

# Supplementary Material

## 1 SUPPLEMENTARY TABLES AND FIGURES

**Table S1.** Summary statistics of bias in the mean uptake in PET<sub>AtlasAC</sub> and PET<sub>ZTEAC</sub> in all 85 anatomical VOIs averaged over all 30 static PET acquisitions. These data are also visualized in Fig. 4 in the main manuscript. Please note that the VOIs in the cerebellum had to be excluded in 3 subjects (6,7,21).

VOI	region	bias in PET <sub>AtlasAC</sub> [%]					p	bias in PET <sub>ZTEAC</sub> [%]					p
		mean	sd	min	max			mean	sd	min	max		
Amygdala left	medial temporal cortex	-3.1	3.6	-17.2	2.2	<0.001		0.3	1.6	-3.3	3.2	0.44	
Amygdala right	medial temporal cortex	-2.5	2.9	-12.6	2.3	<0.001		0.4	1.6	-2.8	3.5	0.229	
Anterior orbital gyrus left	frontal cortex	-1.5	4	-14.2	5.7	0.043		-0.3	2.5	-3.9	6.4	0.245	
Anterior orbital gyrus right	frontal cortex	-2.2	3.7	-13.8	4	0.003		-0.5	2.5	-4.7	6	0.245	
Anterior temporal lobe lateral part left	temporal cortex	-4.1	3.3	-11.8	1.3	<0.001		-0.3	2.3	-4.2	4.6	0.229	
Anterior temporal lobe lateral part right	temporal cortex	-4.2	3.7	-12.3	2	<0.001		-0.3	2.1	-5	3.9	0.28	
Anterior temporal lobe medial part left	temporal cortex	-3	4.2	-12.2	5.7	<0.001		-0.5	2.6	-4.2	6	0.088	
Anterior temporal lobe medial part right	temporal cortex	-2.8	4.4	-13.9	5.4	0.001		-0.3	2.4	-4.3	4.9	0.105	
Caudate nucleus left	striatum	0.9	2.3	-3.2	5.1	0.119		1.2	1.8	-2.5	4.2	0.005	
Caudate nucleus right	striatum	1.7	2.6	-2.9	7.2	0.009		1.2	1.9	-2.2	4.2	0.015	
Cerebellar white matter	-	-4.5	2.9	-10.9	1.5	<0.001		1.1	2.7	-1.7	7.6	0.211	
Cerebellum left	cerebellum	-4.1	2.7	-10.6	0.8	<0.001		0.4	2.3	-3.1	5.7	0.859	
Cerebellum right	cerebellum	-4.2	2.8	-10.6	2	<0.001		0.7	2.4	-2.3	6.4	0.455	
Cerebral white matter left	cerebral WM	2.3	2.6	-4.5	7.6	<0.001		-0.4	1.6	-3.5	2.6	0.221	
Cerebral white matter right	cerebral WM	2.2	2.6	-4.4	7.3	<0.001		-0.3	1.6	-2.9	2.7	0.28	
Cingulate gyrus anterior part left	-	3.3	2.8	-2.2	9.4	<0.001		-0.3	1.8	-3.8	2.7	0.452	
Cingulate gyrus anterior part right	-	3.7	2.9	-1.8	10.1	<0.001		-0.3	1.8	-3.8	2.9	0.477	
Corpus callosum	-	2	2.4	-3.3	7	<0.001		0.6	1.7	-2.4	3.7	0.124	
Cuneus left	occipital cortex	1	2.8	-4.9	5.7	0.077		-1.5	1.5	-4.5	1.2	<0.001	
