

Quantib ND 1.5 REPORT



Patient information

Patient ID: [REDACTED]
 Name: [REDACTED]
 Age: 45.9 years old at latest exam
 Birth date: [REDACTED]
 Sex: F

Brain Volumetry

[REDACTED]	CSF	Brain	ICV
[REDACTED]	284 cm ³ 19.8% of ICV	1152 cm ³ 80.2% of ICV	1436 cm ³

Lobes Volumetry

[REDACTED]	Structure	Left	Right	Total
[REDACTED]	Frontal Lobe	176 cm ³ 12.2% of ICV	172 cm ³ 12.0% of ICV	348 cm ³ 24.2% of ICV
	Occipital Lobe	52 cm ³ 3.6% of ICV	47 cm ³ 3.3% of ICV	100 cm ³ 7.0% of ICV
	Parietal Lobe	116 cm ³ 8.1% of ICV	107 cm ³ 7.4% of ICV	223 cm ³ 15.5% of ICV
	Temporal Lobe	101 cm ³ 7.0% of ICV	111 cm ³ 7.7% of ICV	212 cm ³ 14.8% of ICV
	Cerebellum	60 cm ³ 4.2% of ICV	60 cm ³ 4.2% of ICV	121 cm ³ 8.4% of ICV

Hippocampus Volumetry

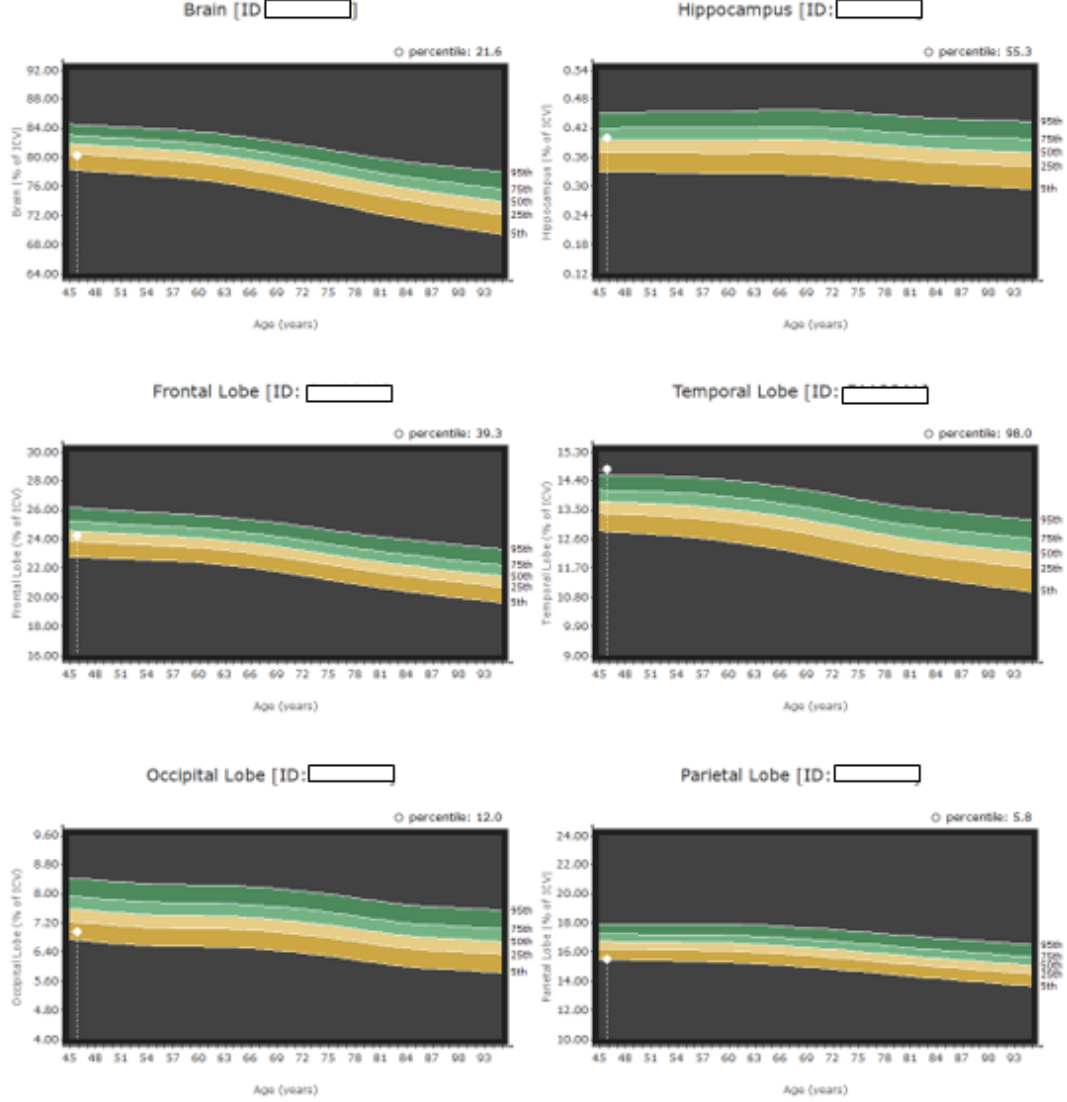
[REDACTED]	Structure	Left	Right	Total
[REDACTED]	Hippocampus	2.72 cm ³ 0.2% of ICV	3.02 cm ³ 0.2% of ICV	5.74 cm ³ 0.4% of ICV

