

SUPPLEMENTAL DIGITAL CONTENT

CT Exam Protocol and Quality Assurance

Thin section (< 1.0 mm) CT images were reconstructed using moderate and high spatial frequency kernels and a 512x512 matrix (Table S1). Tube-current modulation algorithms (e.g., “Smart mA”, “Auto mA”, “Care dose”, “Dose right”) were not implemented during the CT data acquisition. No additional image filters (e.g., “IQ enhance”, “Adaptive filtering”) or iterative reconstruction algorithms (“ASIR”, “IRIS”, “iDOSE”) were implemented in image reconstruction.

Two custom made phantoms (Bitca Lung Phantom, Bitca Ltd, Alberta, Canada) were scanned at all the clinical sites to determine if the CT scanners were similarly calibrated and created CT images that would result in similar quantitative results. The phantoms consisted of three carbon foam sections of different density that were in the range of the density of the lung. One CT image from each carbon foam section was evaluated based on the mean and standard deviation of predefined regions.

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Table S1. CT scanner models and protocol

Manufacturer	General Electric	Siemens	Philips
Model	LightSpeed 16 LightSpeed VCT	Sensation Cardiac Sensation 64 Definition Definition Flash	Brilliance 40
Acquisition			
Acquisition mode	Helical	Spiral	Helix
Energy (kVp)	120	120	120
Effective exposure (max), (mAs)	n/a	100 (125)	100 (125)
Tube current (max), (mA)	200 (250)	n/a	n/a
Gantry rotation time (sec)	0.5	0.5	0.5
Tube current modulation	off	Off	off
Pitch	1.375	1.100	1.100
Reconstruction 1			
Kernel	Standard	B31f	B
Thickness (mm)	0.625	0.750	0.900
Interval (mm)	0.625	0.500	0.450
Reconstruction 2			
Kernel	Bone	B46f	D
Image thickness (mm)	0.625	0.750	0.900
Interval (mm)	0.625	0.500	0.450

Table S2. Step-wise, multivariable linear regression against quantified emphysema (Perc950) that included CD4 cell count for all HIV-infected participants (n=510)

	Model 1			Model 2		
	Unstandardized coefficients	T-value	p-value	Unstandardized coefficients	T-value	p-value
Constant	-5.912	-14.12	<.0001	-5.840	-13.45	<.0001
CD4 cell count						
< 500 cells/ μ L	0.120	1.12	0.2624	0.097	0.88	0.3782
$\geq$ 500 cells/ μ L	0.000	.	.	0.000	.	.
Age	0.034	5.82	<.0001	0.033	5.43	<.0001
Race						
White	0.321	2.05	0.0408	0.313	1.94	0.0531
Black	0.298	1.60	0.1094	0.300	1.60	0.1113
Other	0.000	.	.	0.000	.	.
Smoking						
Current	-0.321	-1.14	0.2530	-0.348	-1.19	0.2356
Ever	-0.342	-1.21	0.2259	-0.393	-1.34	0.1826
Never	0.000	.	.	0.000	.	.
ART				0.008	0.06	0.9514

Table S3. Step-wise, multivariable linear regression against quantified emphysema (Perc950) that included CD4 cell count for all HIV-infected participants (n=510)

	Model 3			Model 4		
	Unstandardized coefficients	T-value	p-value	Unstandardized coefficients	T-value	p-value
Constant	-6.047	-13.38	<.0001	-6.072	-12.91	<.0001
CD4 cell count						
< 500 cells/ μ L	0.122	1.08	0.2794	0.121	1.03	0.3048
$\geq$ 500 cells/ μ L	0.000	.	.	0.000	.	.
Age	0.033	5.18	<.0001	0.035	5.31	<.0001
Race						
White	0.199	1.16	0.2460	0.180	1.03	0.3036
Black	0.141	0.71	0.4752	0.183	0.91	0.3643
Other	0.000	.	.	0.000	.	.
Smoking						
Current	-0.265	-0.89	0.3723	-0.298	-0.97	0.3339
Ever	-0.348	-1.17	0.2421	-0.407	-1.32	0.1886
Never	0.000	.	.	0.000	.	.
ART	-0.022	-0.17	0.8684	-0.136	-0.97	0.3326
Marijuana	0.284	1.88	0.0609	0.346	2.21	0.0276
Injection drug use	0.213	1.48	0.1398	0.196	1.34	0.1801
Bacteria pneumonia				-0.116	-0.86	0.3884
<i>Pneumocystis</i> pneumonia				0.241	1.30	0.1956