Cuneus right	occipital cortex	0.9	2.7	-5.1	5.1	0.124		-1.3	1.5	-4.6	1.3	<0.001	
Fusiform gyrus left	temporal cortex	-3.9	4	-12.1	4.4	<0.001		-0.4	2.6	-3.6	6.7	0.092	
Fusiform gyrus right	temporal cortex	-3.7	4	-11.1	6.1	<0.001		0	2.5	-3.3	6.9	0.318	
Gyrus cinguli posterior part left	-	3.7	2.8	-3.4	9.9	<0.001		0	1.6	-2.8	3.1	0.903	
Gyrus cinguli posterior part right	-	3.8	3	-3.2	10.9	<0.001		0	1.7	-3.1	3.5	0.746	
Hippocampus left	medial temporal cortex	-2.4	2.6	-9.5	2.3	<0.001		0.3	1.6	-2.5	3.5	0.57	
Hippocampus right	medial temporal cortex	-1.8	2.7	-10	2.8	<0.001		0.2	1.6	-2.6	3.2	0.73	
Inferior lateral remainder of parietal lobe left	parietal cortex	2.7	3.2	-6.3	8.4	<0.001		-0.9	1.5	-3.7	3.2	0.003	
Inferior lateral remainder of parietal lobe right	parietal cortex	1.6	3.2	-6.8	6.4	0.011		-0.5	1.7	-3.8	3.3	0.14	
Inferior frontal gyrus left	frontal cortex	0.4	3.4	-9	7.7	0.641		-0.3	1.9	-3.1	3.5	0.349	
Inferior frontal gyrus right	frontal cortex	-0.6	3.1	-7.2	6.4	0.271		0	2.1	-3.7	3.6	0.984	
Insula left	-	-0.3	2.6	-8.4	4.3	0.543		0.1	1.5	-2.3	3.3	0.808	
Insula right	-	-0.2	2.4	-6.8	3.8	0.715		0.2	1.7	-2.5	3.8	0.746	
Lateral orbital gyrus left	frontal cortex	-1.6	3.7	-12.3	5.2	0.016		0	2.2	-2.5	5.5	0.685	
Lateral orbital gyrus right	frontal cortex	-2.7	3.4	-11.3	4.6	<0.001		0.1	2.5	-3.7	5.6	0.919	
Lateral remainder of occipital lobe left	occipital cortex	0.1	2.9	-4.5	7	0.919		-1.8	1.7	-4.9	1.5	<0.001	
Lateral remainder of occipital lobe right	occipital cortex	0.1	2.8	-5.7	5.7	0.968		-1.6	1.6	-4.8	1.6	<0.001	
Lateral ventricle (excluding temporal horn) left	-	2	2.7	-2.5	8.1	0.004		2.2	2.3	-2.8	5.7	<0.001	
Lateral ventricle (excluding temporal horn) right	-	3.2	3	-2.2	11.2	<0.001		1.7	2.3	-2.7	5.8	0.001	
Lateral ventricle temporal horn left	-	-2	2.6	-8.5	3.1	<0.001		0.3	1.6	-2.5	3.4	0.49	
Lateral ventricle temporal horn right	-	-1.1	2.7	-9.1	4	0.025		0.2	1.7	-2.5	3.5	0.839	
Lingual gyrus left	occipital cortex	-1.3	2.3	-6.3	3.9	0.002		-0.6	1.8	-3.3	3.7	0.016	
Lingual gyrus right	occipital cortex	-1.2	2.2	-5.9	2.7	0.006		-0.5	1.6	-3.3	3.4	0.058	
Medial orbital gyrus left	frontal cortex	-4	5.4	-27.7	3.6	<0.001		0.1	2.1	-3.9	5.1	0.952	