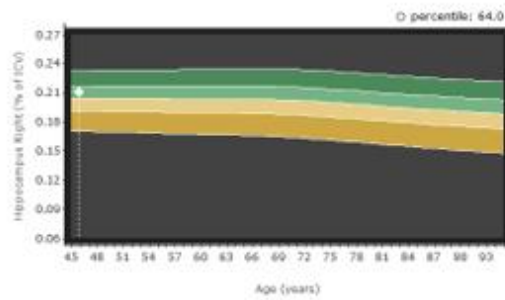
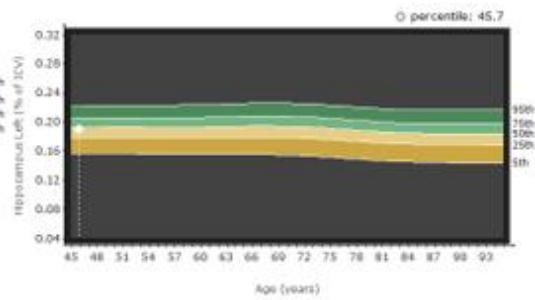
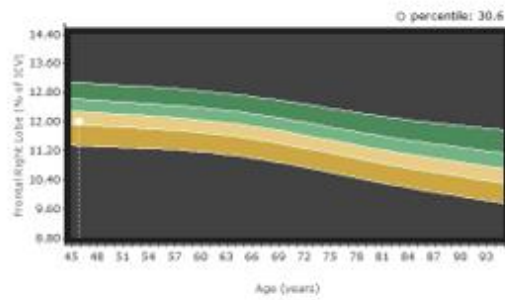
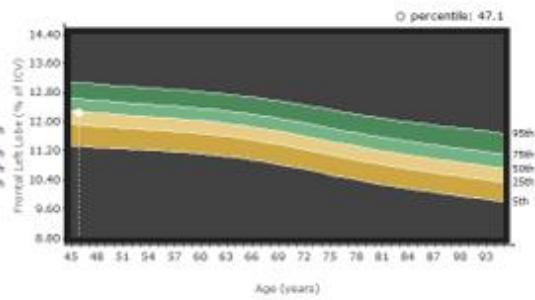
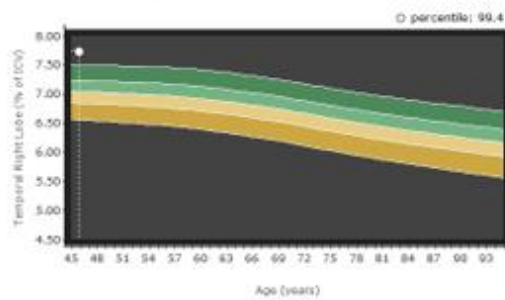
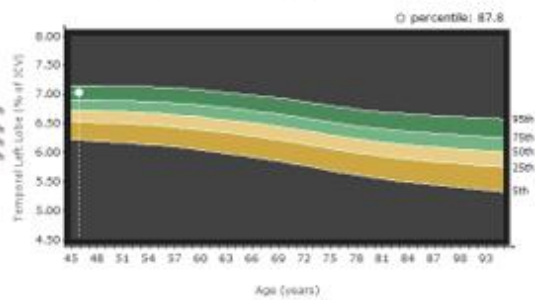
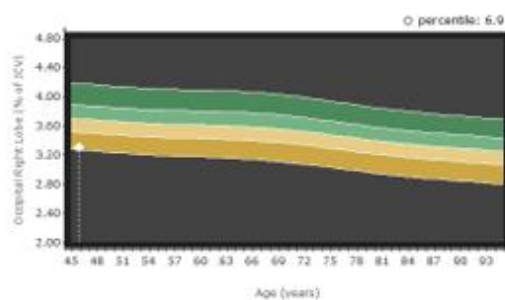
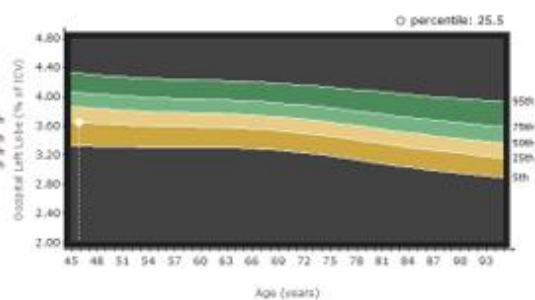
Images

