

**Supporting Table S1. Participant listing of imaging measurements and estimates**

	D' cm <sup>2</sup> /s	Alpha	ADC cm <sup>2</sup> /s			<i>L<sub>mD</sub></i> μm			<i>L<sub>m</sub></i> μm		
			FS	AF=2	AF=3	FS	AF= 2	AF=3	FS	AF=2	AF=3
<b>NS</b>	<b>.03 (.01)</b>	<b>.67 (.19)</b>	<b>.05 (.02)</b>	<b>.05 (.01)</b>	<b>.05 (.01)</b>	<b>140 (30)</b>	<b>130 (30)</b>	<b>140 (30)</b>	<b>280 (130)</b>	<b>300 (130)</b>	<b>300 (130)</b>
NS-1	.04 (.01)	.73 (.18)	.04 (.01)	.04 (.01)	.04 (.01)	150 (30)	150 (30)	150 (30)	310 (130)	340 (130)	340 (130)
NS-2	.03 (.02)	.59 (.21)	.05 (.02)	.05 (.02)	.05 (.02)	120 (40)	120 (40)	120 (40)	240 (140)	250 (150)	260 (150)
NS-3	.03 (.01)	.67 (.20)	.04 (.02)	.04 (.01)	.05 (.02)	140 (30)	140 (30)	140 (30)	260 (120)	290 (130)	290 (120)
NS-4	.04 (.01)	.69 (.19)	.05 (.02)	.05 (.01)	.05 (.01)	150 (30)	160 (30)	150 (30)	300 (130)	340 (130)	300 (110)
<b>COPD</b>	<b>.09 (.04)</b>	<b>.67 (.20)</b>	<b>.08 (.02)</b>	<b>.08 (.02)</b>	<b>.08 (.02)</b>	<b>190 (50)</b>	<b>190 (50)</b>	<b>190 (50)</b>	<b>560 (240)</b>	<b>570 (250)</b>	<b>580 (250)</b>
COPD-1	.12 (.05)	.51 (.24)	.10 (.02)	.10 (.02)	.10 (.02)	170 (60)	150 (60)	150 (60)	430 (270)	410 (270)	420 (270)
COPD-2	.08 (.03)	.76 (.18)	.08 (.02)	.08 (.02)	.08 (.02)	210 (50)	220 (50)	220 (50)	650 (240)	710 (250)	700 (230)
COPD-3	.08 (.03)	.69 (.21)	.07 (.02)	.07 (.02)	.07 (.02)	190 (50)	180 (50)	180 (50)	530 (240)	520 (250)	530 (250)
COPD-4	.09 (.05)	.63 (.22)	.08 (.03)	.08 (.03)	.08 (.03)	180 (50)	180 (50)	180 (50)	500 (250)	480 (270)	510 (270)
COPD-5	.09 (.03)	.77 (.14)	.08 (.02)	.08 (.02)	.08 (.02)	220 (40)	230 (30)	230 (30)	690 (210)	730 (180)	730 (180)

FS=Fully Sampled k-space; AF=Acceleration Factor; D'=apparent MRI diffusivity estimate; Alpha=MRI-derived heterogeneity index *L<sub>mD</sub>*=MRI mean airway length scale estimate; *L<sub>m</sub>*=MRI mean linear intercept estimate. NS=Never-Smoker; COPD=ex-smoker with COPD; COPD-5=AATD patient