Table S2. Continuation of Tab. S1

VOI	region	bias in PET <sub>AtlasAC</sub> [%]					bias in PET <sub>ZTEAC</sub> [%]				
		mean	sd	min	max	p	mean	sd	min	max	p
Medial orbital gyrus right	frontal cortex	-3.8	4.8	-23.5	3.3	<0.001	-0.2	2	-4	4.9	0.516
Middle and inferior temporal gyrus left	temporal cortex	-3.1	3.1	-9.7	4	<0.001	-0.1	2	-3.1	4.3	0.339
Middle and inferior temporal gyrus right	temporal cortex	-3.7	3.1	-9.7	2.4	<0.001	-0.2	1.9	-4	4.5	0.245
Middle frontal gyrus left	frontal cortex	4.9	4.4	-4.8	16.1	<0.001	-0.7	2.4	-8	3.1	0.339
Middle frontal gyrus right	frontal cortex	3.6	4	-4.3	12.9	<0.001	-0.5	2.3	-5.4	3.3	0.49
Nucleus accumbens left	striatum	-1.8	2.8	-12.3	2.3	0.001	0.4	1.4	-2.6	3	0.129
Nucleus accumbens right	striatum	-1.1	2.4	-8	3.5	0.021	0.5	1.5	-3.1	3.2	0.067
Pallidum left	-	-1.1	2.2	-5.9	3	0.01	0.3	1.4	-2.3	2.7	0.349
Pallidum right	-	-0.7	2.1	-5.4	3.4	0.1	0.3	1.6	-2.6	3.6	0.393
Parahippocampal and ambient gyri left	-	-3.3	3.2	-10	3.3	<0.001	0.1	1.9	-2.7	4.2	0.67
Parahippocampal and ambient gyri right	-	-2.8	3.1	-10.5	3.9	<0.001	0.1	2	-3.1	4.5	0.685
Postcentral gyrus left	parietal cortex	5.2	3.9	-4.1	14.3	<0.001	-0.1	1.8	-4.6	3.9	0.7
Postcentral gyrus right	parietal cortex	4.5	3.6	-3.5	11.9	<0.001	0	1.9	-3.5	3.8	0.903
Posterior orbital gyrus left	frontal cortex	-2	3.3	-14.3	3.1	<0.001	0.5	1.7	-2.3	5.3	0.109
Posterior orbital gyrus right	frontal cortex	-2.1	2.8	-11.4	1.5	<0.001	0.3	1.7	-2.7	4.2	0.556
Posterior temporal lobe left	temporal cortex	-1.8	2.3	-5.9	3	<0.001	-0.5	1.6	-3	2.6	0.07
Posterior temporal lobe right	temporal cortex	-2.5	2.5	-7.5	2.1	<0.001	-0.4	1.7	-3.6	3.4	0.129
Precentral gyrus left	frontal cortex	6.2	4.1	-2.9	16.3	<0.001	-0.2	2.1	-6.4	4	0.7
Precentral gyrus right	frontal cortex	5.3	3.8	-2	13.5	<0.001	-0.1	2.1	-5.1	4	0.761
Pre-subgenual frontal cortex left	-	-1	2.2	-5.3	3.6	0.015	0.6	1.8	-2.5	4.2	0.141
Pre-subgenual frontal cortex right	-	-0.7	2	-4.1	3.1	0.077	0.7	1.7	-2.3	3.9	0.047
Putamen left	striatum	-0.8	2.4	-7.7	3.5	0.05	0.2	1.4	-2.4	2.5	0.503
Putamen right	striatum	-0.5	2.2	-6.1	3.7	0.245	0.3	1.6	-2.4	3.1	0.404
Straight gyrus left	frontal cortex	-4.2	5.7	-31.6	1.4	<0.001	0.7	1.5	-2.9	3.2	0.012
Straight gyrus right	frontal cortex	-3.7	4.6	-24.6	1.4	<0.001	0.6	1.4	-2.8	3.3	0.023
Subcallosal area left	-	-1.4	2.4	-7.8	2.6	0.002	0.9	1.5	-2.6	3.9	0.009
Subcallosal area right	-	-0.6	2.2	-5	2.9	0.164	0.9	1.5	-2.6	4.2	0.006
Subgenual frontal cortex left	-	-1.7	2.1	-6.4	2	<0.001	0.9	1.5	-2.5	3.6	0.006
Subgenual frontal cortex right	-	-1.2	1.9	-4.5	2.5	0.002	1	1.5	-2.1	3.3	0.004
Substantia nigra left	-	-1.9	1.9	-5.7	1.3	<0.001	0.1	1.6	-3.4	3.2	0.761
Substantia nigra right	-	-1.5	2.2	-7.8	2.5	<0.001	0.3	1.5	-2.5	3.5	0.67
Superior frontal gyrus left	frontal cortex	6.6	4	-1.7	16.5	<0.001	-0.5	2.4	-7.6	3.6	0.416
Superior frontal gyrus right	frontal cortex	6.2	3.8	-1.2	15.2	<0.001	-0.5	2.4	-7.3	3.8	0.44
Superior parietal gyrus left	parietal cortex	5.2	3.4	-3.6	11.9	<0.001	-0.7	1.5	-3	3.2	0.008
Superior parietal gyrus right	parietal cortex	5	3.3	-2.9	11.7	<0.001	-0.5	1.6	-3.2	3.4	0.035
Superior temporal gyrus anterior part left	temporal cortex	-3	3.5	-13.2	2.7	<0.001	0.2	2.2	-4.2	6.2	0.855
Superior temporal gyrus anterior part right	temporal cortex	-3.1	3.3	-12.4	3.3	<0.001	0.3	2.4	-4.3	7	0.984
Superior temporal gyrus posterior part left	temporal cortex	-0.9	2.9	-9.1	4.9	0.052	-0.1	1.5	-2.9	2.9	0.598
Superior temporal gyrus posterior part right	temporal cortex	-1.8	2.6	-8.9	3.2	<0.001	0.1	1.8	-3.1	3.5	0.919
Thalamus left	thalamus	-0.2	2.1	-4.6	3.3	0.685	0.4	1.6	-2.3	3.4	0.271
Thalamus right	thalamus	0.1	2.2	-5.1	3.4	0.746	0.4	1.7	-2.4	3.5	0.44
Third ventricle	-	-0.4	2.3	-5.3	4	0.152	1	1.8	-2	5.4	0.009