Resources

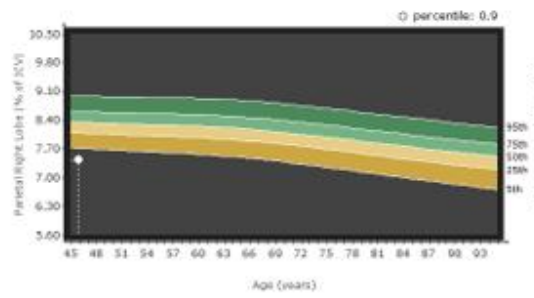
	Scan(s) used	Manufacturer	Field Strength
	[17:39] PACS 3DT1 std fMRI	Philips Medical Systems	3T

Reference Centile Curves

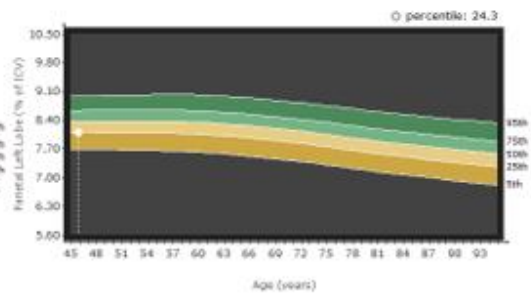


Hippocampus Right [ID: Hippocampus Left [ID: Frontal Right Lobe [ID: Frontal Left Lobe [ID: Temporal Right Lobe [ID: Temporal Left Lobe [ID: Occipital Right Lobe [ID: Occipital Left Lobe [ID: 

Parietal Right Lobe [ID:



Parietal Left Lobe [ID:



eTable 1. Number of scans that were made with an 8 channel or 32 channel head coil per visit number.

Visit number		1	2	3	4	5	6
<i>GRN</i>	8ch	31	27	21	0	0	0
	32ch	3	6	8	21	16	9
<i>MAPT</i>	8ch	5	2	2	0	0	0
	32ch	3	3	1	1	1	0
<i>C9orf72</i>	8ch	8	1	0	0	0	0
	32ch	6	10	8	2	0	0

Abbreviations: *C9orf72* = chromosome 9 open reading frame 72; *GRN* = progranulin; *MAPT* = microtubule-associated protein tau.

eTable 2. Overview of best fitting models per outcome

Outcome	Number of knots	Random effects
Total brain	2	Random intercepts
Frontal lobe	2	Random intercepts Random slopes
Frontal lobe left	2	Random intercepts Random slopes
Frontal lobe right	2	Random intercepts Random slopes
Temporal lobe	3	Random intercepts
Temporal lobe left	3	Random intercepts
Temporal lobe right	3	Random intercepts Random slopes
Parietal lobe	2	Random intercepts
Parietal lobe left	2	Random intercepts
Parietal lobe right	2	Random intercepts Random slopes
Occipital lobe	2	Random intercepts
Occipital lobe left	2	Random intercepts Random slopes
Occipital lobe right	2	Random intercepts
Cerebellum	2	Random intercepts
Cerebellum left	2	Random intercepts Random slopes
Cerebellum right	2	Random intercepts
Hippocampus	2	Random intercepts Random slopes
Hippocampus left	2	Random intercepts Random slopes
Hippocampus right	2	Random intercepts Random slopes
MMSE	n.a.	Random intercepts Random slopes
FAB	n.a.	Random intercepts
NPI-Q	n.a.	Random intercepts Random slopes
CBI-R	n.a.	Random intercepts
FRS	n.a.	Random intercepts Random slopes
Language	n.a.	Random intercepts
Attention	n.a.	Random intercepts Random slopes
Executive function	n.a.	Random intercepts

		Random slopes
Memory	n.a.	Random intercepts Random slopes
Social cognition	n.a.	Random intercepts
Visuoconstruction	n.a.	Random intercepts Random slopes

eTable 3. Summary output from mixed effects model with natural cubic splines.

