

Summary of key items related to radioprotection

Calculating the required volume of the eluate, before drawing back the volume needed, prevents the need to draw back the volume over and over (when after measurements the dose appears to be too high or too low). Doing so, reduces the exposure time for your hands which will lead to a lower finger dose.

Using a syringe shield is obligated! Based upon the ORAMED project (Optimization of Radiation Protection of Medical Staff, European Atomic Energy Communities Seventh Framework Program 2008), M. Sans Merce et al. (2011) developed Guidelines to Optimize Extremity Monitoring and to Reduce Skin Doses in Nuclear Medicine.

These guidelines state that shielding was found to be the most influent parameter to reduce hand dose exposure in nuclear medicine. Even though the use of shields slows down the procedure and can be uncomfortable for technicians, their use provides a protection which cannot be replaced by increasing working speed. Furthermore, any tool increasing the distance (e.g. forceps) between the hands/fingers and the source is very effective for dose reduction. Working fast is not sufficient, the use of shields or increasing the distance are more effective than working quickly. Shielding of vials and syringes is essential. This is a precondition but not a guarantee for low exposure, since not all parts (e. g. bottom of the syringe) are shielded during use. Training and education in good practices are more relevant parameters than the worker's experience level. A training on how to correct handle the syringe shield, how and when to use forceps will reduce skin dose.

The whole article can be read by clicking this [link](#).

Training tips can be found on the [ORAMED webiste](#).

Step 9, 10, 11 and 12 in checklist 2 describe the ideal method to draw back the volume of the eluate. Before removing the needle from the vial (after you have drawn up the volume of eluate), you should turn vial and syringe the right way up again. This does need a little practice, but it is the safest method to reduce the risk of a droplet of Tc99m falling down, causing contamination. Furthermore, this method reduces the risk to make your needle unsterile by accidentally touching the aluminium border of your vial or the elution shield,

which happens easier than expected, due to the heavy weight of both the elution vial and syringe shield.

After replacing the sheath on the needle, it is important to remove large bubbles of air before measuring the dose. Doing so makes it easy to notice whether or not you have drawn up the correct volume as calculated. This step can eliminate the need to measure the dose multiple times which will again reduce the exposure time for your hands and lead to a lower finger dose.

After preparation it is important to invert some of the kits. Doing so, make sure the vial is shielded, also on top. If there is still a small hole on top, make sure not to place your hand or fingers over it. Often it is a reflex to put your finger just on top of this hole, which would of course lead to a higher finger dose.