**Table S3.** Summary statistics of bias in the mean uptake in PET<sub>AtlasAC</sub> and PET<sub>ZTEAC</sub> in all 30 static PET acquisitions averaged over all VOIs. These data are also visualized in Fig. 2 in the main manuscript. Please note that the VOIs in the cerebellum had to be excluded in 3 subjects (6,7,21).

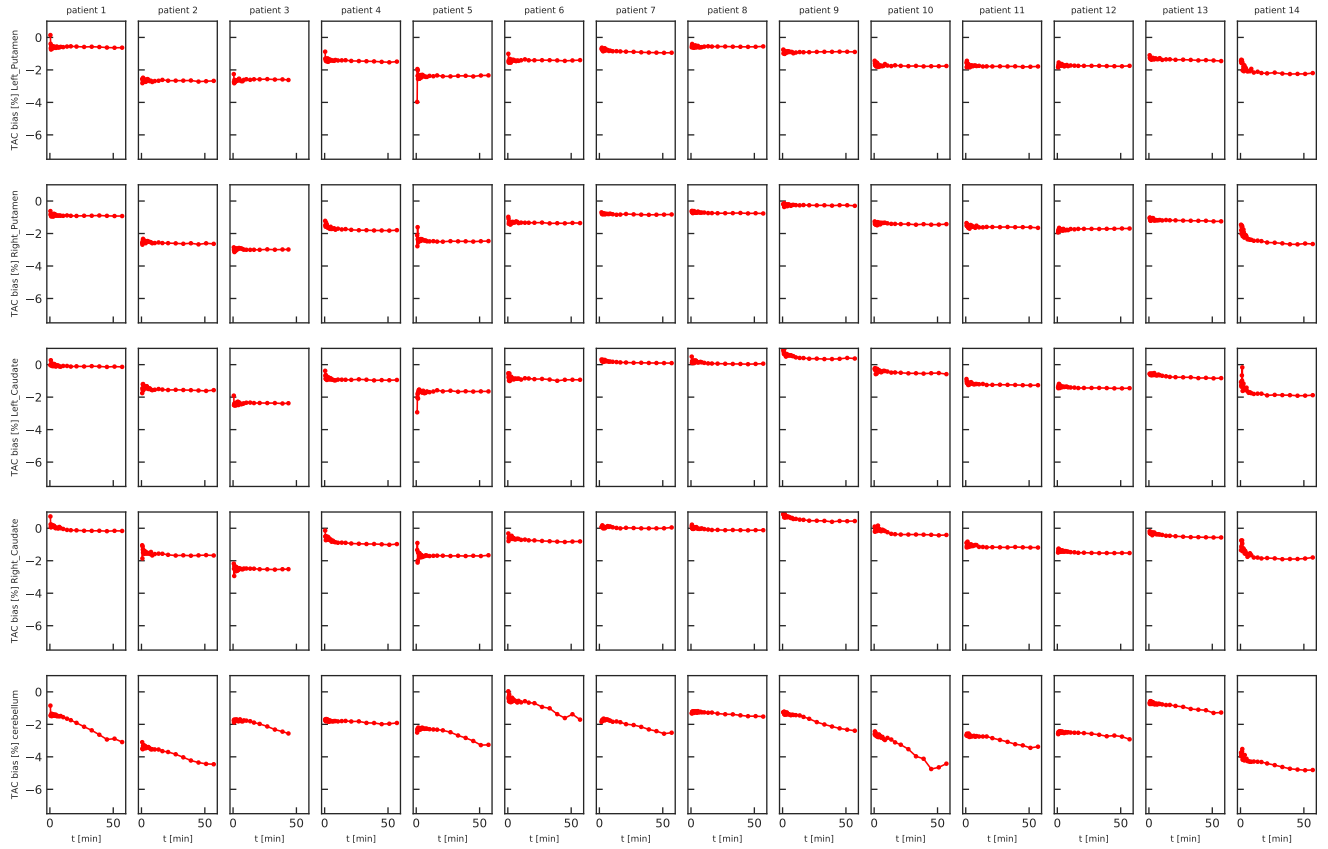
subject	bias in PET <sub>AtlasAC</sub> [%]					<i>p</i>	bias in PET <sub>ZTEAC</sub> [%]					<i>p</i>
	mean	sd	min	max			mean	sd	min	max		
1	-0.7	3	-7	4.9	0.056		1.7	1	-0.8	3.5	<0.001	
2	0	2.5	-7.3	6.6	0.835		2.9	1.8	-1	7.6	<0.001	
3	-0.8	3.1	-6	6.5	0.014		-0.3	1.1	-2.7	2.5	0.02	
4	0.7	2.8	-4.1	7.1	0.273		-1.7	1.2	-4.3	1.9	<0.001	
5	-0.4	2.7	-4.8	7.6	0.02		-0.9	1.2	-3.6	2.3	<0.001	
6	0.6	2.7	-3.7	8	0.601		0	1.5	-3.4	3.2	0.952	
7	1.6	2.3	-3	7.2	<0.001		-0.7	1.4	-3.7	3	<0.001	
8	-0.7	2.7	-6.6	5.7	0.045		-1.1	1.1	-4.7	1	<0.001	
9	0.1	3.2	-4.6	7.5	0.602		-1.6	1.8	-8	0.4	<0.001	
10	-2.9	1.8	-6.5	2.5	<0.001		-2.4	0.7	-4.2	-0.9	<0.001	
11	-4	2.8	-9.9	2.1	<0.001		-1.5	1	-3.6	0.8	<0.001	
12	0.8	3.3	-5.2	9.5	0.27		0.6	1.1	-2.3	2.5	<0.001	
13	-0.2	2.5	-4.7	5.2	0.318		-0.4	1.1	-3.5	3.3	<0.001	
14	-1.6	3.1	-6.3	6.5	<0.001		0.6	0.7	-1.3	3.4	<0.001	