	Coefficient	SE	DF	T-value	p-value
<i>Total brain</i>					
Intercept	82.85	0.74	132	112.79	<0.001
ns(Age, df = 2)1	-6.86	1.37	132	-5.01	<0.001
ns(Age, df = 2)2	-6.80	1.09	132	-6.25	<0.001
GroupMAPT	-0.82	1.06	52	-0.77	0.442
GroupC9orf72	-3.27	1.13	52	-2.91	0.005
SexFemale	-0.62	0.59	52	-1.05	0.300
Software_update5	-3.28	0.25	132	-13.14	<0.001
ns(Age, df = 2)1:GroupMAPT	-26.13	7.18	132	-3.64	<0.001
ns(Age, df = 2)2:GroupMAPT	-43.25	14.12	132	-3.06	0.003
ns(Age, df = 2)1:GroupC9orf72	3.02	2.65	132	1.14	0.256
ns(Age, df = 2)2:GroupC9orf72	2.28	2.64	132	0.86	0.390
<i>Frontal lobe</i>					
Intercept	25.72	0.34	132	76.72	<0.001
ns(Age, df = 2)1	-3.68	0.70	132	-5.23	<0.001
ns(Age, df = 2)2	-2.72	0.85	132	-3.20	0.002
GroupMAPT	-1.42	0.49	52	-2.90	0.005
GroupC9orf72	-1.84	0.47	52	-3.89	0.003
SexFemale	-0.49	0.26	52	-1.86	0.069
Software_update5	-1.46	0.12	132	-12.70	<0.001
ns(Age, df = 2)1:GroupMAPT	-14.55	3.20	132	-4.55	<0.001
ns(Age, df = 2)2:GroupMAPT	-27.22	6.00	132	-4.54	<0.001
ns(Age, df = 2)1:GroupC9orf72	2.36	1.34	132	1.76	0.081
ns(Age, df = 2)2:GroupC9orf72	0.89	1.80	132	0.49	0.623
<i>Frontal lobe left</i>					
Intercept	12.82	0.18	132	70.40	<0.001
ns(Age, df = 2)1	-1.94	0.43	132	-4.56	<0.001
ns(Age, df = 2)2	-1.17	0.35	132	-3.32	0.001
GroupMAPT	-0.75	0.27	52	-2.77	0.008
GroupC9orf72	-0.97	0.26	52	-3.74	0.001
SexFemale	-0.21	0.14	52	-1.49	0.143
Software_update5	-0.75	0.06	132	-12.32	<0.001
ns(Age, df = 2)1:GroupMAPT	-6.49	1.88	132	-3.45	0.001
ns(Age, df = 2)2:GroupMAPT	-12.10	3.30	132	-3.67	<0.001
ns(Age, df = 2)1:GroupC9orf72	1.18	0.80	132	1.47	0.143
ns(Age, df = 2)2:GroupC9orf72	0.24	0.75	132	0.32	0.751
<i>Frontal lobe right</i>					
Intercept	12.90	0.17	132	77.71	<0.001
ns(Age, df = 2)1	-1.78	0.33	132	-5.44	<0.001
ns(Age, df = 2)2	-1.58	0.47	132	-3.37	0.001
GroupMAPT	-0.69	0.24	52	-2.93	0.005

