Supplementary Document S1

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U.S. Radiologic Technologists Study

A collaborative effort between the University of Minnesota School of Public Health, National Cancer Institute, and American Registry of Radiologic Technologists

RADIOISOTOPE PROCEDURES QUESTIONNAIRE

Instructions:

- Use blue or black ink
- Print legible numbers: 1 2 3
- Mark an **X** in the box: Right ☒ Wrong ☑ ❑
- Do not make any stray marks on this form. If you have comments, please write them on a separate piece of paper.

This questionnaire is focused on:

- **DIAGNOSTIC radioisotope procedures:** (Section 1, pages 1-5) and
- **THERAPEUTIC radioisotope procedures:** (Section 2, pages 6-8).

Some information from the past may be difficult to recall. Just do your best. Even if not exact, your best estimates are valuable to the study.

SECTION 1: DIAGNOSTIC RADIOISOTOPE PROCEDURES

1. Did you ever perform or assist with DIAGNOSTIC RADIOISOTOPE procedures <u>at least once a WEEK for a year or more</u>?

❑ **NO** → **Go to Page 6, Question 11.**

❑ **YES (Please continue with survey.)**

2. What years did you FIRST and LAST perform or assist with DIAGNOSTIC RADIOISOTOPE procedures <u>at least once a WEEK</u>?

				FIRST YEAR				**LAST YEAR** (Enter current year if still working with procedures.)

3. During each time period, how many YEARS did you perform or assist with DIAGNOSTIC RADIOISOTOPE procedures at least once a week?

Number of YEARS				
1945-1964	1965-1979	1980-1989	1990-1999	2000-2009

4. During each time period, how many total TIMES per WEEK did you usually perform or assist with DIAGNOSTIC RADIOISOTOPE procedures?

Total Number of TIMES per WEEK				
1945-1964	1965-1979	1980-1989	1990-1999	2000-2009

5. For the following DIAGNOSTIC RADIOISOTOPE procedures, please provide your best estimate of how many TIMES per WEEK you performed or assisted with these procedures during each time period.

Please provide estimates for all procedures you performed in each group (e.g. all thyroid scans) and also for procedures within each group that you performed using the selected radiopharmaceutical listed. If you used more than one radiopharmaceutical for a given procedure, please answer separately for each radiopharmaceutical. NOTE: Leave all time period boxes blank if you NEVER worked with a procedure; leave specific time period boxes blank if you worked with a procedure less than once a week during that time period.

DIAGNOSTIC PROCEDURE	RADIOPHARMACEUTICAL	NEVER	How many TIMES per WEEK did you perform these procedures in each time period? 1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
All Thyroid scans		❑					
Thyroid scan	^{131}I-sodium iodide	❑					
	^{123}I-sodium iodide	❑					
	^{99m}Tc-pertechnetate	❑					
All Thyroid uptakes		❑					
Thyroid uptake	^{131}I-sodium iodide	❑					
	^{123}I-sodium iodide	❑					
All Liver scans		❑					
Liver scan	^{198}Au-Colloid	❑					
	^{99m}Tc -SC	❑					
All Brain scans		❑					
Brain scan	^{131}ISHA	❑					
	^{197}Hg-, ^{203}Hg-chlormerodrin	❑					
	^{99m}Tc (pertechnetate, DTPA, HMPAO, etc.)	❑					
All Renal scans		❑					
Renal scan	^{197}Hg-, ^{203}Hg-chlormerodrin	❑					
	^{131}I-hippurate	❑					
.	^{99m}Tc (DTPA, MAG3, DMSA, etc.)	❑					
All Bone scans		❑					
Bone scan	^{85}Sr-chloride	❑					
	^{99m}Tc (phosphate, MDP, etc.).	❑					
All Lung perfusion scans		❑					
Lung perfusion scan	^{131}I-MAA	❑					
	^{99m}Tc (MAA, HAMicrospheres, etc.)	❑					