15	1	3	-3.7	8.1	0.095		2.1	1.3	-0.7	5.9	<0.001	
16	-1.6	2.7	-7.9	3.8	<0.001		0	0.9	-2	2.9	0.733	
17	0.2	2.6	-4.4	6.8	0.813		0.6	0.9	-2	3.6	<0.001	
18	2.7	3.1	-1.8	10.2	<0.001		2.6	1.1	0.6	6.8	<0.001	
19	4	4.2	-3.3	13.9	<0.001		0.5	1.3	-1.8	5.7	<0.001	
20	2.4	2.6	-3.3	8.7	<0.001		1.1	1	-1.7	4.5	<0.001	
21	3	4.3	-2.4	16.3	<0.001		1	1.8	-2.8	6.9	<0.001	
22	4.5	3.9	-1	16.5	<0.001		2.7	1.6	-1.9	7	<0.001	
23	-0.6	3.7	-6.8	7.7	0.054		-0.9	1.1	-3.2	3.3	<0.001	
24	-7.8	5.6	-31.6	-1.2	<0.001		0.1	1.2	-2.6	2.5	0.878	
25	-2.5	4	-9.3	7.4	<0.001		-1.6	1.1	-4.7	0.9	<0.001	
26	-3.2	3.6	-9.6	7.6	<0.001		-2.2	1.4	-5	1.5	<0.001	
27	1.6	3.5	-3.3	9.7	0.001		1.2	0.9	-0.4	4.4	<0.001	
28	-3.8	4.6	-12.2	4.6	<0.001		-0.9	1.2	-3.7	2	<0.001	
29	-4.8	3	-11.6	1.5	<0.001		-2.5	0.7	-4.9	-1.2	<0.001	
30	1.3	4.6	-7.5	9.9	0.02		2.8	1	0.6	5.8	<0.001	

**Table S4.** Summary statistics of bias in the mean uptake in PET<sub>AtlasAC</sub> and PET<sub>ZTEAC</sub> in different anatomical regions averaged over all 30 static PET acquisitions. These data are also visualized in Fig. 3 in the main manuscript. Please note that the VOIs in the cerebellum had to be excluded in 3 subjects (6,7,21).