GroupC9orf72	-0.88	0.23	52	-3.77	<0.001
SexFemale	-0.28	0.13	52	-2.11	0.040
Software_update5	-0.73	0.06	132	-12.77	<0.001
ns(Age, df = 2)1:GroupMAPT	-8.09	1.51	132	-5.36	<0.001
ns(Age, df = 2)2:GroupMAPT	-15.24	2.97	132	-5.13	<0.001
ns(Age, df = 2)1:GroupC9orf72	1.18	0.63	132	1.88	0.063
ns(Age, df = 2)2:GroupC9orf72	0.63	1.00	132	0.64	0.526
<i>Temporal lobe</i>					
Intercept	13.84	0.20	129	67.69	<0.001
ns(Age, df = 2)1	-0.79	0.19	129	-4.10	0.0001
ns(Age, df = 2)2	-1.49	0.36	129	-4.13	0.001
GroupMAPT	-1.45	0.29	129	-5.05	<0.001
GroupC9orf72	0.15	0.29	52	0.52	0.609
SexFemale	-0.70	0.31	52	-2.24	0.030
Software_update5	0.01	0.18	52	0.08	0.941
ns(Age, df = 2)1:GroupMAPT	-0.44	0.06	129	-7.26	<0.001
ns(Age, df = 2)2:GroupMAPT	0.52	1.78	129	0.29	0.770
ns(Age, df = 2)1:GroupC9orf72	-29.17	7.54	129	-3.87	0.002
ns(Age, df = 2)2:GroupC9orf72	-45.30	12.61	129	-3.59	0.005
<i>Temporal lobe left</i>					
Intercept	6.63	0.11	129	62.99	<0.001
ns(Age, df = 2)1	-0.29	0.11	129	-2.65	0.009
ns(Age, df = 2)2	-0.50	0.20	129	-2.46	0.015
GroupMAPT	-0.39	0.16	129	-2.45	0.016
GroupC9orf72	0.16	0.15	52	1.04	0.304
SexFemale	-0.25	0.16	52	-1.54	0.130
Software_update5	0.07	0.08	52	0.87	0.389
ns(Age, df = 2)1:GroupMAPT	-0.11	0.03	129	-3.26	0.001
ns(Age, df = 2)2:GroupMAPT	0.60	1.03	129	0.58	0.562
ns(Age, df = 2)1:GroupC9orf72	-14.29	4.63	129	-3.09	0.002
ns(Age, df = 2)2:GroupC9orf72	-22.27	7.72	129	-2.89	0.005
<i>Temporal lobe right</i>					
Intercept	7.07	0.11	129	63.25	<0.001
ns(Age, df = 2)1	-0.27	0.14	129	-1.91	0.059
ns(Age, df = 2)2	-0.88	0.29	129	-3.04	0.003
GroupMAPT	-1.11	0.31	129	-3.62	<0.001
GroupC9orf72	0.17	0.16	52	1.10	0.277
SexFemale	-0.34	0.16	52	-2.10	0.041
Software_update5	0.01	0.09	52	0.11	0.916
ns(Age, df = 2)1:GroupMAPT	-0.33	0.03	129	-10.67	<0.001
ns(Age, df = 2)2:GroupMAPT	0.25	0.87	129	0.29	0.775
ns(Age, df = 2)1:GroupC9orf72	-15.92	3.98	129	-4.01	<0.001
ns(Age, df = 2)2:GroupC9orf72	-24.13	6.54	129	-3.69	<0.001

<i>Parietal lobe</i>					
Intercept	16.35	0.26	132	63.46	<0.001
ns(Age, df = 2)1	-1.34	0.40	132	-3.35	0.001
ns(Age, df = 2)2	-1.95	0.32	132	-6.17	<0.001
GroupMAPT	0.04	0.38	52	0.10	0.919
GroupC9orf72	-0.43	0.38	52	-1.12	0.267
SexFemale	-0.08	0.24	52	-0.34	0.738
Software_update5	-0.57	0.07	132	-8.31	<0.001
ns(Age, df = 2)1:GroupMAPT	-3.74	1.84	132	-2.03	0.044
ns(Age, df = 2)2:GroupMAPT	-5.19	3.46	132	-1.50	0.1357
ns(Age, df = 2)1:GroupC9orf72	0.36	0.83	132	0.44	0.6621
ns(Age, df = 2)2:GroupC9orf72	0.14	0.75	132	0.19	0.8487
<i>Parietal lobe left</i>					
Intercept	8.22	0.13	132	63.22	<0.001
ns(Age, df = 2)1	-0.65	0.19	132	-3.44	0.001
ns(Age, df = 2)2	-0.77	0.15	132	-5.13	<0.001
GroupMAPT	0.08	0.19	52	0.43	0.666
GroupC9orf72	-0.19	0.19	52	-1.00	0.324
SexFemale	0.01	0.13	52	0.10	0.923
Software_update5	-0.34	0.03	132	-10.50	<0.001
ns(Age, df = 2)1:GroupMAPT	-1.29	0.85	132	-1.51	0.132
ns(Age, df = 2)2:GroupMAPT	-1.52	1.59	132	-0.96	0.341
ns(Age, df = 2)1:GroupC9orf72	0.23	0.40	132	0.57	0.572
ns(Age, df = 2)2:GroupC9orf72	-0.21	0.35	132	-0.60	0.548
<i>Parietal lobe right</i>					
Intercept	8.06	0.16	132	50.35	<0.001
ns(Age, df = 2)1	-0.59	0.26	132	-2.29	0.024
ns(Age, df = 2)2	-1.27	0.29	132	-4.37	<0.001
GroupMAPT	-0.03	0.25	52	-0.13	0.897
GroupC9orf72	-0.22	0.24	52	-0.92	0.362
SexFemale	-0.06	0.12	52	-0.21	0.836
Software_update5	-0.21	0.04	132	-5.67	<0.001
ns(Age, df = 2)1:GroupMAPT	-1.77	0.97	132	-1.83	0.070
ns(Age, df = 2)2:GroupMAPT	-2.04	1.89	132	-1.08	0.283
ns(Age, df = 2)1:GroupC9orf72	0.11	0.48	132	0.22	0.824
ns(Age, df = 2)2:GroupC9orf72	0.54	0.61	132	0.88	0.379
<i>Occipital lobe</i>					
Intercept	7.90	0.18	132	43.30	<0.001
ns(Age, df = 2)1	-0.38	0.29	132	-1.32	0.189
ns(Age, df = 2)2	-0.60	0.25	132	-2.38	0.019
GroupMAPT	-0.17	0.27	52	-0.62	0.540
GroupC9orf72	0.08	0.26	52	0.32	0.753
SexFemale	-0.30	0.17	52	-1.70	0.095

