

## **Mitigating Transition Challenges from Gamma Irradiator to X-ray Irradiators**

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When X-ray irradiators first started to replace Gamma irradiators, there were many questions about reliability, accuracy, cost, service, etc. However, the US government now considers these devices to be a low risk alternative to gamma irradiators and has put many resources into helping institutions transition to them. The Office of Radiological Security (ORS) has successfully reduced the number of self-shielded gamma irradiators in the United States by replacing nearly 50% of them through the Cesium Irradiator Replacement Project since 2015. In this presentation, we will review valuable operational experiences gained since 2015 to make other institutions' migration to x-ray irradiators easier. Some institutions have had rare experiences that are important to learn from and be prepared for. For example, last year (2022) the temperature in New York City reached above 100 degrees Fahrenheit for a few days. This led to all the air conditioners in the city working at the same time and led the voltage input to the X-ray irradiator to become unstable. This led to it shutting down automatically and disrupting normal daily work. The X-ray Irradiator company investigated the issue quickly and solved the problem by installing a voltage stabilizer. Another incident involved a user accidentally removing the irradiator's x-ray filter, causing an overexposure to 42 mice, leading to their death. One X-ray irradiator user at Mount Sinai mistakenly set the irradiation time to 448 seconds instead of the intended 4 minutes and 48 seconds. Sharing the experiences of current X-ray irradiator users should help the transition of new or prospective users easier. Understanding these experiences can help users communicate what changes they need manufacturers to make in order to improve reliability and ease of use. For example, manufacturers can ship their products with preset programs for common operations like blood or mice irradiation similar to the preset programs on a microwave oven. We could also use virtual personal assistants [like Alexa] so that a less experienced or extremely busy users could ask for support without opening dense manuals. After the Covid pandemic, interaction between people has become much faster and easier. X-ray irradiator manufacturers could also expand on their customer support services to make it faster and more economical through virtual communication options like Zoom or other platforms. Finally, diagnostic X-ray machines have been used for many years in the clinical environment with appropriate standard practices to guide users. Therefore, we should establish some non-clinical standard practices for X-ray irradiators as well.