Table S4. Step-wise, multivariable linear regression against quantified emphysema (Perc950) that included HIV viral load for all HIV-infected participants (n=510)

	Model 1			Model 2		
	Unstandardized coefficients	T-value	p-value	Unstandardized coefficients	T-value	p-value
Constant	-5.807	-13.73	<.0001	-5.723	-12.97	<.0001
HIV viral load						
< 500 copies/ml	-0.056	-0.50	0.6200	-0.073	-0.59	0.5527
≥ 500 copies/ml	0.000	.	.	0.000	.	.
Age	0.033	5.55	<.0001	0.032	5.23	<.0001
Race						
White	0.341	2.18	0.0299	0.327	2.03	0.0426
Black	0.302	1.62	0.1053	0.304	1.62	0.1067
Other	0.000	.	.	0.000	.	.
Smoking						
Current	-0.325	-1.16	0.2474	-0.351	-1.20	0.2322
Ever	-0.324	-1.14	0.2537	-0.375	-1.27	0.2057
Never	0.000	.	.	0.000	.	.
ART				-0.012	-0.09	0.9282

Table S5. Step-wise, multivariable linear regression against quantified emphysema (Perc950) that included HIV viral load for all HIV-infected participants (n=510)

	Model 3			Model 4		
	Unstandardized	T-value	p-value	Unstandardized	T-value	p-value
	coefficients			coefficients		
Constant	-5.911	-12.91	<.0001	-5.958	-12.58	<.0001
HIV viral load						
< 500 copies/ml	-0.069	-0.55	0.5808	-0.045	-0.34	0.7306
≥ 500 copies/ml	0.000	.	.	0.000	.	.
Age	0.032	5.01	<.0001	0.034	5.18	<.0001
Race						
White	0.220	1.28	0.2002	0.198	1.13	0.2576
Black	0.149	0.75	0.4534	0.186	0.92	0.3572
Other	0.000	.	.	0.000	.	.
Smoking						
Current	-0.271	-0.91	0.3623	-0.312	-1.01	0.3120
Ever	-0.329	-1.10	0.2716	-0.398	-1.28	0.2009
Never	0.000	.	.	0.000	.	.
ART	-0.043	-0.30	0.7622	-0.150	-1.02	0.3091
Marijuana	0.271	1.79	0.0741	0.337	2.15	0.0321
Injection drug use	0.218	1.52	0.1305	0.201	1.37	0.1701
Bacteria						
pneumonia				-0.119	-0.89	0.3741
<i>Pneumocystis</i>						
pneumonia				0.267	1.45	0.1491

Table S6. Multivariable linear regression against quantified emphysema (Perc950) that included FEV1/FVC, age, and smoking status for all HIV-infected participants (n=510)

	Unstandardized		
	Coefficient	T-value	p-value
Constant	-2.993	-5.32	<.0001
FEV1/FVC (Post BD)	-3.396	-6.71	<.0001
Age	0.020	3.90	0.0001
Smoking			
Current	0.234	1.79	0.0739
Former	0.293	1.92	0.0553
Never	0.000	.	.

Table S7. Step-wise, multivariable linear regression against fibrosis-like changes in the lung (PercHAA) that included CD4 cell count for all HIV-infected participants (n=510)

	Model 1			Model 2		
	Unstandardized coefficients	T-value	p-value	Unstandardized coefficients	T-value	p-value
Constant	-2.880	-16.32	<.0001	-2.819	-15.72	<.0001
CD4 cell count						
< 500 cells/ μ L	-0.057	-1.26	0.2080	-0.045	-0.98	0.3263
$\geq$ 500 cells/ μ L	0.000	--	--	0.000	.	.
Age	-0.010	-4.15	<.0001	-0.008	-3.10	0.0021
Race						
White	0.118	1.00	0.3200	0.110	1.65	0.1006
Black	0.095	0.80	0.4230	0.033	0.43	0.6677
Other	0.000	--	--	0.000	.	.
Smoking						
Current	0.159	2.41	0.0165	0.106	0.88	0.3820
Ever	0.050	0.63	0.5259	0.087	0.72	0.4741
Never	0.000	--	--	0.000	.	.
ART				-0.193	-3.62	0.0003