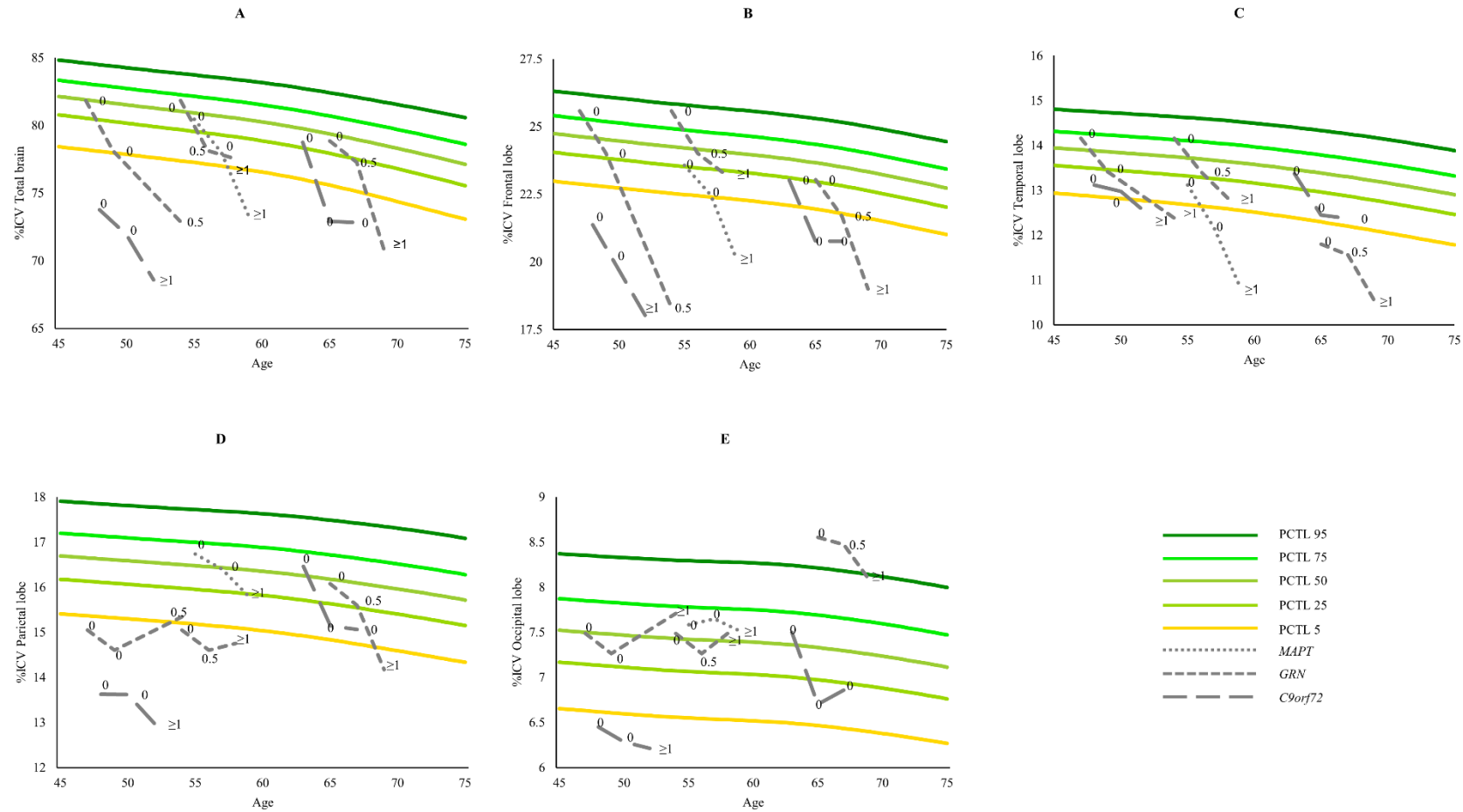
Software_update5	-0.46	0.04	132	-11.12	<0.001
ns(Age, df = 2)1:GroupMAPT	-0.45	1.19	132	-0.38	0.708
ns(Age, df = 2)2:GroupMAPT	-0.73	2.15	132	-0.34	0.735
ns(Age, df = 2)1:GroupC9orf72	0.73	0.58	132	1.25	0.212
ns(Age, df = 2)2:GroupC9orf72	-0.01	0.54	132	-0.02	0.983
<i>Occipital lobe left</i>					
Intercept	4.02	0.12	132	35.01	<0.001
ns(Age, df = 2)1	-0.04	0.19	132	-0.19	0.849
ns(Age, df = 2)2	-0.21	0.13	132	-1.62	0.108
GroupMAPT	-0.08	0.17	52	-0.48	0.635
GroupC9orf72	0.04	0.17	52	0.23	0.816
SexFemale	-0.12	0.10	52	-1.19	0.239
Software_update5	-0.27	0.02	132	-11.74	<0.001
ns(Age, df = 2)1:GroupMAPT	-0.40	0.69	132	-0.57	0.570
ns(Age, df = 2)2:GroupMAPT	-0.51	1.21	132	-0.42	0.676
ns(Age, df = 2)1:GroupC9orf72	0.27	0.36	132	0.76	0.447
ns(Age, df = 2)2:GroupC9orf72	0.029937	0.27	132	0.11	0.913
<i>Occipital lobe right</i>					
Intercept	3.88	0.09	132	45.78	<0.001
ns(Age, df = 2)1	-0.41	0.13	132	-3.13	0.002
ns(Age, df = 2)2	-0.35	0.10	132	-3.35	0.001
GroupMAPT	-0.15	0.13	52	-1.17	0.247
GroupC9orf72	0.01	0.13	52	0.05	0.959
SexFemale	-0.12	0.08	52	-1.52	0.136
Software_update5	-0.18	0.02	132	-7.78	<0.001
ns(Age, df = 2)1:GroupMAPT	0.30	0.61	132	0.50	0.618
ns(Age, df = 2)2:GroupMAPT	0.13	1.14	132	0.11	0.912
ns(Age, df = 2)1:GroupC9orf72	0.50	0.27	132	1.84	0.068
ns(Age, df = 2)2:GroupC9orf72	-0.07	0.25	132	-0.28	0.783
<i>Cerebellum</i>					
Intercept	8.92	0.16	132	54.80	<0.001
ns(Age, df = 2)1	-0.64	0.21	132	-3.00	0.003
ns(Age, df = 2)2	-0.80	0.17	132	-4.70	<0.001
GroupMAPT	0.40	0.24	52	1.62	0.111
GroupC9orf72	-0.73	0.23	52	-3.13	0.002
SexFemale	0.02	0.16	52	0.14	0.892
Software_update5	-0.12	0.04	132	-3.20	0.002
ns(Age, df = 2)1:GroupMAPT	0.59	0.94	132	0.63	0.530
ns(Age, df = 2)2:GroupMAPT	1.72	1.74	132	0.99	0.323
ns(Age, df = 2)1:GroupC9orf72	0.09	0.47	132	0.20	0.845
ns(Age, df = 2)2:GroupC9orf72	-0.26	0.40	132	-0.64	0.523
<i>Cerebellum left</i>					
Intercept	4.45	0.09	132	50.01	<0.001