DIAGNOSTIC PROCEDURE, cont.	RADIOPHARMACEUTICAL	NEVER	How many TIMES per WEEK did you perform these procedures in each time period? 1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
All Lung ventilations		❑					
Lung ventilation	^{133}Xe	❑					
	^{99m}Tc-DTPA (aerosol)	❑					
All Bone marrow scans		❑					
Bone marrow scan	^{198}Au-Colloid	❑					
	^{99m}Tc-SC	❑					
All Gallbladder scans with ^{99m}Tc (HIDA, DISIDA, etc.)		❑					
All GI bleeding scans with ^{99m}Tc (labeled RBC, pertechnetate, SC, etc.)		❑					
All Cardiac scans		❑					
Cardiac scan	^{201}Tl-chloride	❑					
	^{99m}Tc-MIBI (1 day)	❑					
	^{99m}Tc-MIBI (2 day)	❑					
	^{99m}Tc (labeled RBC, phosphate, etc.)	❑					
All Tumor and abscess localizations		❑					
Tumor and abscess localization	^{67}Ga-citrate	❑					
	^{111}In (pentreotide, WBC, etc.)	❑					
All Pancreas scans		❑					
All PET scans (Brain) with ^{18}F-FDG		❑					
All PET scans (except brain)		❑					
PET scan (except brain)	^{18}F-FDG	❑					
	^{82}Rb-chloride	❑					

Please list other **DIAGNOSTIC RADIOISOTOPE** procedures below:

	DIAGNOSTIC PROCEDURE	RADIOPHARMACEUTICAL	How many TIMES per WEEK did you perform these procedures in each time period? 1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
1.							
2.							
3.							

The following questions are about your work patterns and practices while performing or assisting with DIAGNOSTIC RADIOISOTOPE procedures. Please complete all questions for each time period.

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
6a. Did you ever prepare radiopharmaceuticals for DIAGNOSTIC procedures? Do NOT include if prepared by a radiopharmacy. ❑ **Never** If NEVER, go to Question 7a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
6b. How many TIMES per WEEK did you prepare radiopharmaceuticals?					
6c. When you prepared radiopharmaceuticals, did you use any radiation protection? ❑ **Never** If NEVER, go to Question 7a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
6d. Check all of the following that you typically used more than 50%of the time while preparing radiopharmaceuticals:					
lead shielded vial	❑	❑	❑	❑	❑
lead shielded syringe	❑	❑	❑	❑	❑
lead apron	❑	❑	❑	❑	❑
fume hood	❑	❑	❑	❑	❑
L-Block, L-shield or lead L	❑	❑	❑	❑	❑
other (specify) _____ .	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
7a. Did you ever elute the ^{99m}Tc generator? ❑ **Never** If NEVER, go to Question 8a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
7b. How many TIMES per WEEK did you elute the ^{99m}Tc generator?					
7c. When you eluted the ^{99m}Tc generator, did you use any radiation protection? ❑ **Never** If NEVER, go to Question 8a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
7d. Check all of the following that you typically used more than 50% of the time while eluting the ^{99m}Tc generator:					
lead shielded vial	❑	❑	❑	❑	❑
lead apron	❑	❑	❑	❑	❑
fume hood	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
8a. Did you ever inject patients with a DIAGNOSTIC RADIOISOTOPE? ❑ Never If NEVER, go to Question 9a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
8b. How many TIMES per WEEK did you inject patients with a radioisotope?					
8c. When you injected patients, did you use any radiation protection? ❑ Never If NEVER, go to Question 9a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
8d. Check all of the following that you typically used more than 50% of the time while injecting patients:					
lead shielded syringe	❑	❑	❑	❑	❑
lead apron	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
9a. When you assisted patients for DIAGNOSTIC RADIOISOTOPE examinations, did you use any radiation protection? ❑ Never If NEVER, go to Question 10a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
9b. Check all of the following that you typically used or did more than 50% of the time while assisting patients:					
lead apron	❑	❑	❑	❑	❑
moved more than 3 feet away from patient.....	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
10a. When you imaged patients, did you use any radiation protection? ❑ Never If NEVER, go to Question 11a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
10b. Check all of the following that you typically used or did more than 50% of the time while imaging patients:					
lead apron	❑	❑	❑	❑	❑
moved more than 3 feet away from patient.....	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

SECTION 2: THERAPEUTIC RADIOISOTOPE PROCEDURES

11. Did you ever perform or assist with THERAPEUTIC RADIOISOTOPE procedures at least once a MONTH for a year or more?

❑ NO ⟶ STOP (Thank you. Please return survey.)

❑ YES (Please continue.)

12. What years did you FIRST and LAST perform or assist with THERAPEUTIC RADIOISOTOPE procedures at least once a MONTH?

☐☐☐☐ FIRST YEAR ☐☐☐☐ LAST YEAR (Enter current year if still working with procedures.)

13. During each time period, how many YEARS did you perform or assist with THERAPEUTIC RADIOISOTOPE procedures at least once a month?

Number of YEARS				
1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
☐☐	☐☐	☐☐	☐☐	☐☐

14. During each time period, how many total TIMES per MONTH did you usually perform or assist withTHERAPEUTIC RADIOISOTOPE procedures?

