DICOM Change Proposal

STATUS	Final Text
Date of Last Update	2025/11/12
Person Assigned	steven.nichols@gehealthcare.com
Submitter Name	keran.elazari@gehealthcare.com
Submission Date	4 March 2025

Change Number	CP-2512
Log Summary: Add radiopharmaceutical codes	
Name of Standard PS3.16 2025d	

Rationale for Change:

Include additional Radiopharmaceuticals and Isotopes utilized in PET and NM.

References:

- **^47^Scandium:** Müller C, Bunka M, Reber J, et al. Promising prospects for 44Sc-/47Sc-based theragnostics: application of 47Sc for radionuclide tumor therapy in mice. J Nucl Med. 2014;55(10):1658-64.
- **^122^Iodine:** Mathis CA, Sargent T, Shulgin AT. Iodine-122-labeled amphetamine derivative with potential for PET brain blood-flow studies. J Nucl Med. 1985 Nov;26(11):1295-1301.
- **^123^Xenon:** Pietzsch H-J, Mamat C, Müller C, Schibli R. Single Photon Emission Computed Tomography Tracer. In: Molecular Imaging in Oncology, Recent Results in Cancer Research, vol 216. Springer, 2020. doi: 10.1007/978-3-030-42618-7_7.
- **^149^Terbium:** Müller C, Reber J, Haller S, Dorrer H, Köster U, Johnston K, et al. Alpha-PET with terbium-149: evidence and perspectives for radiotheragnostic applications. EJNMMI Radiopharm Chem. 2017 Dec;2(1):5. doi: 10.1186/s41181-017-0021-4. PMID: 28649642.
- **^161^Terbium:** Kazakov A, Singh A, Müller C, Leung K, Domnanich KA, Kaeppeli SA, et al. First-in-humans SPECT/CT imaging of metastatic prostate cancer with terbium-161-labeled PSMA-617. J Nucl Med. 2023 Aug;64(8):1322–1325. doi: 10.2967/jnumed.122.265496. PMID: 36862853.
- **^211^Astatine:** Kratochwil C, Kunert M, Rathke H, Happel C, Köhn A, Linxweiler J, et al. First-in-human application of 211At-labeled PSMA ligand: functional alpha imaging and therapy of mCRPC. Eur J Nucl Med Mol Imaging. 2024;51:1596–1602. doi: 10.1007/s00259-024-07017-w. PMID: 38496283.
- **^212^Lead:** Zhang XY, Zhao YD, Kang CS, Zhang C, Liang XL. Alpha-emitters and targeted alpha therapy in cancer treatment. iRadiology. 2023;1(2):144-165. doi: 10.1002/ird3.30.
- **^225^Actinium:** Zwarthoed C, Desmonts C, Peyronneau MA, Gonon G, Kriza C, Le Duc G, et al. Quantitative SPECT/CT imaging of actinium-225 for targeted alpha therapy. EJNMMI Res. 2024 Apr 30;14(1):48. doi: 10.1186/s13550-024-01056-z. PMID: 38698292.
