



Characterizing Functional Lung Heterogeneity in COPD Using Reference Equations for CT Scan-Measured Lobar Volumes

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This supplement provides the reader with results of additional analyses.

Results

e-Table 1. Difference in total lung and lobar volumes at TLC and FRC between males and females after adjusting for height

	Male vs. Female	p-value
TLC		
Total lung volume	935 mL	<0.0001
LLL	195 mL	<0.0001
LUL	271 mL	<0.0001
RLL	161 mL	<0.0001
RML	79 mL	<0.0001
RUL	229 mL	<0.0001
FRC		
Total lung volume	411 mL	<0.0001
LLL	57 mL	0.0003
LUL	138 mL	<0.0001
RLL	48 mL	0.003
RML	53 mL	<0.0001
RUL	115 mL	<0.0001

N=469 for TLC measures

N=419 for FRC measures

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e-Table 2. Difference in total lung and lobar volumes at TLC and FRC between Non-Hispanic Whites and African Americans after adjusting for height

	Non-Hispanic White vs. African American	p-value
TLC		
Total lung volume	783 mL	<0.0001
LLL	245 mL	<0.0001
LUL	108 mL	<0.0001
RLL	288 mL	<0.0001
RML	81 mL	<0.0001
RUL	61 mL	0.004
FRC		
Total lung volume	102 mL	0.09
LLL	57 mL	0.0001
LUL	-15 mL	0.47
RLL	64 mL	<0.0001
RML	14 mL	0.15
RUL	-18 mL	0.30

N=469 for TLC measures

N=419 for FRC measures

e-Table 3. Prediction Equations for Lobar Volume at Full Inflation – Derivation Cohort

Group	LLL volume	Model R ²
Non-Hispanic Whites (N=386)	= -1858.07 + 18.62(ht) + 202.87(male)	0.66
African Americans (N=83)	= -1533.29 + 15.10(ht) + 238.87(male)	0.68

Group	LUL volume	Model R ²
Non-Hispanic Whites (N=386)	= -1621.46 + 16.89(ht) + 272.67(male)	0.73
African Americans (N=83)	= -1143.89 + 13.30(ht) + 297.52(male)	0.79

Group	RLL volume	Model R ²
Non-Hispanic Whites (N=386)	= -1802.93 + 19.03(ht) + 190.67(male)	0.63
African Americans (N=83)	= -1824.95 + 17.65(ht) + 119.44(male)	0.62

Group	RML volume	Model R ²
Non-Hispanic Whites (N=386)	= -946.77 + 8.35(ht) + 72.33(male)	0.53
African Americans (N=83)	= -369.57 + 4.29(ht) + 127.25(male)	0.65

Group	RUL volume	Model R ²
Non-Hispanic Whites (N=386)	= -939.47 + 11.52(ht) + 229.91(male)	0.64
African Americans (N=83)	= -461.16 + 8.25(ht) + 239.53(male)	0.63

ht = height in centimeters, male = 1 for male and 0 for female

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e-Table 4. Prediction Equations for Lobar Volume at End of Normal Exhalation – Derivation Cohort

Group	LLL volume	Model R ²
Non-Hispanic Whites (N=345)	= -772.58 + 7.78(ht) + 48.76(male)	0.42
African Americans (N=74)	= -441.14 + 5.28(ht) + 110.84(male)	0.35

Group	LUL volume	Model R ²
Non-Hispanic Whites (N=345)	= -860.55 + 8.87(ht) + 121.78(male)	0.47
African Americans (N=74)	= -579.41 + 6.99(ht) + 204.09(male)	0.45

Group	RLL volume	Model R ²
Non-Hispanic Whites (N=345)	= -571.06 + 6.93(ht) + 53.23(male)	0.38
African Americans (N=74)	= -780.06 + 7.78(ht) + 48.89(male)	0.29

Group	RML volume	Model R ²
Non-Hispanic Whites (N=345)	= -469.00 + 4.36(ht) + 45.16(male)	0.38
African Americans (N=74)	= -291.76 + 3.06(ht) + 94.55(male)	0.56

Group	RUL volume	Model R ²
Non-Hispanic Whites (N=345)	= -485.86 + 6.04(ht) + 102.26(male)	0.41
African Americans (N=74)	= 40.06 + 2.83(ht) + 161.02(male)	0.31

ht = height in centimeters, male = 1 for male and 0 for female

*23/386 Non-Hispanic Whites and 5/83 African Americans did not have lobar volume measurements at the end of normal exhalation; 18/386 Non-Hispanic Whites and 4/83 African Americans were excluded because of total lung volume at FRC to total lung volume at TLC ratios that were outside the middle 95% of the distribution.



e-Table 5. Lobar volume and Percent Emphysema by GOLD Stage

Lobe	Volume (mL)	Percent Emphysema
LUL		
GOLD 2	1429 ± 393	5.4 (2.2 – 12.8)
GOLD 3	1550 ± 453	16.5 (6.3 – 28.2)
GOLD 4	1668 ± 447	27.1 (15.3 – 40.3)
LLL		
GOLD 2	1263 ± 384	3.6 (1.4 – 8.3)
GOLD 3	1362 ± 403	11.4 (4.2 – 21.8)
GOLD 4	1557 ± 452	22.3 (12.0 – 35.3)
RUL		
GOLD 2	1265 ± 377	4.7 (1.5 – 13.9)
GOLD 3	1406 ± 441	17.1 (5.8 – 31.4)
GOLD 4	1541 ± 442	29.3 (15.6 – 47.4)
RML		
GOLD 2	466 ± 164	5.3 (1.9 – 12.3)
GOLD 3	477 ± 177	13.1 (5.3 – 24.5)
GOLD 4	482 ± 197	19.8 (10.1 – 31.1)
RLL		
GOLD 2	1350 ± 382	3.3 (1.2 – 7.9)
GOLD 3	1400 ± 391	12.0 (4.2 – 21.8)
GOLD 4	1561 ± 436	24.3 (12.0 – 36.9)

Volumes presented as means +/- standard deviations. Percent emphysema presented as medians and interquartile ranges.

GOLD 1 (N=1069), GOLD 2 (N=727), GOLD 3 (N=395)



e-Table 6. Correlations between lobar volume and percent emphysema (A) and between percent predicted lobar volume and percent emphysema (B) by GOLD stage

Lobe	A	B
LUL		
GOLD 2	0.41, p<0.0001	0.46, p<0.0001
GOLD 3	0.37, p<0.0001	0.52, p<0.0001
GOLD 4	0.27, p<0.0001	0.39, p<0.0001
LLL		
GOLD 2	0.39, p<0.0001	0.35, p<0.0001
GOLD 3	0.43, p<0.0001	0.48, p<0.0001
GOLD 4	0.48, p<0.0001	0.48, p<0.0001
RUL		
GOLD 2	0.45, p<0.0001	0.52, p<0.0001
GOLD 3	0.40, p<0.0001	0.53, p<0.0001
GOLD 4	0.28, p<0.0001	0.44, p<0.0001
RML		
GOLD 2	0.20, p<0.0001	0.12, p<0.0001
GOLD 3	0.06, p=0.09	0.10, p=0.007
GOLD 4	0.16, p=0.002	0.17, p=0.001
RLL		
GOLD 2	0.33, p<0.0001	0.32, p<0.0001
GOLD 3	0.41, p<0.0001	0.45, p<0.0001
GOLD 4	0.40, p<0.0001	0.46, p<0.0001

Spearman correlation coefficients are presented
GOLD 1 (N=1069), GOLD 2 (N=727), GOLD 3 (N=395)