Total Number of TIMES per MONTH				
1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
☐☐☐	☐☐☐	☐☐☐	☐☐☐	☐☐☐

15. For the following THERAPEUTIC RADIOISOTOPE procedures, please provide your best estimate of how many TIMES per MONTH you performed or assisted with these procedures, with the specific radionuclide listed, during each time period. If you used more than one radionuclide for a given procedure, please include in the section below.

NOTE: Leave all time period boxes blank if you NEVER worked with a procedure; leave specific time period boxes blank if you worked with a procedure less than once a month during that time period.

THERAPEUTIC PROCEDURE OR DISEASE	RADIONUCLIDE	NEVER	How many TIMES per MONTH did you perform these procedures in each time period? 1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
Hyperthyroidism	^{131}I	❑	☐☐	☐☐	☐☐	☐☐	☐☐
Thyroid cancer	^{131}I	❑	☐☐	☐☐	☐☐	☐☐	☐☐
Thyroid ablation	^{131}I	❑	☐☐	☐☐	☐☐	☐☐	☐☐
Follow up after thyroid ablation	^{131}I	❑	☐☐	☐☐	☐☐	☐☐	☐☐
Malignant effusion	^{198}Au-Colloid	❑	☐☐	☐☐	☐☐		
Bone metastases	^{153}Sm	❑		☐☐	☐☐	☐☐	☐☐
Non-Hodgkin's lymphoma or liver tumor	^{90}Y	❑			☐☐	☐☐	☐☐

Please list other **THERAPEUTIC RADIOISOTOPE** procedures or disease below:

	THERAPEUTIC PROCEDURE	RADIONUCLIDE	How many TIMES per MONTH did you perform these procedures in each time period? 1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
1.			☐☐	☐☐	☐☐	☐☐	☐☐
2.			☐☐	☐☐	☐☐	☐☐	☐☐
3.			☐☐	☐☐	☐☐	☐☐	☐☐

The following questions are about your work patterns and practices while performing or assisting with THERAPEUTIC RADIOISOTOPE procedures. Please complete all questions for each time period.

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
16a. Did you ever prepare radiopharmaceuticals for THERAPEUTIC procedures? Do NOT include if prepared by a radiopharmacy. ❑ **Never** If NEVER, go to Question 17a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
16b. How many TIMES per MONTH did you prepare radiopharmaceuticals?					
16c. When you prepared radiopharmaceuticals, did you use any radiation protection? ❑ **Never** If NEVER, go to Question 17a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
16d. Check all of the following that you typically used more than 50% of the time while preparing radiopharmaceuticals:					
lead shielded vial	❑	❑	❑	❑	❑
lead shielded syringe	❑	❑	❑	❑	❑
lead apron	❑	❑	❑	❑	❑
fume hood	❑	❑	❑	❑	❑
L-Block, L-shield or lead L	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
17a. Did you ever administer oral ^{131}I? ❑ **Never** If NEVER, go to Question 18a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
17b. How many TIMES per MONTH did you administer oral ^{131}I?					
17c. When you administered oral ^{131}I, did you use any radiation protection? ❑ **Never** If NEVER, go to Question 18a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
17d. Check all of the following that you typically used more than 50% of the time while administering oral ^{131}I:					
lead apron	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
18a. Did you ever inject patients with a THERAPEUTIC RADIOISOTOPE? ❑ **Never** If NEVER, go to Question 19a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
18b. How many TIMES per MONTH did you inject patients with the radioisotope?	☐☐	☐☐	☐☐	☐☐	☐☐
18c. When you injected patients with the radioisotope, did you use any radiation protection? ❑ **Never** If NEVER, go to Question 19a.	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
18d. Check all of the following that you typically used more than 50% of the time while injecting patients:					
lead apron	❑	❑	❑	❑	❑
lead shielded syringe	❑	❑	❑	❑	❑
other (specify) _____ ...	❑	❑	❑	❑	❑

	1945-1964	1965-1979	1980-1989	1990-1999	2000-2009
19a. When you assisted patients for THERAPEUTIC RADIOISOTOPE procedures, did you use any radiation protection? ❑ **Never** If NEVER, end of survey. **Thank you.**	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
19b. Check all of the following that you typically used or did more than 50% of the time while assisting patients:					
lead apron	❑	❑	❑	❑	❑
moved more than 3 feet away from patient.....	❑	❑	❑	❑	❑
other (specify) _____ ..	❑	❑	❑	❑	❑

Thank you!