a culture of shared responsibility for radiation safety in the lab. It starts with a mindset that prioritizes safety not only for patients but also for staff and physicians in the lab. We all need

Dr. Sutton: Elaborate on this—what key factors go into the adoption of an advanced system? As you think about bringing in an advanced protection device, most, if not all, of these systems currently offer > 90% protection, at least to the main operator. What are your must-haves for an advanced system, from an adoption perspective?

Dr. Shlofmitz: We have a very busy cath lab at St. Francis Hospital, and workflow integration is vital for us. We recognize that with any advanced shielding system, there may be a bit of a trade-off with regard to workflow; but for us, it can't be more than a few seconds here or there, or it can really slow down our day and flow. We've evaluated and tried other advanced systems in our lab but have found that the Radiation system doesn't slow down our workflow at all. We are able to move the C-arm as needed to get the desired

RADIATION DYNAMIC SMART SHIELD

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image with very steep angles for all diagnostics and percutaneous coronary interventions, while still being able to access the patient immediately in cases of emergencies (eg, intubation, CPR). Room turnover has not changed at all either. Overall, workflow integration has been seamless for us with Radiation.

Dr. Rosenfield: I'm as enthusiastic as anyone about advanced shielding, especially those that allow me to lighten my lead apron burden. I've had multiple debilitating back injuries and surgeries, and the 10-hour days wearing that heavy lead are just not possible for me. But what really limits things is a system that can't integrate into the procedural workflow.

I do coronary and peripheral work at Massachusetts General Hospital. To be truly effective in "lightening my load," any shielding system I bring in must be able to accommodate both of those procedure types, as well as structural and electrophysiology procedures, at a high percentage of orthogonal angles, with variable access points, and for different types of interventions. One size must fit all, and it must not slow you down. Otherwise, it will get shoved in the corner and "forgotten" to be used. Given that these systems represent a significant capital expenditure, administration will ultimately not be incentivized to purchase more.

Dr. Sutton: To maximize the return on investment, in the eyes of an administrator, it would make sense that protecting as many people as possible in the lab would be a priority. Some of the available systems protect one to two operators, or even only one side of the room; some claim a bit more. Even, have you measured the scatter radiation protection at St. Francis with Radiation?

Dr. Shlofmitz: We have a large number of staff in our lab, and we consider them part of our extended family. So as important as workflow integration is, it was essential to find a solution that provided protection for everyone in the lab. At St. Francis, we conducted a study of our initial 152 patients and saw a 91% scatter reduction to the entire lab, from around the room and protecting the main operator, scrub nurse, circulator, and anesthesiologist.¹ In terms of average dose per procedure, based on the health care worker occupational dose limits for New York, an individual can do up to 6,400 cases in 1 year, wear a lighter 4-lb lead (which we are incorporating into our lab), and still not hit the yearly dose limit. We also conducted surveys of our physicians and staff, asking questions about ease of use, sense of protection, and integration into workflow. All three categories of questions scored very high for Radiation, and so at

6 months in, we are in talks to expand use of Radiation to more labs within our health care system.

Dr. Sutton: In structural procedures, there are echocardiographers at the head of the table—an example of another position to think of when talking about full lab protection. Do you see this position protected as well with Radiation?

Dr. Shlofmitz: If you look at some of the data out there, echo techs and cardiac imagers during structural interventions actually have a substantially higher exposure to scatter radiation dose compared with the primary operator. We are looking to expand Radiation into structural procedures at St. Francis and study this further, but based on some early numbers, we anticipate the reduction with Radiation will be similar. We have already expanded use into peripheral procedures.

Dr. Sutton: Anything to add about the two key factors of workflow integration and protection for all?

Dr. Rosenfield: Simply put, these are imperatives, not nice-to-haves. It should be a mandate for any advanced system to protect everyone in the lab and allow for techs and nurses also to lighten their loads. Otherwise, it's an expensive piece of equipment for one or two people. Second, as I mentioned before, it must be easily integrated into the different procedure types and workflows, from coronary, structural, peripheral, and electrophysiology. Like mine, many labs around the country aren't just doing one procedure type. They share with other specialists and handle a variety of procedures, and so any advanced system must be multipurpose and address all the nuances of any of these procedures. Workflow is vital.

Dr. Shlofmitz: I would also add, education of everyone involved is essential. For the months leading up to our integration of Radiation, I made sure to educate the staff on the hazards of radiation exposure, as well as the potential opportunities with radiation protection systems. I believe this was helpful in having staff buy-in for a new system. The staff was eager to test it out, and it didn't take long until staff would request to be assigned to the lab with Radiation installed in it.

Dr. Sutton: Given the advancements in scatter radiation protection, what do you think about the current state of technology as it relates to lighter lead apron use and the advice some are providing to eliminate personal protective equipment (ie, personal lead aprons) entirely?

Do you foresee a time when improved shielding technology could allow for reduced dependence on personal lead aprons, or is wearing lead always going to be a necessary safety measure?

Dr. Rosenfield: Some companies have come out of the gate telling physicians, “Don’t worry, take your lead off.” However, it’s not that simple, and it may actually be irresponsible to make such claims, for a couple of reasons. First, these are FDA class I devices making these claims, the same class as bandages. There is little to no rigor and FDA involvement to their testing, so I’m a bit skeptical about directives to “go ahead and take off your protection.” The readings we obtain while using the system currently in my institution are far from zero. Second, and especially with these advanced systems that claim you can take your lead off, you cannot protect the operators at every angle. There are leaks in every advanced system, so there will be instances where you absolutely need some sort of personal protection. I see too many scenarios where not wearing anything will lead to exposure. To me, a leadless cath lab is aspirational and years away. In the shorter term, we should ask, “Does this integrate into my workflow” and “Does this protect everyone sufficiently so that we can all wear a much lighter lead?” I think some of the advanced shielding companies and health care professionals can work together to reach this goal in the short term.

Dr. Sutton: Any final thoughts?

Dr. Shlofmitz: I want to reiterate that we need to be practical and set our expectations for future advance-

ments. We think Radiation is the shield that addresses our two big needs of protecting everyone in the lab and integrating into our workflow seamlessly. We are working with the Radiation research and development team on product improvements for down the road that we hope will help further reduce exposure.

The cath lab of the future will feature an intuitive dynamic protection; perhaps a wave of a hand, a voice command, or technology built into the C-arm directly will predict an operator’s next angle or procedural step and shield the room accordingly. There are conversations happening with Radiation and some of the large imaging companies. I think an imaging company that partners with a company like Radiation Medical to codevelop and integrate this technology will bring it to reality much faster, as well as offer an appealing competitive advantage.

I believe the cath lab of the future will have radiation protection incorporated as standard of care. This is foundational as part of the ALARA (as low as reasonably achievable) principle that has served as the core of radiation safety. ■

1. Shlofmitz E. Evaluation of novel robotic radiation protection technology to reduce scatter radiation during percutaneous coronary interventions. Presented at: CRT 2025; March 8-11, 2025; Washington, DC.

Disclosures

Dr. Sutton: Scientific advisory board for or consultant to Radiation, Philips.

Dr. Rosenfield: Scientific advisory board for or consultant to Radiation, Philips.

Dr. Shlofmitz: Scientific advisory board for or consultant to Radiation, Philips.