

1	Status	Letter Ballot
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8	Correction Number CP-1524	
9	Log Summary: More tracer kinetic models	
10	Name of Standard	
11	PS3.16	
12	Rationale for Correction:	
13	Review of the recent literature has identified more tracer kinetic models used in perfusion studies (e.g., DCE-MRI).	
14	Correction Wording:	

Amend DICOM PS 3.16 as follows:

CID 4101 Tracer Kinetic Models

Type: Extensible
Version: 20141110yyymmdd

Table CID 4101. Tracer Kinetic Models

Coding Scheme Designator	Code Value	Code Meaning
DCM	126340	Standard Tofts Model
DCM	126341	Extended Tofts Model
DCM	126343	First Pass Leakage Profile (FPLP) Model
DCM	126344	Shutter-Speed Model (SSM)
DCM	ddd001	Gamma Capillary Transit Time (GCTT) Model
DCM	ddd002	Adiabatic Tissue Homogeneity (ATH) Model
DCM	ddd003	Two-Compartment Exchange (2CX) Model
DCM	ddd004	
DCM	ddd005	

Note

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
...
126340	Standard Tofts Model	<p>A tracer diffusion kinetic model in which the permeability is assumed to be isodirectional.</p> <p>See P. Tofts, "Modeling tracer kinetics in dynamic Gd-DTPA MR imaging", Journal of Magnetic Resonance Imaging, vol. 7, pp. 91–101, 1997.</p> <p><u>Mathematically equivalent to the model proposed by Kety in a non-MRI context, hence sometimes referred to as the Tofts-Kety (TK) model. See Kety SS. The Theory and Applications of the Exchange of Inert Gas at the Lungs and Tissues. Pharmacological Reviews. 1951 Mar 1;3(1):1–41.</u></p>	
126341	Extended Tofts Model	<p>A tracer diffusion kinetic model in which the permeability is not assumed to be isodirectional, and which includes the contribution of tracer in the blood plasma to the total tissue concentration.</p> <p>See P. Tofts, "Modeling tracer kinetics in dynamic Gd-DTPA MR imaging", Journal of Magnetic Resonance Imaging, vol. 7, pp. 91–101, 1997.</p>	
...
126343	First Pass Leakage Profile (FPLP) Model	<p>A tracer diffusion kinetic model that accounts for the tumor leakage profile during the first pass of contrast.</p> <p>See Li, Ka-Loh, Xiao Ping Zhu, John Waterton, and Alan Jackson. "Improved 3D Quantitative Mapping of Blood Volume and Endothelial Permeability in Brain Tumors." Journal of Magnetic Resonance Imaging 12, no. 2 (2000): 347–357. doi:10.1002/1522-2586(200008)12:2<347::AID-JMRI19>3.0.CO;2-7.</p>	

Code Value	Code Meaning	Definition	Notes
126344	Shutter-Speed Model (SSM)	A tracer diffusion kinetic model that does not assume that intercompartmental water molecule exchange is infinitely fast. See Li, Xin, Wei Huang, Thomas E. Yankeelov, Alina Tudorica, William D. Rooney, and Charles S. Springer. "Shutter-Speed Analysis of Contrast Reagent Bolus-Tracking Data: Preliminary Observations in Benign and Malignant Breast Disease." <i>Magnetic Resonance in Medicine</i> 53, no. 3 (2005): 724–29. doi:10.1002/mrm.20405.	
...
<u>DCM_ddd001</u>	<u>Gamma Capillary Transit Time (GCCT) Model</u>	<u>A tracer diffusion kinetic model that mathematically unifies the Tofts, Extended Tofts, Adiabatic Tissue Homogeneity, and Two Compartment Exchange models</u> <u>See Schabel MC. A unified impulse response model for DCE-MRI. <i>Magnetic Resonance in Medicine</i>. 2012;68(5):1632–46. doi:10.1002/mrm.24162.</u>	...
<u>DCM_ddd002</u>	<u>Adiabatic Tissue Homogeneity (ATH) Model</u>	<u>An adiabatic approximation to the tissue homogeneity tracer diffusion kinetic model, which assumes that the tracer concentration in parenchymal tissue changes slowly relative to that in capillaries.</u> <u>See St. Lawrence KS, Lee T-Y. An Adiabatic Approximation to the Tissue Homogeneity Model for Water Exchange in the Brain: I. Theoretical Derivation. <i>J Cereb Blood Flow Metab</i>. 1998 Dec;18(12):1365–77. doi:10.1097/00004647-199812000-00011.</u>	...
<u>DCM_ddd003</u>	<u>Two Compartment Exchange (2CX) Model</u>	<u>A tracer diffusion kinetic that incorporates the extracellular space of the lesion as a peripheral compartment, connected to the central (plasma) compartment by linear exchange processes in both directions.</u> <u>See Brix G, Semmler W, Port R, Schad LR, Layer G, Lorenz WJ. Pharmacokinetic Parameters in CNS Gd-DTPA Enhanced MR Imaging. <i>Journal of Computer Assisted Tomography</i>. 1991;15(4):621–8.</u>	...
<u>DCM_ddd004</u>
<u>DCM_ddd005</u>