- **2-Thymidine C^11^:** Eary JF, Mankoff DA, Spence AM, Berger MS, Olshen A, Link JM, O'Sullivan F, Krohn KA. 2-[C-11]thymidine imaging of malignant brain tumors. Cancer Res. 1999 Feb 1;59(3):615-21. PMID: 9973209.
- **3-N-Methylspiperone C^11^:** Burns HD, Hamill TG, Dannals RF, et al. [11C]N-methylspiperone: a potential PET radiotracer for dopamine D-2 receptors. J Nucl Med. 1984;25(10):1222-7.
- **DASB C^11^:** Ginovart N, Wilson AA, Meyer JH, Hussey D, Houle S. [11C]-DASB, a tool for in vivo measurement of SSRI-induced occupancy of the serotonin transporter: PET characterization and evaluation in cats. Synapse. 2003 Feb;47(2):123-33. doi: 10.1002/syn.10155. PMID: 12454950.
- **Fluoroazomycin arabinoside F^18^:** Kumar P, Emami S, Kresolek Z, Yang J, McEwan AJ, Wiebe LI. Synthesis and hypoxia selective radiosensitization potential of beta-2-FAZA and beta-3-FAZL: fluorinated azomycin beta-nucleosides. Med Chem. 2009 Mar;5(2):118-29. doi: 10.2174/157340609787582945. PMID: 19275710.
- **Glucose C^11^:** Ehrin E, Stone-Elander S, Nilsson JL, et al. C-11-labeled glucose and its utilization in positron-emission tomography. J Nucl Med. 1983 Apr;24(4):326-31.
- **Pembrolizumab ^89^Zr:** Kok IC, Hooiveld JS, van de Donk PP, Giesen D, van der Veen EL, Lub-de Hooge MN, Brouwers AH, Hiltermann TJN, van der Wekken AJ, Hijmering-Kappelle LBM, Timens W, Elias SG, Hospers GAP, Groen HJM, Uyterlinde W, van der Hiel B, Haanen JB, de Groot DJA, Jalving M, de Vries EGE. 89Zr-pembrolizumab imaging as a non-invasive approach to assess clinical response to PD-1 blockade in cancer. Ann Oncol. 2022 Jan;33(1):80-88. doi: 10.1016/j.annonc.2021.10.213. Epub 2021 Nov 1. PMID: 34736925.
- **^211^Astatine, ^149^Terbium, ^161^Terbium, ^225^Actinium, ^213^Bismuth (general alpha therapy isotopes):** Huclier-Markai S, Alliot C, Kerdjoudj R, Chouin N, Haddad F, Davodeau F. Promising radionuclides for targeted alpha therapy: a review. Nucl Med Biol. 2016 Sep;43(5):523–541. doi: 10.1016/j.nucmedbio.2016.03.002. PMID: 27014673.
- **^213^Bismuth, ^225^Actinium:** Bernhardt P, Forssell-Aronsson E, Bäck T, Jacobsson L, Johanson K. Rat renal dosimetry and biokinetics of ^213Bi- and ^225Ac-labeled MX35 F(ab')$_2$ antibodies for ovarian cancer treatment. J Nucl Med. 2016 Mar;57(3):486–492. doi: 10.2967/jnumed.115.161646. PMID: 26576896.

