

A. Purpose:

To provide guidance for Radiologic Technologists, Supervisors and Radiation Safety personnel on the use, storage and reading of the Landauer nanoDot™ dosimeters for patient holding individuals, in order to track radiation exposure to radiation workers and members of the public.

B. Applicability/Scope:

This policy applies to Radiation Safety personnel and NewYork-Presbyterian Hospital Radiology personnel.

C. Definitions:

- Patient Holder: Individuals who are in physical contact or at a very close proximity to a patient, during a radiation exposure, including patient's family members, general public and/or hospital personnel, who are not considered radiation workers.
- nanoDot™ dosimeter: A type of dosimeter for use in single point radiation assessments based on the OSL (Optically Stimulated Luminescence) technology.
- microStar Reader: A device that measures radiation exposure and reads the measurement with OSL technology.

D. Procedures

1. nanoDot™ dosimeters are used for patient holding dosimetry. nanoDots™ are delivered by Landauer to the Radiation Safety Department and they can be read by the use of the Landauer microStar™ reader.
2. Radiation Safety personnel will deliver/exchange unexposed nanoDot™ dosimeters to Radiology areas or facilities according to the needs of the area or facility. The Supervisor/Manager of the Radiology area or facility is responsible for receiving the dosimeters from Radiation safety.
3. Once the dosimeters are received by the Supervisor/Manager, they must be stored at a secure location away from radiation exposure under the supervision of the Supervisor/Manager.
4. When patient holding is required, the Supervisor/Manager shall provide the dosimeter to the Technologist, and the dosimeter is assigned to an individual patient holder. The name of the holder shall be recorded on the sticker on the dosimeter's case and on the patient holding dosimeter log.
5. Pregnant women and individuals under 18 years old shall not hold patients. No one shall hold patients on regular basis.
6. Risks to the individual patient holder must be explained. If she/he agrees to participate then the following will apply:

- a. Technologist will prepare the individual by placing the dosimeter on the chest (trunk of the body) outside the required lead apron. Lead gloves shall be worn if necessary. The protective equipment must be at least 0.25 mm lead equivalent.
- b. No part of the holding individual's body shall be in the useful beam.
- c. All other precautions shall be taken to minimize exposure.
7. After the procedure, the Technologist will provide the used dosimeter to the Supervisor/Manager and the dosimeter should be stored in a secure place other than the location of the unexposed dosimeters.
8. The Supervisor/Manager should contact Radiation Safety to pick up the exposed dosimeters.
9. By following Appendix 4 and the user manual of the microStar™ reader, Radiation Safety will read the dosimeter and record the dose for each patient holder.
10. Readings will be provided to the Supervisor/Manager of the corresponding Radiology area or facility.
11. All the records of exposure shall be kept in a log.
12. After reading the dosimeters, Radiation Safety will reset the exposure of the dosimeters by following the annealing process, described on the calibration manual of the Landauer microStar™ reader and Appendix 4.
13. After the annealing of the dosimeters, they may be sent back to the facilities for re-use.

E. Responsibilities

1. **Supervisor/Manager** – (*see Appendix 2*) Receive the dosimeters from Radiation Safety, store them in a secure place, provide them to Technologists when patient holding is needed, receive them back after exposure, verify the name of the holder with the serial number of the dosimeter, store exposed dosimeters in a different location, contact Radiation Safety for pick up, update the log by adding the resulting dose reading, keep the holding log in their office or procedure room.
2. **Technologist** – (*see Appendix 3*) Explain the radiation risks to the holder, receive dosimeters from supervisor/manager, prepare holder for exposure, complete patient holding dosimeter record and sticker on the case of the dosimeter, deliver dosimeters to supervisor/manager after exposure.
3. **Radiation Safety personnel** – Coordinate with Landauer for the purchase of new nanoDot™ dosimeters, deliver them to the Supervisor/Manager of Radiology facilities, pick up dosimeters after exposure, read them on the microStar™ reader, provide dose readings to the Supervisor/ Manager, reset the dosimeter's exposure through annealing process, send the dosimeters to the radiology facilities for reuse.