ns(Age, df = 2)1	-0.22	0.13	132	-1.68	0.095
ns(Age, df = 2)2	-0.36	0.09	132	-4.25	<0.001
GroupMAPT	0.20	0.13	52	1.54	0.130
GroupC9orf72	-0.38	0.13	52	-3.01	0.004
SexFemale	0.02	0.09	52	0.19	0.848
Software_update5	-0.07	0.02	132	-4.01	<0.001
ns(Age, df = 2)1:GroupMAPT	0.34	0.51	132	0.67	0.507
ns(Age, df = 2)2:GroupMAPT	0.95	0.90	132	1.06	0.293
ns(Age, df = 2)1:GroupC9orf72	0.08	0.27	132	0.31	0.760
ns(Age, df = 2)2:GroupC9orf72	-0.14	0.19	132	-0.74	0.460
<i>Cerebellum right</i>					
Intercept	4.47	0.08	132	54.21	<0.001
ns(Age, df = 2)1	-0.39	0.11	132	-3.41	0.001
ns(Age, df = 2)2	-0.40	0.09	132	-4.39	<0.001
GroupMAPT	0.16	0.12	52	1.32	0.193
GroupC9orf72	-0.33	0.12	52	-2.80	0.007
SexFemale	0.01	0.08	52	0.11	0.913
Software_update5	-0.06	0.02	132	-2.88	0.005
ns(Age, df = 2)1:GroupMAPT	0.48	0.51	132	0.94	0.349
ns(Age, df = 2)2:GroupMAPT	1.17	0.94	132	1.24	0.218
ns(Age, df = 2)1:GroupC9orf72	-0.08	0.24	132	-0.33	0.745
ns(Age, df = 2)2:GroupC9orf72	-0.16	0.21	132	-0.74	0.464
<i>Hippocampus</i>					
Intercept	0.39	0.01	132	36.37	<0.001
ns(Age, df = 2)1	-0.00	0.02	132	-0.22	0.824
ns(Age, df = 2)2	-0.03	0.02	132	-1.25	0.214
GroupMAPT	0.01	0.02	52	0.82	0.417
GroupC9orf72	0.01	0.02	52	0.33	0.744
SexFemale	0.02	0.01	52	1.86	0.069
Software_update5	-0.03	0.00	132	-13.01	<0.001
ns(Age, df = 2)1:GroupMAPT	-0.03	0.07	132	-0.46	0.649
ns(Age, df = 2)2:GroupMAPT	0.08	0.13	132	0.65	0.518
ns(Age, df = 2)1:GroupC9orf72	-0.04	0.03	132	-1.29	0.200
ns(Age, df = 2)2:GroupC9orf72	0.01	0.05	132	0.22	0.829
<i>Hippocampus left</i>					
Intercept	0.19	0.01	132	37.50	<0.001
ns(Age, df = 2)1	0.00	0.01	132	0.17	0.863
ns(Age, df = 2)2	-0.01	0.01	132	-2.00	0.048
GroupMAPT	0.01	0.01	52	0.65	0.520
GroupC9orf72	0.00	0.01	52	0.46	0.651
SexFemale	0.01	0.00	52	2.17	0.035
Software_update5	-0.02	0.00	132	-11.02	<0.001
ns(Age, df = 2)1:GroupMAPT	0.00	0.05	132	0.02	0.982