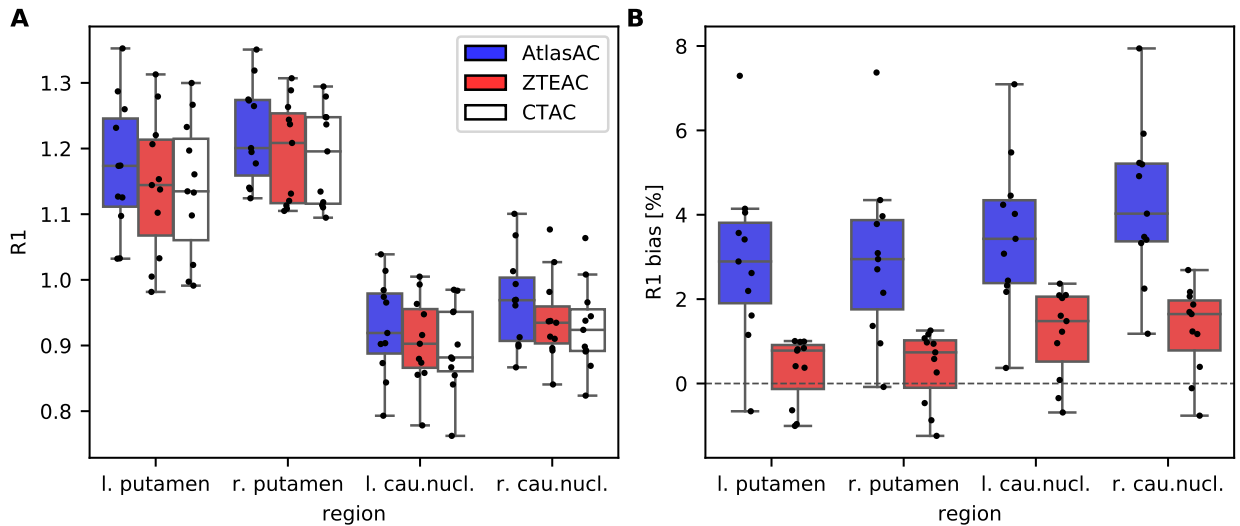
region	bias in PET <sub>AtlasAC</sub> [%]					<i>p</i>	bias in PET <sub>ZTEAC</sub> [%]					<i>p</i>
	mean	sd	min	max			mean	sd	min	max		
frontal cortex	0.3	5.6	-31.6	16.5	0.777		-0.1	2.1	-8	6.4	0.408	
temporal cortex	-3	3.5	-13.9	6.1	<0.001		-0.2	2.1	-5	7	<0.001	
parietal cortex	4	3.7	-6.8	14.3	<0.001		-0.4	1.7	-4.6	3.9	<0.001	
occipital cortex	0	2.7	-6.3	7	0.461		-1.2	1.7	-4.9	3.7	<0.001	
medial temporal cortex	-2.4	3	-17.2	2.8	<0.001		0.3	1.6	-3.3	3.5	0.151	
striatum	-0.3	2.7	-12.3	7.2	0.032		0.6	1.6	-3.1	4.2	<0.001	
thalamus	-0.1	2.2	-5.1	3.4	0.956		0.4	1.6	-2.4	3.5	0.177	
cerebellum	-4.2	2.7	-10.6	2	<0.001		0.6	2.4	-3.1	6.4	0.541	
cerebral WM	2.3	2.6	-4.5	7.6	<0.001		-0.3	1.6	-3.5	2.7	0.103	

**Table S5.** BP<sub>nd</sub> derived from PET<sub>CTAC</sub> and bias of BP<sub>nd</sub> in PET<sub>AtlasAC</sub> and PET<sub>ZTEAC</sub> for the eight [<sup>18</sup>F]PE2I acquisitions in the striatum using PET<sub>CTAC</sub> as the ground truth.