Table S8. Step-wise, multivariable linear regression against fibrosis-like changes in the lung (PerCHAA) that included CD4 cell count for all HIV-infected participants (n=510)

	Model 3			Model 4		
	Unstandardized coefficients	T-value	p-value	Unstandardized coefficients	T-value	p-value
Constant	-2.798	-15.03	<.0001	-2.782	-14.48	<.0001
CD4 cell count						
< 500 cells/ μ L	-0.036	-0.78	0.4385	-0.059	-1.22	0.2226
$\geq$ 500 cells/ μ L	0.000	.	.	0.000	--	--
Age	-0.008	-3.21	0.0015	-0.009	-3.23	0.0014
Race						
White	0.117	1.65	0.0991	0.122	0.97	0.3339
Black	0.041	0.50	0.6184	0.085	0.67	0.5029
Other	0.000	.	.	0.000	--	--
Smoking						
Current	0.094	0.77	0.4409	0.096	1.35	0.1780
Ever	0.069	0.56	0.5737	0.036	0.44	0.6612
Never	0.000	.	.	0.000	--	--
ART	-0.166	-2.99	0.0030	-0.149	-2.61	0.0095
Marijuana	-0.010	-0.16	0.8760	-0.050	-0.78	0.4343
Injection drug use	-0.042	-0.70	0.4823	-0.049	-0.83	0.4081
Bacteria pneumonia				0.052	0.96	0.3375
<i>Pneumocystis</i> pneumonia				0.096	1.26	0.2088

Table S9. Step-wise, multivariable linear regression against fibrosis-like changes in the lung (PerCHAA) that included HIV viral load for all HIV-infected participants (n=510)

	Model 2			Model 3		
	Unstandardized coefficients	T-value	p-value	Unstandardized coefficients	T-value	p-value
Constant	-2.887	-15.85	<.0001	-2.876	-15.28	<.0001
HIV viral load						
< 500 copies/ml	0.050	0.99	0.3223	0.067	1.31	0.1924
≥ 500 copies/ml	0.000	.	.	0.000	.	.
Age	-0.007	-2.86	0.0045	-0.008	-2.98	0.0031
Race						
White	0.103	1.55	0.1229	0.107	1.53	0.1277
Black	0.030	0.39	0.6948	0.035	0.43	0.6705
Other	0.000	.	.	0.000	.	.
Smoking						
Current	0.106	0.87	0.3840	0.092	0.75	0.4510
Ever	0.075	0.62	0.5385	0.054	0.44	0.6620
Never	0.000	.	.	0.000	.	.
ART	-0.179	-3.20	0.0015	-0.144	-2.50	0.0130
Marijuana				-0.003	-0.05	0.9607
Injection drug use				-0.040	-0.68	0.4943

Table S10. Step-wise, multivariable linear regression against fibrosis-like changes in the lung (PercHAA) that included HIV viral load for all HIV-infected participants (n=510)

	Model 4		
	Unstandardized coefficients	T-value	p-value
Constant	-2.876	-14.90	<.0001
HIV viral load			
< 500 copies/ml	0.075	1.41	0.1607
≥ 500 copies/ml	0.000	--	--
Age	-0.008	-2.98	0.0031
Race			
White	0.123	0.98	0.3289
Black	0.067	0.53	0.5956
Other	0.000	--	--
Smoking			
Current	0.084	1.18	0.2383
Ever	0.031	0.38	0.7050
Never	0.000	--	--
ART	-0.125	-2.10	0.0369
Marijuana	-0.044	-0.68	0.4940
Injection drug use	-0.049	-0.82	0.4120
Bacteria pneumonia	0.052	0.96	0.3388
<i>Pneumocystis</i> pneumonia	0.081	1.08	0.2826

Table S11. Step-wise, multivariable linear regression against quantified fibrosis-like changes (PercHAA) that included FVC% and smoking status for all HIV-infected participants (n=510)

	Unstandardized		
	Coefficient	T-value	p-value
Constant	-2.790	-19.10	<.0001
FVC% (Post BD)	-0.004	-3.24	0.0013
Smoking status			
Current	0.126	2.25	0.0250
Former	-0.033	-0.49	0.6260
never	0.000	.	.