

## DICOM Change Proposal

STATUS	Letter Ballot
Date of Last Update	2025/09/07
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Change Number	CP-2512
Log Summary: Add radiopharmaceutical codes	
Name of Standard PS3.16	

## Rationale for Change:

Include additional Radiopharmaceuticals and Isotopes utilized in PET and NM.

## References:

- **<sup>47</sup>Scandium**: Müller C, Bunka M, Reber J, et al. Promising prospects for <sup>44</sup>Sc-/<sup>47</sup>Sc-based theragnostics: application of <sup>47</sup>Sc for radionuclide tumor therapy in mice. *J Nucl Med*. 2014;55(10):1658-64.
- **<sup>122</sup>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.
- **<sup>123</sup>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.
- **<sup>149</sup>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.
- **<sup>161</sup>Terbium**: Kazakov A, Singh A, Müller C, Leung K, Domnanich KA, Kaeppli 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.
- **<sup>211</sup>Astatine**: Kratochwil C, Kunert M, Rathke H, Happel C, Köhn A, Linxweiler J, et al. First-in-human application of <sup>211</sup>At-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.
- **<sup>212</sup>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.
- **<sup>225</sup>Actinium**: Zwarthoed C, Desmots 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<sup>11</sup>**: Early 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<sup>11</sup>**: 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<sup>11</sup>**: 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<sup>18</sup>**: 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<sup>11</sup>**: 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 <sup>89</sup>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, Uytendil W, van der Hiel B, Haanen JB, de Groot DJA, Jalving M, de Vries EGE. <sup>89</sup>Zr-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.
- **<sup>211</sup>Astatine, <sup>149</sup>Terbium, <sup>161</sup>Terbium, <sup>225</sup>Actinium, <sup>213</sup>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.
- **<sup>213</sup>Bismuth, <sup>225</sup>Actinium**: Bernhardt P, Forssell-Aronsson E, Bäck T, Jacobsson L, Johanson K. Rat renal dosimetry and biokinetics of <sup>213</sup>Bi- and <sup>225</sup>Ac-labeled MX35 F(ab')<sub>2</sub> 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<sup>11</sup> 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<sup>18</sup>) with 764937002 (Fluorothymidine F<sup>18</sup>) 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.

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	<sup>14</sup> Carbon	C-105A2	C0302945
SCT	77004003	<sup>18</sup> Fluorine	C-111A1	C0302995
SCT	71633006	<sup>22</sup> Sodium	C-155A1	C0303511
SCT	58541008	<sup>24</sup> Sodium	C-155A2	C0303512
...				
<u>MSH</u>	<u>C000615359</u>	<u><sup>47</sup>Scandium</u>		<u>C4546991</u>
<u>SCT</u>	<u>66956003</u>	<u><sup>122</sup>Iodine</u>		<u>C0303022</u>
<u>SCT</u>	<u>68153002</u>	<u><sup>123</sup>Xenon</u>		<u>C0303674</u>
<u>MSH</u>	<u>C000615034</u>	<u><sup>149</sup>Terbium</u>		<u>C4546779</u>
<u>MSH</u>	<u>C000615038</u>	<u><sup>161</sup>Terbium</u>		<u>C4546782</u>
<u>MSH</u>	<u>C000615146</u>	<u><sup>211</sup>Astatine</u>		<u>C4546839</u>
<u>SCT</u>	<u>87401005</u>	<u><sup>212</sup>Lead</u>		<u>C0303247</u>
<u>MSH</u>	<u>C000615137</u>	<u><sup>213</sup>Bismuth</u>		<u>C4546830</u>
<u>SCT</u>	<u>32059002</u>	<u><sup>225</sup>Actinium</u>		<u>C0303084</u>
...				

**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 <sup>14</sup> D-xylose	C-B1302	C0305043	
SCT	42417005	Carbon <sup>14</sup> triolein	C-B1300	C0305042	
SCT	17069007	Chromic phosphate P <sup>32</sup>	C-B1140	C0392428	
SCT	4693006	Chromium <sup>51</sup> albumin	C-B1012	C0304956	
...					
<u>SCT</u>	<u>1263794005</u>	<u>Lutetium Lu<sup>177</sup> vipivotide tetraxetan</u>		<u>C4308025</u>	<u>PLUVICTO</u>
...					

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

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**Table CID 4021. PET Radiopharmaceutical**

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Other Names
DCM	126752	28H1 <sup>89</sup> Zr			
DCM	126713	2FA F <sup>18</sup>			FA-85380
DCM	126751	7D12 <sup>89</sup> Zr			
DCM	126750	7E11 <sup>89</sup> Zr			
...					
<u>NCIt</u>	<u>C90936</u>	<u>2-Thymidine C<sup>11</sup></u>		<u>C2983946</u>	
<u>SCT</u>	<u>771875003</u>	<u>3-N-Methylspiperone C<sup>11</sup></u>		<u>C4750094</u>	
<u>MSH</u>	<u>C412822</u>	<u>DASB C<sup>11</sup></u>		<u>C1570551</u>	<u>3-amino-4-(2-dimethylaminomethylphenyl)sulfanyl)benzonitrile</u>
<u>NCIt</u>	<u>C62520</u>	<u>Fluoroazomycin arabinoside F<sup>18</sup></u>		<u>C1566975</u>	<u>18F-FAZA</u>
<u>SCT</u>	<u>764937002</u>	<u>Fluorothymidine F<sup>18</sup></u>		<u>C1432709</u>	<u>FLT</u>
<u>DCM</u>	<u>newCODE1</u>	<u>Glucose C<sup>11</sup></u>			
<u>NCIt</u>	<u>C148167</u>	<u>Pembrolizumab <sup>89</sup>Zr</u>		<u>C4724867</u>	
<u>SCT</u>	<u>129502002</u>	<u>Thymidine F<sup>18</sup></u>	<u>C-B1036</u>	<u>C1268554</u>	<u>FLT</u>

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Other Names
...					

**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.	
...			
<u>newCODE1</u>	<u>Glucose C^11^</u>	<u>C 11 Glucose PET Radiotracer.</u>	
...			

**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	
...			
<u>129502002</u>	<u>Thymidine F^18^</u>	<u>764937002</u>	<u>Replacement code has meaning of the F-18 labeled version of Fluorothymidine.</u> <u>Retired code means the base compound without isotope specification.</u>