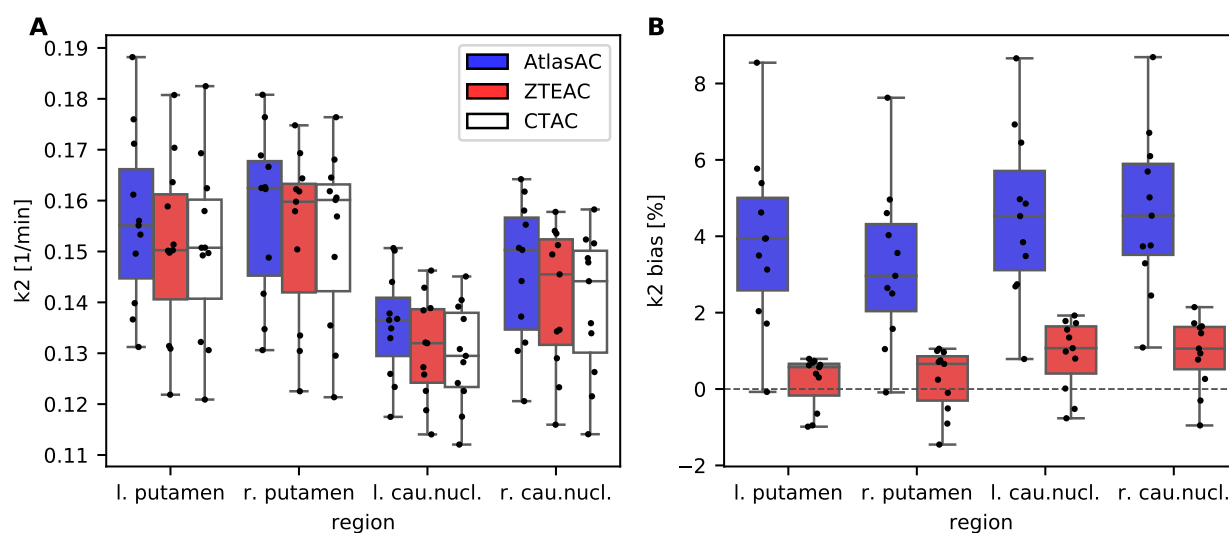
region	BP <sub>nd,CTAC</sub>		bias in BP <sub>nd,AtlasAC</sub> [%]					<i>p</i>	bias in BP <sub>nd,ZTEAC</sub> [%]					<i>p</i>
	mean	sd	mean	sd	min	max	mean		sd	min	max			
left caudate nucleus	3.3	0.5	5.0	2.6	1.0	9.4	0.003	2.0	1.5	-0.1	4.6	0.008		
left putamen	4.3	0.5	3.7	2.7	-0.4	8.7	0.008	1.0	1.1	-0.6	2.7	0.026		
right caudate nucleus	3.3	0.6	5.1	2.6	1.1	9.3	0.003	2.0	1.5	-0.3	4.8	0.006		
right putamen	4.3	0.4	3.0	2.5	-0.6	7.8	0.008	1.1	1.3	-0.8	3.1	0.033		
all combined	3.8	0.7	4.2	2.6	-0.6	9.4	<0.001	1.5	1.4	-0.8	4.8	<0.001		



**Figure S1.** Bias in time activity curves of PET<sub>AtlasAC</sub> (blue), and PET<sub>ZTEAC</sub> (red) with respect to PET<sub>CTAC</sub> in different regions for the 11 [<sup>18</sup>F]PE2I subjects.



**Figure S2.** (A) Boxplot of  $R_1$  values in four striatal regions of the 11 [<sup>18</sup>F]PE2I subjects obtained from PET<sub>AtlasAC</sub>, PET<sub>ZTEAC</sub>, and PET<sub>CTAC</sub>. (B) Bias in  $R_1$  estimation in PET<sub>AtlasAC</sub>, PET<sub>ZTEAC</sub> compared to PET<sub>CTAC</sub>.



**Figure S3.** (A) Boxplot of  $k_2$  values in four striatal regions of the 11  $[^{18}\text{F}]\text{PE2I}$  subjects obtained from  $\text{PET}_{\text{AtlasAC}}$ ,  $\text{PET}_{\text{ZTEAC}}$ , and  $\text{PET}_{\text{CTAC}}$ . (B) Bias in  $k_2$  estimation in  $\text{PET}_{\text{AtlasAC}}$ ,  $\text{PET}_{\text{ZTEAC}}$  compared to  $\text{PET}_{\text{CTAC}}$ .