ns(Age, df = 2)2:GroupMAPT	0.04	0.09	132	0.46	0.644
ns(Age, df = 2)1:GroupC9orf72	-0.03	0.02	132	-1.72	0.088
ns(Age, df = 2)2:GroupC9orf72	0.01	0.02	132	0.44	0.658
<i>Hippocampus right</i>					
Intercept	0.20	0.02	132	31.41	<0.001
ns(Age, df = 2)1	-0.01	0.01	132	-0.86	0.390
ns(Age, df = 2)2	-0.03	0.01	132	-3.90	0.002
GroupMAPT	0.00	0.01	52	0.27	0.792
GroupC9orf72	0.01	0.01	52	0.50	0.619
SexFemale	0.00	0.01	52	0.71	0.484
Software_update5	-0.01	0.00	132	-7.50	<0.001
ns(Age, df = 2)1:GroupMAPT	0.00	0.05	132	0.06	0.956
ns(Age, df = 2)2:GroupMAPT	0.02	0.10	132	0.15	0.879
ns(Age, df = 2)1:GroupC9orf72	-0.02	0.02	132	-0.77	0.441
ns(Age, df = 2)2:GroupC9orf72	0.01	0.02	132	0.60	0.548

Results are shown as a difference compared to *GRN* Mutation carriers. Abbreviations: SE = standard error; DF = degrees of freedom; ns = natural splines; *C9orf72* = chromosome 9 open reading frame 72; *GRN* = progranulin; *MAPT* = microtubule-associated protein tau.

eFigure 1. Atrophy rates of the cortical structures in the six converters compared to reference centile curves. Numbers in the figure indicate CDR® NACC FTLD global score. Abbreviations: %ICV = percentage of the total intracranial volume; PCTL = percentile; *C9orf72* = chromosome 9 open reading frame 72; *GRN* = progranulin; *MAPT* = microtubule-associated protein tau.



eFigure 2. Atrophy rates of the subcortical structures in the six converters compared to reference centile curves. Numbers in the figure indicate CDR® NACC FTLD global score. Abbreviations: %ICV = percentage of the total intracranial volume; PCTL = percentile; *C9orf72* = chromosome 9 open reading frame 72; *GRN* = progranulin; *MAPT* = microtubule-associated protein tau.