F. Emergency contacts

Radiation Safety – (212) 305-0303

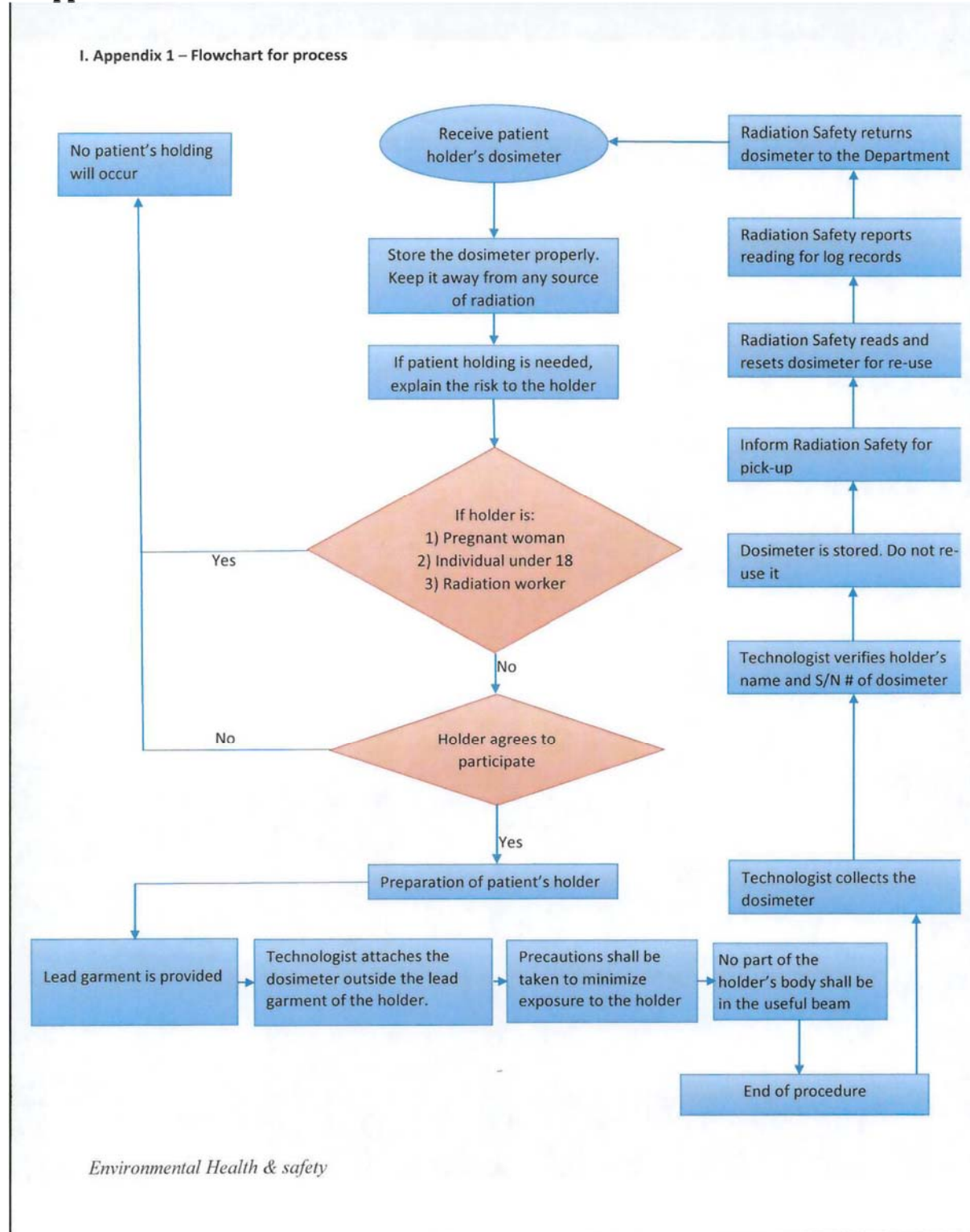
Handling Procedures For Use Of nanoDot™ Dosimeters For Patient Holding Purposes	Procedure: 7.823 Version 1.0	Created: 10-14-2015 Revised:
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G. Medical Surveillance – N/A

H. Recordkeeping

Holding log is kept by the Supervisor in each Radiology facility. Radiation Safety also keeps dose records in Radiation Safety Office files.

J. Appendices



**Appendix 2
Responsibilities of Supervisor/Manager**

- 1) Receive nanoDot™ dosimeters from Radiation Safety department.
- 2) Keep the unexposed dosimeters in an area (e.g. Manager's office), away from any sources of radiation.
- 3) When patient holding is required, provide dosimeters to the Technologist prior patient exposure.
- 4) Inform Technologists to return dosimeter at the end of the procedure.
- 5) When the dosimeter is returned, make sure that the name of the holding individual is written on the case of the dosimeter. Keep the dosimeter in a safe place, separated from the place for the unexposed dosimeters. Do not allow access to the dosimeters.
- 6) Contact Radiation Safety to pick up the exposed dosimeters.
- 7) Radiation Safety will read the patient holder's dose and will reset the dosimeter for re-use. Complete the patient holding dosimeter record with the dose reading.
- 8) Report estimated number of dosimeters that required for clinical use the following week.