Notes:

- The Glucose C^11^ reference (Ehrin et al. 1983) predates modern MeSH terminology standards. While clinically superseded by F-18 FDG, C-11 glucose remains relevant for specialized research and historical data compatibility.

- This CP replaces SNOMED code 129502002 (Thymidine F^18^) with 764937002 (Fluorothymidine F^18^) for isotope-specific terminology for PET radiopharmaceutical applications.
- The inconsistency in the Code Meaning patterns for radionuclides is noted and will be the subject of a future harmonization effort and is beyond the scope of this CP.

[Ed.Note: CRS Request # 970600 to inactivate duplicate concept 129502002.]

[Ed.Note: CRS Request # 973377 to add 66956003, 68153002, 87401005, 32059002, 1263794005, 771875003, 764937002.]

[Ed.Note: SCT:771875003 | Mespiperone (substance) (UMLS: C4750094) does not specifically refer to C^11^, nor does MSH:C039167, though latter does in description.]

Change Wording:

Amend PS3.16 Chapter B DCMR Context Groups Table CID 18 Radiopharmaceutical Isotope as follows

Table CID 18. Radiopharmaceutical Isotope

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	71647005	^14^Carbon	C-105A2	C0302945
SCT	77004003	^18^Fluorine	C-111A1	C0302995
SCT	71633006	^22^Sodium	C-155A1	C0303511
SCT	58541008	^24^Sodium	C-155A2	C0303512
…				
MSH	**C000615359**	**^47^Scandium**		**C4546991**
SCT	**66956003**	**^122^Iodine**	**C-114A3**	**C0303022**
SCT	**68153002**	**^123^Xenon**	**C-172A2**	**C0303674**
MSH	**C000615034**	**^149^Terbium**		**C4546779**
MSH	**C000615038**	**^161^Terbium**		**C4546782**
MSH	**C000615146**	**^211^Astatine**		**C4546839**
SCT	**87401005**	**^212^Lead**	**C-132B6**	**C0303247**
MSH	**C000615137**	**^213^Bismuth**		**C4546830**
SCT	**32059002**	**^225^Actinium**	**C-119A2**	**C0303084**
…				

Amend PS3.16 Chapter B DCMR Context Groups Table CID 25 Radiopharmaceutical as follows

Table CID 25. Radiopharmaceutical

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Trade name (Informative)
SCT	2942001	Carbon^14^ D-xylose	C-B1302	C0305043	
SCT	42417005	Carbon^14^ triolein	C-B1300	C0305042	
SCT	17069007	Chromic phosphate P^32^	C-B1140	C0392428	
SCT	4693006	Chromium^51^ albumin	C-B1012	C0304956	
…					
SCT	**1263794005**	**Lutetium^177^ vipivotide tetraxetan**		**C4308025**	**PLUVICTO**
…					

Amend PS3.16 Chapter B DCMR Context Groups Table CID 4021 PET Radiopharmaceutical as follows

Table CID 4021. PET Radiopharmaceutical

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Other Names
DCM	126752	28H1 ^89^Zr			
DCM	126713	2FA F^18^			FA-85380
DCM	126751	7D12 ^89^Zr			
DCM	126750	7E11 ^89^Zr			
…					
NCIt	**C90936**	**2-Thymidine C^11^**		**C2983946**	
SCT	**771875003**	**3-N-Methylspiperone C^11^**		**C4750094**	
MSH	**C412822**	**DASB C^11^**		**C1570551**	**3-amino-4-(2-dimethylaminomethylphenylsulfanyl)benzonitrile**
NCIt	**C62520**	**Fluoroazomycin arabinoside F^18^**		**C1566975**	**18F-FAZA**
SCT	**764937002**	**Fluorothymidine F^18^**		**C1432709**	**FLT**
DCM	**126521**	**Glucose C^11^**			
NCIt	**C148167**	**Pembrolizumab ^89^Zr**		**C4724867**	

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Other Names
~~SCT~~	~~129502002~~	~~Thymidine F^18^~~	~~C-B1036~~	~~C1268554~~	~~FLT~~
…					

Amend PS3.16 Table D-1. DICOM Controlled Terminology Definitions as follows

Table D-1. DICOM Controlled Terminology Definitions (Coding Scheme Designator "DCM" Coding Scheme Version "01")

Code Value	Code Meaning	Definition	Notes
…			
126512	Trastuzumab ^89^Zr	A Zr 89 Trastuzumab PET Radiotracer.	
126513	Cetuximab ^89^Zr	A Zr 89 Cetuximab PET Radiotracer.	
126514	J591 ^89^Zr	A Zr 89 J591 PET Radiotracer.	
126515	cU36 ^89^Zr	A Zr 89 cU36 PET Radiotracer.	
…			
126521	**Glucose C^11^**	**A C 11 Glucose PET Radiotracer.**	
…			

Amend PS3.16 Table J-1. SNOMED Codes Retired from DICOM Use, as follows

Table J-1. SNOMED Codes Retired from DICOM Use

Retired Code Value	Code Meaning	Replacement Code	Notes
G-5190	Headfirst	102540008	
G-5191	Feet-first	102541007	
G-A11A	Mid-longitudinal	103342007	
G-A11B	Parasagittal	103343002	
…			
129502002	**Thymidine F^18^**	**764937002**	**Replacement code has meaning of the F-18 labeled version of Fluorothymidine.** **Retired code means the base compound without isotope specification.**