Precautions:

- 1) Do not store exposed and unexposed dosimeters at the same place. Possible use of an exposed dosimeter as unexposed one may occur.
- 2) Never store used or unused dosimeters in radiation areas. Keep it away from any sources of radiation prior to and after the patient's exposure.
- 3) Do not try to open the dosimeter's case.

**Appendix 3
Responsibilities of Technologist**

- 1) Receive the holder containing the nanoDot™™ dosimeter from the supervisor.
- 2) Explain exposure risks to the individual who will help with patient holding.
- 3) If individual agrees to participate, prepare her/him for the procedure.
- 4) Assist the individual patient holder to wear the lead apron (at least 0.25mm of lead equivalent) and place the dosimeter on the chest (trunk of the body). Provide protective gloves if needed.
- 5) Pregnant women and individuals under 18 years old shall not hold patients under any conditions.
- 6) Write holder's name on the sticker of the dosimeter's case. Make sure that the holder's name corresponds to the dosimeter's serial number recorded.
- 7) Complete the patient holding dosimeter log and confirm that the serial number of the dosimeter corresponds to the appropriate individual holder.
- 8) During exposure, make sure that no part of the holding individual's body is exposed in the primary beam.
- 9) After exposure, collect the dosimeter from the individual and submit it to the supervisor for storage to the assigned secure location.

Precautions:

- 1) Never use the same dosimeter for different individual holders, unless the dosimeter is already been read and cleared by Radiation Safety from previous exposures.
- 2) Never store used or unused dosimeters in radiation areas. Keep it away from any sources of radiation prior and after the patient's exposure.
- 3) Do not try to open the dosimeter's case.

**Appendix 4
microStar™ Procedure
microStar™ Reader Version 1.13.0**

This document provides instructions for the use of the microStar™ reader.

- 1) Connect the laptop with the reader and plug both of them. No password is required for the laptop.
- 2) Switch on the reader.
- 3) Double click microStar™ reader icon on desktop.
- 4) Username: admin
Password: admin
- 5) Use default reader
- 6) Go to calibration icon to verify that appropriate calibration is used. Select if unselected:
Kos-High-Diagnost for high dose level
Kos-Diagnostic for low level dose
- 7) Select Reading icon. Select the “dosimeter info” and scan the barcode of the NanoDot™. The serial number of the nanoDot™ and its sensitivity, will be showed on the screen. Sensitivity value is characteristic of each dosimeter.
- 8) Open reader’s door, place the nanoDot™ to the case as is showed in the picture (barcode facing front) and close the door.
- 9) From H/P (Home Position) turn the dial **clockwise** to E1 position. Wait 5 seconds until the light to switch off and turn back to H/P position. The reading is showed at the screen on Dose box in mrad.
- 10) Save the reading by adding first-last name of patient, date-time and dosimeter serial number.
- 11) Follow same process for the next dosimeter.



Front of nanoDot™ carrier with alphanumeric sensitivity code and serial number (DN091=0.91 sensitivity). Either the front or the back of the carrier can face toward the radiation source during exposure.

For questions follow Inlight microStar™ User Manual. (Start→ Program→ microStar Reader→ User manual) or call Kostas Georgiou at 212-3054936. Contact details of the physics team of Landauer, Nicole or Gabriel: 708-441-8351

Reuse of nanoDots™

Exposed nanoDots™ must be annealed prior to reuse.

- 1) From the top of the one side of the dosimeter, with a thin pin or the end of a paper clip, gently push out the sensitive area. Do not push from the bottom side due to the risk of breaking the dosimeter.
- 2) When you open the dosimeter, place it under white light for 2 days to effectively clear all the dosimetric traps.
- 3) To confirm that the dosimeter is annealed, simply analyze it using the reader. An annealed dosimeter should have a dose of approximately 10mrad or less.

[Note]: the dosimeter cannot be used indefinitely. The sensitivity is compromised by continuous annealing process.

J. Forms – N/A

K. References

- Rules of the City of New York (R.C.N.Y) § 175.60 (b)
- Landauer microStar™ user manual

L. Acknowledgements – N/A